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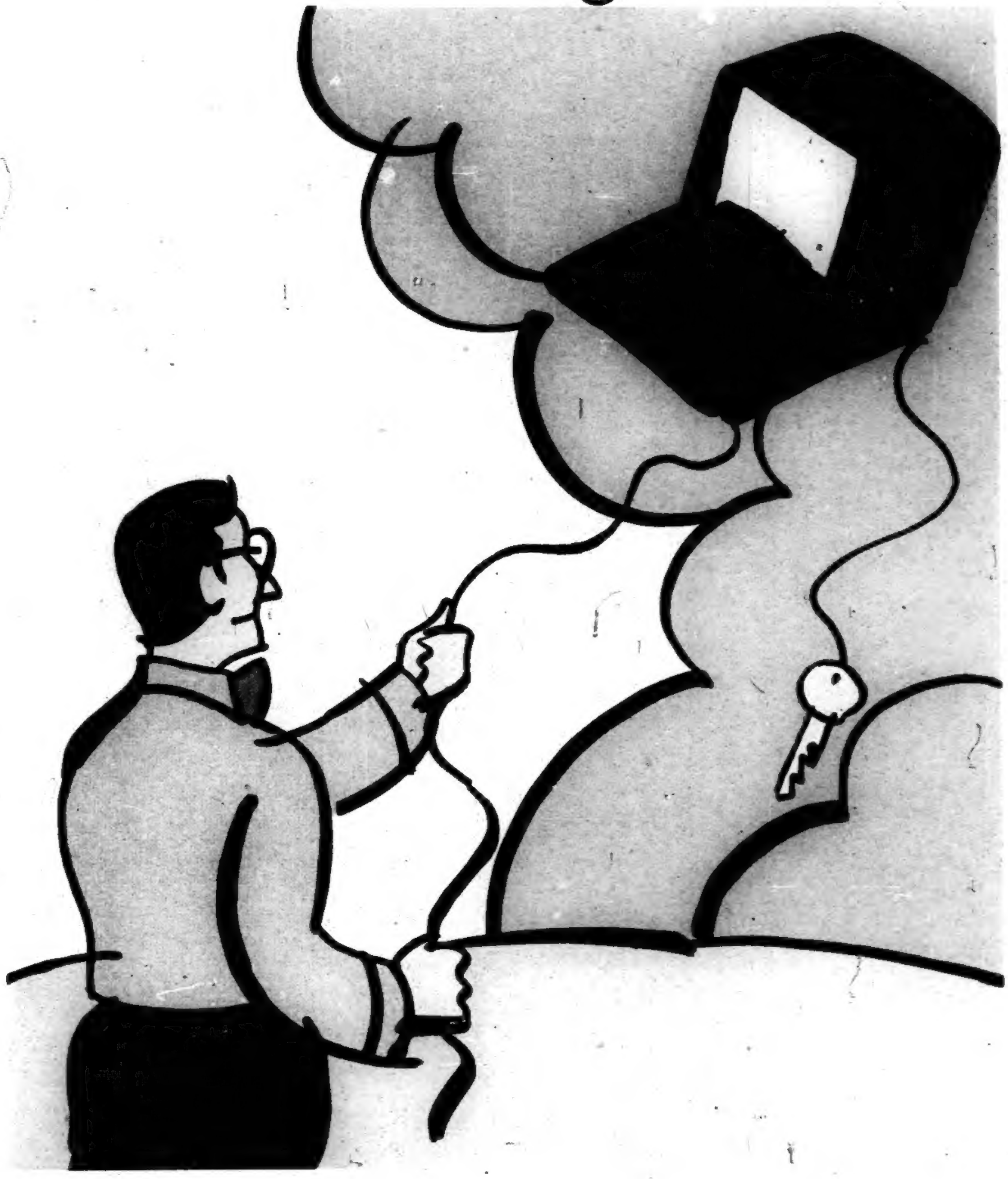
Harnessing Forces of Change



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CW Communications International News Service
Susan Blakeney, Director

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171 617/879-0700

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FORECAST '87

Harnessing Forces of Change

James Connolly and Douglas Barney	**DP takes on extra duty** *Development mirrors corporate growth as multilayer processing strategies take shape*	3
David Ludlum	**The information budget** *Competitive needs, not business climate, driving force in '87 information spending*	8
Elisabeth Horwitt	**Network pressure: Managers seek remedies** *Integrating resources is top concern*	13
Stanley Gibson	**IBM ties its shoelaces** *Loose lines have tripped Big Blue too often*	17
James A. Martin	**Microsoft pace gives life to alternatives** *Operating systems find niche opportunities*	21
David Bright	**Managers seek tools to exploit today's PCs** *MS-DOS with more memory, faster software top wish lists*	27
Jeffry Beeler	**HP battles doubts about systems, marketing skills** *Haunted by delays, corroded competitive edge*	30
Donna Raimondi	**Generic minis create market competition** *Software, services may tip the balance*	36
Clinton Wilder	**Marriages of strategy and economy** *Merger mania should keep the industry volatile into '87*	43
Charles Babcock	**Programmer power** *Expert systems-based front ends speed design process, enhance user satisfaction*	51
Ninamary Buba Maginnis	**Powers to be: Distributed data bases** *Taking address and filing troubles off end-users' minds*	55
Rosemary Hamilton	**Smokestack revival** *Rust belt manufacturers automate, integrate*	61
Mitch Betts	**U.S. turns inward to deal with challenge** *Government looks at business to place blame, repair deficit*	68

SECTIONS:

MICROCOMPUTERS/71
COMMUNICATIONS/73
SOFTWARE AND SERVICES/75
SYSTEMS AND PERIPHERALS/79
COMPUTER INDUSTRY/81

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DP takes on extra duty

Development mirrors corporate growth as multilayer processing strategies take shape

BY JAMES CONNOLLY
and DOUGLAS BARNEY

MIS strategies for this year and beyond are as varied as MIS professionals themselves.

But despite that variety, common threads — such as the addition of layers of computing, primarily departmental and micro-based systems to augment host systems, and the integration of those systems into an overall data processing environment — run through many organizations.

Many companies are counting more on minicomputers and microcomputers than on mainframes. For others, the strategy is to maintain centralization with minimal use of departmental or remote systems.

Often, the way that MIS is set up mirrors the way the company itself runs — centralized data centers in a headquarters-oriented company and decentralized computer operations in firms organized on business unit lines.

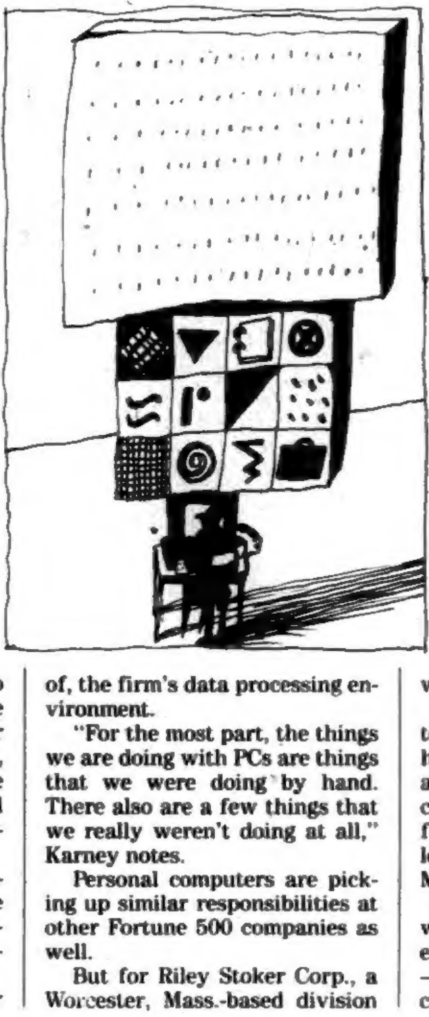
But when the data processing community is examined as a whole, the common element is the growth of processing at all three levels; the mainframe, the department and the desktop.

"Practically everything we do today involves some intelligence outside of our central computer complex," reports David Karney, vice-president for MIS at The Southland Corp., a Dallas-based operator of 8,000 7-Eleven convenience stores.

At Southland, the MIS department is shifting from a long-time centralized organization by moving its systems development operation out to business units.

In general, the nondata center intelligence that Karney mentions rests in approximately 800 personal computers. Southland does most of its computing on personal computers and IBM 3270-type terminals tied to IBM and Amdahl Corp. mainframes.

Much of what the microcomputers are doing for Southland can be classified as new applications and can be seen as an addition to, rather than a restructing of, the firm's data processing environment.



BLAIR THORNLEY ILLUSTRATION

"For the most part, the things we are doing with PCs are things that we were doing by hand. There also are a few things that we really weren't doing at all," Karney notes.

Personal computers are picking up similar responsibilities at other Fortune 500 companies as well.

But for Riley Stoker Corp., a Worcester, Mass.-based division of Ashland Oil, Inc., PCs are not the answer to expanding the number of computer users.

"We are very cost-conscious in the sense that we are not going to spend $3,000 for a PC and software when we can spend $600 and put a terminal on the Digital Equipment Corp. systems. We do have a controlled environment regarding the expansion of PCs, or regarding any sort of experimental-type computing," explains Michael J. Corby, MIS director for Riley Stoker.

Other companies assert that they, too, are not abandoning terminals despite the increasing number of PCs. Southland has replaced numerous dumb terminals with micros, particularly where users run word processing or spreadsheets and need mainframe access.

"But there is still a big population, probably 2,400 dumb workstations out there, because those applications are still being driven by a mainframe IBM CICS application," Karney says.

Like many others, a financial services firm whose MIS director asked not to be identified is adding a second tier between the personal computer and the mainframe. In this case, the second tier is a network of DEC minicomputers.

"This industry always has tended to be centralized, and we have been no exception. But we are looking to break away from centralized processing and away from IBM. Right now we are looking at DEC," explains the MIS director.

"There's a lot of function that we would like to be able to deliver to our branches and divisions — office automation, word processing and, when it is ready, im-

Southland decentralizes, shifts from systems to business units

Mainframe link remains, grows

DALLAS — The shift is to decentralization, particularly in systems development, at The Southland Corp., the operator of about 8,000 7-Eleven convenience stores.

"In the past, we had a very centralized organization, but we recently made a change in our systems development structure in which we shifted our applications development people to the business units," reports David Karney, vice-president of MIS at Southland.

While Southland transferred systems developers to business units such as its distribution operation, the company has not decentralized its main processing. The company expects its mainframe complex, where it runs IBM CICS on an IBM 3090 Model 200 and an Amdahl Corp. 5890 Model 300, to continue to grow.

However, mainframe growth will be slower than in the past, when capacity expanded by 40% per year. Much of the processing capacity growth — linked to new applications — will be in networked personal computers, with use of departmental processors growing more slowly than host or PC applications, according to Karney.

"We are following in the direction of a more decentralized organization with a more distributed systems design," Karney says.

"One of our primary objectives is to focus on the needs of the user community, and that was one of the things that led us to put the programmer function out there in the operating groups. It's easy to build accounting systems from a centralized, respect, but when we are talking about systems that support day-to-day operations and support mid-level managers, the programmers really have to be part of the business and understand the objectives," he notes.

At Southland, the shift to decentralized MIS is not a philosophical change. Rather, it is Karney's attempt to have the MIS operation mirror the business operation. "So, as the company changed from a centralized approach to an independent business unit approach, it became clear that data processing had to change to reflect that," he adds.

Under decentralization, developers work in business units using IBM 3270-type terminals tied to the host systems. Only one unit uses departmental systems for production work, the legal department with two Wang Laboratories, Inc. VS100 minicomputers.

In addition, Southland plans to use minicomputers in the distribution operation next year with the addition of processors, such as IBM System/38s, IBM 9370s or Digital Equipment Corp. VAXs.

Southland's Karney

Much of the growth in demand is being absorbed by microcomputers — predominantly IBM Personal Computers — and host systems. The new applications include an in-house-developed videotape rental system, which will allow district offices to use PCs to manage tape rentals at the 4,000 7-Eleven stores equipped with intelligent cash registers.

"With the level of intelligent workstation that is available today and the cost of some of those workstations, we are looking at new structures and systems to offload some activity that really is just a sophisticated data entry application with a lot of validation and testing," Karney claims.

But while the PC-based videotape rental system is under development, 95% of the PC work involves word processing or spreadsheet applications, such as Lotus Development Corp.'s 1-2-3.

Half of the 800 PCs use micro-to-mainframe connector boards. The company also has about 20 Novell, Inc. local-area networks, each linking 12 to 15 PCs in work groups. Karney expects work groups that need communication capabilities will continue to use networks rather than departmental systems, largely because small groups do not justify the use of complex minicomputers that require more support than do networks.

Karney also expects the number of PCs to grow at the expense of dumb terminals, of which Southland now uses about 2,400. He says PCs, rather than 3270s, are being used by people who need tools such as spreadsheets. In addition, Southland will redesign some of its CICS applications during the next few years to offload some mainframe applications to personal computers.

For the average user, the personal computer will continue to be a "vanilla" IBM PC. More sophisticated users and applications, including the videotape rental application, will require the most powerful PC Southland can find.

Offloading applications will not, however, mean a reduction in the mainframe work load, Karney warns. Even as applications are taken off the mainframe, the growth of PC-based applications generates so many files that mainframes will be needed to maintain the data bases.

Because of that, Karney expects disk storage to continue to grow at about 35% per year. "We will still use the central site as a way to pull everything together, so I think we will keep growing the data storage requirements here at the central site quite a bit," he says.

J. C.

Continued from page 3

age. There are a lot of things like that that we don't want to burden our telecommunications network with if we don't have to," he adds.

He says he expects a limited number of general business applications can be migrated to the VAXs, at least for preliminary processing. But he notes that systems and program development will continue to be done in the data center, which will house both IBM and DEC equipment.

But for Tenneco, Inc.'s only oil refinery, departmental systems are not part of the overall strategy.

The refinery uses an IBM 4381 mainframe as the cornerstone of its data processing, relying on terminals and some 20 PCs tied to the mainframe for its end-user computing, according to Warren V. Camp, supervisor of information services for the refinery operations of Tenneco Oil Process and Marketing, a division of Tenneco, Inc. "We are mainly satisfied with our current computer configuration," Camp says.

Even firms that are becoming less centralized than Tenneco report that their mainframe configurations will not shrink. Despite the proliferation of microcomputer networks and minicomputers, those companies expect demands on mainframes to grow — not as fast as the 40% annual growth of recent years, but grow nonetheless.

"Our production systems are still in place and will stay there. What all of this might mean is that we don't grow as rapidly as we have, but, no, it won't reduce it [growth]," the financial services firm's MIS director says. "One thing that is important to remember is that most of these applications weren't being done before or were being done manually. So it's not a case of us throwing out IBM in favor of DEC. The DEC stuff really augments the IBM equipment."

The addition of departmental systems and the influx of microcomputers increase the need to integrate systems.

For Riley Stoker's Corby, that entails eliminating pockets of information. For others it simply means letting machines talk to each other.

The strategies for integrating machines are as varied as the machines themselves. For some, a terminal attached to host or departmental processors is integration. Others stress micro-to-mainframe links, and still others push for departmental systems that tie PCs to mainframes. Just as often, however, firms mix and match all these approaches to meet the variety of user needs.

For Riley Stoker, departmental computing and networking are expected to be fundamentally intertwined. "We may eventually get to localized computing environments where a Microvax may sit in a department, and in order to make that work, that Microvax might be the guardian of the data needed for that department," Corby says. "In addition, through the networking capability, any data that is of interest to other departments would be obtainable through the network."

The Tenneco refinery has a different integration strategy for its 20 or so PCs. "The majority of them are tied into the mainframe. They are just micro-to-mainframe right now," Camp says.

And for Southland, integration takes on a variety of meanings. The firm not only has an IBM Systems Network Architecture network connecting 350 business offices to the firm's Dallas headquarters but next year will have some 4,000 7-Eleven stores on-line to PCs in district offices and connected via IBM 3274 controllers to Dallas to support a new videotape rental service.

Despite the varied means toward the integration goal, it is clear that the addition of computing power and the rising number of end-users make integration a necessity and the MIS manager a prerequisite.

Departmental systems

Capacity expansion

Type	Computing Capacity Index		
	1986	1991	Average Annual Growth Rate
Remote Mainframes Dumb Terminals	.25	.6	19%
▨ Micro Mainframes	.25	1.5	43%
▨ Departmental Mini or Supermicro			
▨ PC-Based LAN			
Stand-Alone Micro	.5	.9	12%
Total MIPS Index	1	3	25%

▨ Departmental Systems

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Pockets of information: Simple goal, complex task

For Riley Stoker Corp. MIS director Michael J. Corby, the goal is simple: Eliminate pockets of information.

But as simple as it may sound, achieving that goal will involve a radical restructuring of the firm's data processing environment, including a new networking strategy and an almost complete overhaul of the firm's existing Digital Equipment Corp. VAX software.

Much of the work has been completed. Already the manufacturer of steam-generating and fuel-burning equipment has introduced a local-area network (LAN) to service a small number of personal computers, and it has tied that LAN into its larger DEC systems through Ethernet.

PCs double as terminals

PCs that are not part of the LAN are far from isolated, but instead double as terminals off the VAX.

"We are going with the Decserver concept so we can hook the terminal up to Ethernet, and they can have access to any or several of the systems available.

"We have also done that with our PC LAN. It is also hooked up to Ethernet so there is the file exchange capability between the VAX systems and the PC," Corby says.

The company has also relegated its 4-year-old DEC VAX 11/785 to the role of a large file server and has connected nine of its recently installed Microvax computer-aided design workstations to the VAXs and the LAN.

"The VAX 11/785 is kind of a hub and acts as an archiving as well as processing machine," according to Corby.

Information base

That is just the beginning. "We are going to build on the concept of providing a common information base, and we are going to do that in the next year more in the software than in the hardware," Corby says.

"Right now our applications software has seemed to have gone the way that the hardware did in the past in that we had information which was not accessible on a corporatewide basis, Corby says.

"It often was replicated, and when you would try to compare it with something that was supposed to be equal, it wasn't," Corby says. The solution, he concludes, is to replace "most of our general business software."

Corby is confident that the already installed hardware provides a suitable base for the new software strategy.

"We are going to use that network of hardware that we have built, in order to deliver the new software and the new information to the hands of the end users," Corby says.

Besides the new software, Riley is expected to implement an ambitious networking strategy within the next few years. One aspect of the networking strategy is said to involve communications with remote sites.

Riley's Corby

"We are planning to do a remote access network with some of our field sales offices, and they will be doing document interchange on a remote basis with PCs.

"It is basically a functional replacement for things like telex and overnight mail," Corby says.

Voice and data

Far more impressive is the plan that may involve the combination of voice and data.

"We are moving to a new building, and we will be restructing the way our data interchange takes place over the network," Corby says.

"We would obviously like to — if the technological developments can happen in time — develop a more close-knit interaction between our voice and data network, which would allow us to transmit through a single cable or a single fiber all of our internal and external voice and data."

D. B.

Sticking to their mainframe guns

Oil refinery says big central unit easier to manage

While many organizations are installing departmental systems to fill the gap between micros and mainframes, Tenneco, Inc.'s only oil refinery is sticking to its mainframe guns.

The Tenneco refinery uses an IBM 4381 dual processor system running MVS, TSO and CICS. "We run all the general-type financial applications, such as payroll, accounts payable, general ledger, inventory and maintenance work order processing on that system," said Warren V. Camp, supervisor of information services for the refinery operations of Tenneco Oil Process and Marketing, a division of Tenneco, Inc.

Tenneco has no immediate plans to change. "Those applications are going to stay on the mainframe. It is easier to manage, and all those systems are used by people throughout the refinery. We also have users in Houston that use our system," Camp said.

Nor is the Tenneco refinery about to install a raft of departmental systems to service particular work groups. "As far as departmental type machines, I think we are either going to stick with PCs, or, if we need more processing, we will be looking at a PC networking type of thing," Camp said.

Tenneco's Camp

Of the refinery's 750 employees, some 300 currently use some type of computing device, either a terminal or personal computer, Camp stated. That number is expected to increase with terminals leading the charge, at least in the short term. "There are probably more terminals being added than PCs, but that is going to slow, and they will be pretty much even up in the future," Camp said.

The growth in the number of PCs is not expected to reduce the load on the firm's mainframe. "Those applications were just done manually before, and some were done on time-sharing," Camp said.

Despite increasing the number of applications running on PCs, the organization also expects to increase the use of its mainframe. "Where the application is just within a given department, such as drafting, we are looking at putting them on PCs. Where they have refinerywide application, we try to put them on the mainframe," Camp said.

D. B.

TREND-SETTERS

It is hard to talk about Judith Estrin without putting Bridge Communications, Inc. in the same breath. The 32-year-old cofounder calls the company her "pet project."

In the past year, Bridge has gone public, gleaning some $24 million; broadened its product line beyond an Ethernet focus to include a token-ring server; and dropped prices on some existing products.

Estrin is in the middle of it all. Her skills have led her to different roles, and now she is executive vice-president overseeing sales.

The past few months in that post have presented a new perspective for the engineer whose credits include software development at Zilog, Inc. and a short stint in marketing at Ungermann-Bass, Inc.

"I can play both roles, technological sell or high-level observation," she says. "For the time being, this position makes sense," she adds.

"Product planning is always a balance among users' requests, the general market trend and the technology/engineering-driven aspects," Estrin says.

Estrin says she has not lost her technological leanings. She argues that entrepreneur engineers can offer valuable perspective for corporate planning by really understanding the technology behind the products.

But she says she has also had to learn to broaden the engineer's typically focused, analytical approach.

"I still review most of the functional specs from a more passive point of view," she says. "My goal is to make Bridge succeed and do what needs to be done to make Bridge succeed. We can use my talents in different areas. It really depends on where the company is."

During the first few years for Bridge and other young firms, product development was the focus. Now, Estrin says she anticipates some years of maturing.

The year 1987 is one for smoothing the rough edges, and broadening features of existing products as opposed to focusing on a new technology, she says. However, she says she also expects 1987 to be "product-rich."

In 1987, Bridge's and Estrin's plans hinge on integration of personal computers into corporate networking, primarily linking microcomputers with minis and mainframes.

Estrin also says she expects network management to be an increasingly important factor, as networks grow.

"Users ask for better, faster, cheaper, more and more features," she says. "They want functionality, beyond simply connecting."

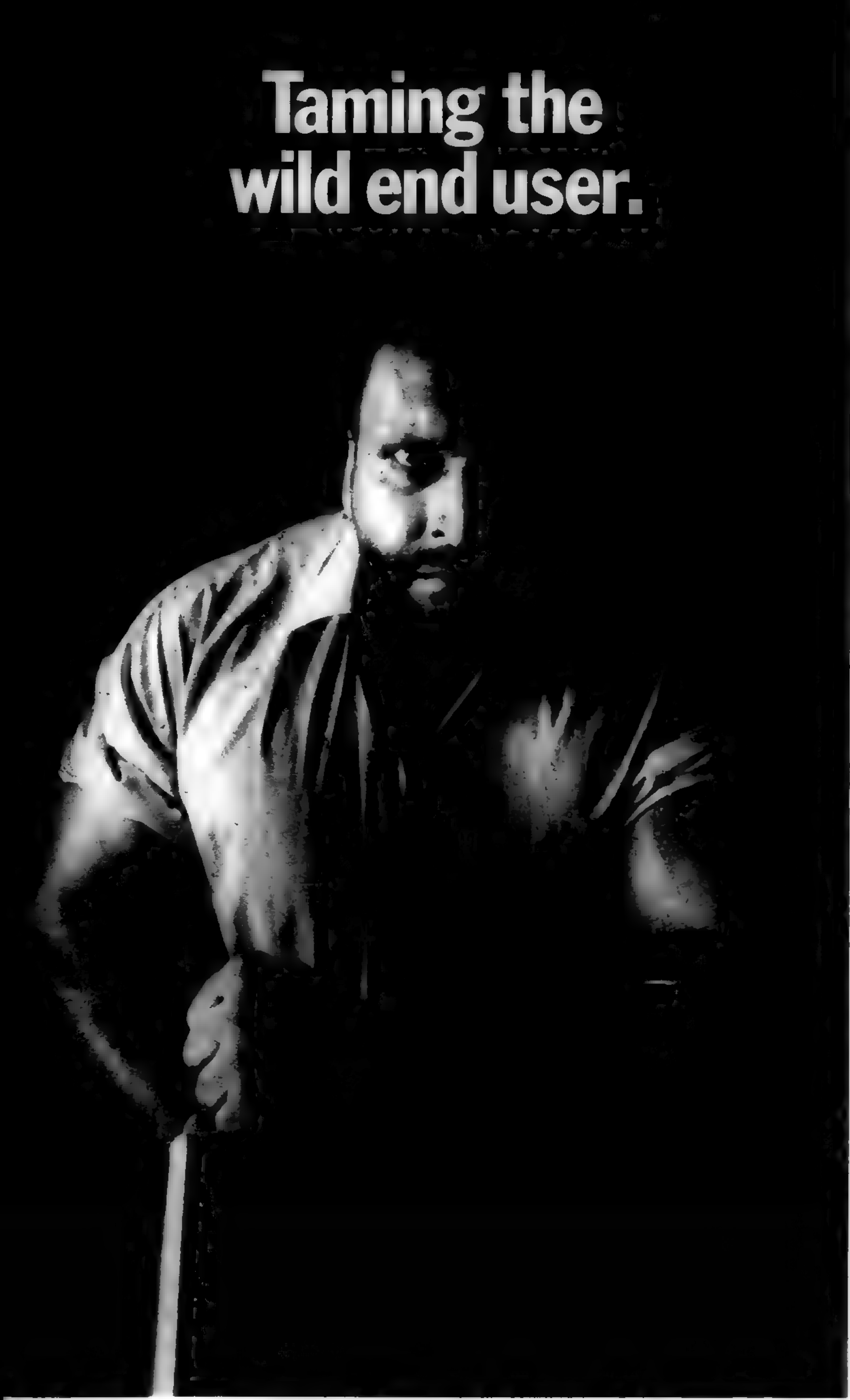
"I'm one of the most people-oriented" of the upper management, she says. She likes to supplement the usual human services by "instilling it from the top down. It's not enough to have a beer bust once a month."

She expects to oversee growth in sales and support next year, and is already adding to the technical support staff and customer services.

"Many of my personal goals are very closely aligned with Bridge," she says.

"I want to continue to be challenged and growing, and perhaps relax a little more, but then, that's my resolution every year."

PEGGY WATT



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The information budget

Competitive needs, not business climate, driving force in '87 information spending

BY DAVID LUDLUM

Experience has shown that spending on corporate information systems isn't necessarily related to general business conditions — whether for a company, an industry or the nation — and this year is expected to be no exception.

A few factors dominate the determination of information systems spending, with business conditions playing a minimal role, according to experts.

Most information systems spending by large corporations is determined by how executives view their long-term competitive needs, rather than by the business cycle, according to Theodore Freiser, president of John Diebold & Associates. The business cycle doesn't affect long-term views on how to be an effective competitor, he adds.

Paul Clermont, a principal with consulting firm Nolan, Norton & Co. in Lexington, Mass., points to the recent past in contending that information systems spending tends to bear no strong correlation to the business cycle. "An awful lot of it was concentrated in the early 1980s, when one could not say business was good," Clermont notes.

One reason for this is that spending often reflects past commitments to develop systems that take several years to complete, says John J. Connell, executive director of the Office Technology Research Group in Pasadena, Calif.

Information systems spending during a period of five years, for example, may reflect the trend in business conditions, but many of the factors determining spending levels for this year were put in place several years ago, according to Connell.

That is borne out by the experience of the Pillsbury Co. in Minneapolis, where the most important factors behind information systems spending are strategic needs, according to John Hammitt, vice-president for information management.

"It [spending] is driven by strategic concerns as opposed to short-term change in the business environment," Hammitt says. Pillsbury's information systems spending will rise substantially this year as a result of a strategic drive to make up for a lack of it in the past, Hammitt says.

ANTHONY RUSSO ILLUSTRATION

Companies, particularly in service industries, might intentionally boost information systems spending in the face of a weak business outlook, says Joseph Brophy, senior vice-president of data processing at The Travelers Corp. in Hartford, Conn.

"Business conditions could be worsening and there still would be an increase in information systems spending if that's viewed as a solution," Brophy says. The spending might be aimed at cutting costs or furthering initiatives in marketing or other areas, he adds.

Clermont of Nolan, Norton says he sees two principal forces driving a lot of information systems spending — the threat posed by such spending on the part of competitors, prompting companies to follow suit, and the entrepreneurial drive of those who manage information technology.

The financial services industry is one in which information systems is being aggressively driven by competition and entrepreneurial energy, according to William Anderson, senior vice-president and director of the Information Systems Division of Prudential-Bache Securities, Inc.

"For firms aggressively competing in the financial services business, I believe systems activity development is crucial at this time," Anderson says. A key element is competition to provide global services, which has prompted U.S. securities firms jockeying for a role in London's newly invigorated markets to double their organizations there in the last 20 months, he says.

Of course, not all information systems spending is strategically driven. At Pillsbury, Hammitt identifies three classes of spending — strategic; a more discretionary, tactically oriented component that includes such things as maintenance; and routine production, which is largely driven for efficiency in the short term and tends to show stable growth. (End-user computing, financed by users at Pillsbury, constitutes a fourth, somewhat separate, area.)

Strategic information systems spending is not without its own cycles, according to Diebold's Freiser. Companies tend to go through phases of growth and consolidation, he says. "There's only so much movement a company can absorb before it has to digest."

That does not mean pressure to cut costs is not placed on information systems departments due to business conditions, Freiser says. However, freezes or cuts can be accommodated without affecting long-term direction, in part through use of contracted services or by leasing rather than purchasing.

While technological innovation may provide opportunities for increased information systems spending, it is "an enabler rather than a driver," Clermont says. How much an individual organization responds to innovations depends on other factors — competitive threats and entrepreneurial drive — although in the absence of innovations there is likely to be less spending.

Observers tend to predict at least a modest increase in information systems spending this year and bigger boosts in financial services.

Clermont says Nolan, Norton sticks to a forecast of an average 20% yearly growth rate for the decade but that the increase for 1987 will be closer to the modest ones of the past two years than to those of the go-go early 1980s.

Connell of Office Technology Research calls for a more distinct departure. "I think you're already seeing a gradual increase in spending levels after a two-year hiatus," he says, calling for "a demonstrable improvement over 1986." The increase will not be across the board; rather, he predicts growth will remain strong for mid-range processors and weak for large systems and microcomputers.

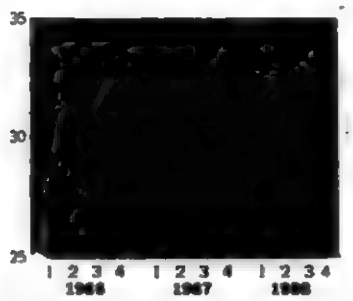
At the Travelers, this year's rate of increase hasn't been finalized but will rise for the first time in five years, Brophy says. Growth in 1986 was 12%, he adds.

At Prudential-Bache, 1987 will be "a very agressive growth year for data processing," Anderson says. "I would say I'm loooking at a 35% increase," not including voice and data communications, he concludes.

The Travelers' Brophy

Spending outlook

U.S. purchases of office and store machinery, including computers



Information provided by Data Resources, Inc. in Lexington, Mass.

FORE-CASTERS

"There is now a transformation in the industry from data processing to information processing. The difference is in the processing that takes place," says Charles Mathey, senior staffer with The Futures Group in Glastonbury, Conn. "From 1990 to 2000 we will be moving from information to knowledge — information that has been processed. Right now we're trying to make the jump from information to knowledge."

Mathey says there are already computers capable of transforming information to knowledge without human intervention. He cites an experimental neural network computer, programmed with 1,000 words and the required phonemes for English, that taught itself to read aloud. "It can do this in a couple of days and pronounces the new words properly," he says. However, he adds, in some ways it scares him.

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Mixed economic bag seen for U.S. industry

Oil firms, federal budgets shrink, insurance grows

BY JANET FIDERIO

Economic forecasts are not just for your chief financial officer. An MIS manager who is savvy regarding economic and business affairs may have a head start when it comes time to anticipate and respond to corporate information needs.

The following snapshot projections of growth in the insurance, banking, oil, government and manufacturing sectors have been gathered from financial analysts and economists.

These projections are one of many tools that MIS and other management professionals can use to anticipate capital spending on items such as major computer equipment.

Insurance. This year is going to be profitable for the insurance industry. Rick Samartino, a banking and financial services analyst at Argus Research Corp., a Manhattan-based independent investment advisory, says he sees "the continuation of strong growth in the 25% range for diversified insurance companies and 35% to 40% growth for the property/casualty companies." The property/casualty industry typically follows a cyclical growth pattern that is composed of three up years followed by three down years.

Strong 1987

According to Samartino, 1985 settled at the bottom of the cycle, followed by 1986 as the first up year. Samartino says, "1987 should be another strong year, while 1988 will probably start to peak."

Elizabeth Malone, an economist for Alex Brown & Sons, an investment banker and broker, also notes the growth cycle of property/casualty companies. Yet Alex Brown economists are projecting a higher, 40% growth in earnings in 1987 and 15% to 20% growth in 1988 for these firms.

"Property/casualty companies are in the middle of an up cycle," Malone says, "so growth is pretty robust right now."

Higher earnings, Malone claims, should translate into increased capital spending in this sector. Alex Brown economists also predict 12% to 15% growth in earnings for life insurance companies but, Malone says, this "trend could slow down in 1988 due to continued low interest rates."

Banking. Early forecasts in the banking area are calling for flat growth in 1987. According to Mark Biderman, senior vice-president at Oppenheimer & Co., a Manhattan-based investment research firm, bank earnings are going to be under pressure this year.

"Banks have been spending a lot of money in expansion, particularly in the capital markets area." Because of the lack of revenue growth, Biderman claims, banks "are going to be trimming their expenses," and capital spending for the likes of computer equipment will be down.

Argus Research's Samartino is also looking for a fairly flat, 3% to 5%, modest growth year for money-center banks. Robert J. Eggert, economist and editor of "Blue Chip Economic Indicators," a newsletter that reports the consensus positions of 51 forecasters, continues to see banking as expanding its operations and remaining a steady part of the economy in 1987.

Petroleum Industry. Oil industry forecasts for this year are mixed, but for the most part, economists predict another down and out year.

William Brunet, vice-president of research at the Advest Group, a Hartford, Conn.-based investment research firm, says that growth in the sector's income will depend on what happens to stabilize prices.

He projects that prices will rise and that the industry can look forward to a better year than last. OPEC may well be able to accomplish higher price levels, according to Brunet, who estimates prices should hang in the $18 to $19 a barrel range. "Prices last year were considerably lower than that," Brunet says.

Catherine Montgomery, vice-president of exploration and production at Merrill Lynch, Pierce, Fenner and Smith, Inc., says she sees a terrible year ahead for the oil industry.

According to Montgomery, the industry is basically in consolidation — it is in a no-growth mode.

"Oil companies have experienced a very sharp drop in their cash flow," Montgomery reports. Consequently, she predicts radically low capital spending industry-wide.

Sara Johnson, senior economist at Data Resources, Inc., a Lexington, Mass.-based economic forecasting firm, has noted that oil prices will stop declining in 1987 and that "the industry will hit bottom in late 1986 and then will begin to turn upward." Although she says she sees that annual averages in drilling and profitability might be lower next year, she adds that she anticipates some turnaround.

Federal Government. As for government spending, don't be surprised by another slow year in 1987. According to "Blue Chip" Editor Eggert, the government will continue with Gramm/Rudman budget cutting.

"The pulling back of the deficit will decrease the government's expenditures," Eggert says. "Military expenditures may continue to go up a shade, but the other types of government expenditures will be on the downward path," he adds.

Data Resources' Johnson reports that she also sees federal government spending as being a weak sector of the economy.

"The federal government's budget in fiscal 1987 will provide about a 1% increase in nominal spending, but after taking inflation into account, this means a drop in real services."

Economic forecast for 1987

Insurance is on the upswing. 1987 looks like it will be a boom year in the insurance industry with property-casualty companies leading the pack with projected growth in the 35% to 40% range.

Banking holds its own. Flat growth may mark the new year for the banking industry. Expansion continues along with modest growth.

Oil firms face hard times. Although industry prices may be on the rise, it will take awhile before these companies rebound.

Government budgets continue to dip. Gramm-Rudman budget cuts make their mark once again in federal spending. Look for government expenditures to be low.

Manufacturing's mixed bag. General expenditures for the coming year so far show a slight decrease. 1987 could be a hard year for companies that produce capital goods.

CW chart

Manufacturing. Due to the manufacturing industry's diversity, it is difficult to track general growth. One way to track trends in the sector, however, is to follow appropriations and expenditures.

According to Walt Arvin, an economist for The Conference Board, a New York-based research organization, the latest figures from The Conference Board's survey of the top 1,000 manufacturing firms show actual expenditures for the 1986 third-quarter project to "a 5.6% decrease from the previous quarter."

Appropriations in the third quarter showed a 1% increase from the prior quarter. Although these are 1986 figures, appropriations usually carry over half a year to a year.

What is holding these figures down, according to Arvin, are low expenditures and appropriations in petroleum, motor vehicles and chemical manufacturing. The economist adds that the survey also shows durable goods industries are outperforming the nondurables industries.

Data Resources' Johnson concludes that this year will be a tough one for businesses that produce capital goods, in that these companies will see their sales weakening as a result of tax reform.

Gray economic skies forecast for 1987

Four out of five economists surveyed are predicting a slow economy in 1987, and one is predicting a recession.

The "Blue Chip Economic Indicators" newsletter, which contains the concensus of 51 economists, projects an average real gross national product (GNP) forecast for 1987 of 2.5%. This consensus forecast dropped a full percentage point below the expected gross rate for 1987 witnessed just six months ago; last June the group projected an economic growth rate of 3.5%.

According to economist and "Blue Chip" Editor Robert J. Eggert, the first quarter of 1987 is expected to be the weakest period of the year, with a projected growth of just 2.1 %.

The "Blue Chip" concensus also predicts inflation will rise just 3.2%. The spread between the top 10 and the bottom 10 economists of this forecast, says Eggert, is narrow. "The top 10 say 3.8%, the bottom 10 say 2.4%, which normally suggests greater accuracy in the average."

GNP growth

Sara Johnson, senior economist at Data Resources, Inc., also projects real GNP growth will be at 2.5%, about the same as in 1985 and 1986. "The leading sources of growth will be exports next year," Johnson predicts. "Dollar depreciation should finally mark a rebound in exports that will in turn generate income and purchasing power from our consumers and businesses, but the weak sectors will be capital spending and federal government spending," Johnson adds.

Inflation, according to Johnson, will turn upward in 1987 because oil prices will no longer be declining. "During 1986 we realized the benefit from a 60% drop in crude oil prices. Those prices are now stabilizing and perhaps moving upwards."

Without that downward pressure on inflation, according to Johnson, the economy will see a higher inflation rate.

Economists Gerd-Uls Krueger and Walt Arvin of The Conference Board estimate the annual growth rate for GNP in constant 1982 dollars will be 2.1%. "We are not expecting a big turnaround in the economy," Krueger says. "To some degree we expect that the trade balance will improve but not dramatically. Forecasts that predict a higher GNP growth in 1987 predict a better improvement of the trade deficit in the U.S. economy."

The survey's lone economist in predicting a recession in 1987 is Jay Levy, of Levy Economic Forecasts, Inc., the Chappaqua, N.Y., publisher of "Industry Forecast."

"The only likely way to avert a recession is a big improvement in the balance of trade," Levy contends, which he thinks is unlikely.

"We expect some improvement," Levy asserts, "but not soon enough and not big enough."

J. F.

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	San Diego	Jan 8, Mar 3
	San Francisco	Dec 9, Jan 8, Feb 4, Mar 12
	San Jose	Jan 21, Feb 11, Mar [illegible]
CO	Colorado Springs	Jan 15
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	New York City	Dec 9, Jan 14, Jan 22, Jan 28, Feb 11, Feb 17, Mar 11, Mar 19, Mar 25
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	Syracuse	Dec 16, Mar 10
OH	Cincinnati	Jan 8, Feb 18, Mar 19
	Cleveland	Feb 3, Mar 3
	Columbus	Feb 4, Mar 4
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PA	Allentown	Mar 5
	Harrisburg	Feb 11
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Network pressure: Managers seek remedies

Integrating resources is top concern

BY ELISABETH HORWITT

Four managers who have extensive, ongoing responsibility for coordinating their companies' communications strategies during the next few years have all taken the risk of purchasing untested and/or unperfected products rather than waiting for vendors to come up with the perfect solution to their needs. Not all of the companies are on the leading (or bleeding) edge of networking technology, but all have often played the role of vendor guinea pig and have been forced to develop in-house whatever crucial pieces are missing.

Several of the firms discussed here have recently embarked on a new level of systems integration, part of the long-range goal of enterprise networking — making the widest possible range of corporate data and computing resources available to the greatest number of employees — using the minimum budget needed for the job.

▶ **WILLIAM FRIEL, vice-president and director of systems and data processing at J. C. Penney Co.**

The giant department store chain is principally concerned with finding better ways to manage, update and operate its extensive network, which consists of some 40,000 point-of-sale terminals, 30,000 dumb terminals and hundreds of personal computers as well as 700 IBM Series/1 Systems Network Architecture (SNA) gateways to IBM 3090 and 3080 mainframes and an assortment of other systems.

"Do we need peer-to-peer networking? Yes. Do we need distributed processing architecture? Yes. Are there software solutions now? No," Friel says.

J. C. Penney's current hierarchical SNA network "is based on a master-slave relationship, which means you spend a lot of time doing nonproductive polls, finding out if someone in a remote site wants to send," Friel says. In a peer-to-peer relationship, "one system just says to another, 'I want to send something, here it is,' " he adds.

IBM's peer-to-peer networking protocol, LU6.2, is "just a concept, like ISDN [Integrated Systems Digital Network]. It won't be here till 1990 or 1995,"

Continued on page 14

▶ **KENNETH JANKOWSKI, manager of network services at TRW Corp.**

Jankowski is struggling with the increasingly common problem of how to integrate customer premises equipment with a wide range of carrier telecommunications services while still maintaining control of networking resources and applications.

The company currently uses an internal communications system composed of AT&T System 85 PBXs and ESS switches that are linked together by dedicated T1 1.5M bit/sec. lines and AT&T's Electronic Tandem Network (ETN) software. During the next 12 months, TRW is replacing the ESS-ETN elements of its voice network with AT&T's Software Defined Network (SDN). The service's rate structure offers cost benefits to companies like TRW, which have multiple sites that need to communicate regularly. SDN also offers a multisite uniform numbering plan that TRW plans to integrate with its existing plan, Jankowski says.

SDN will support TRW's dial-

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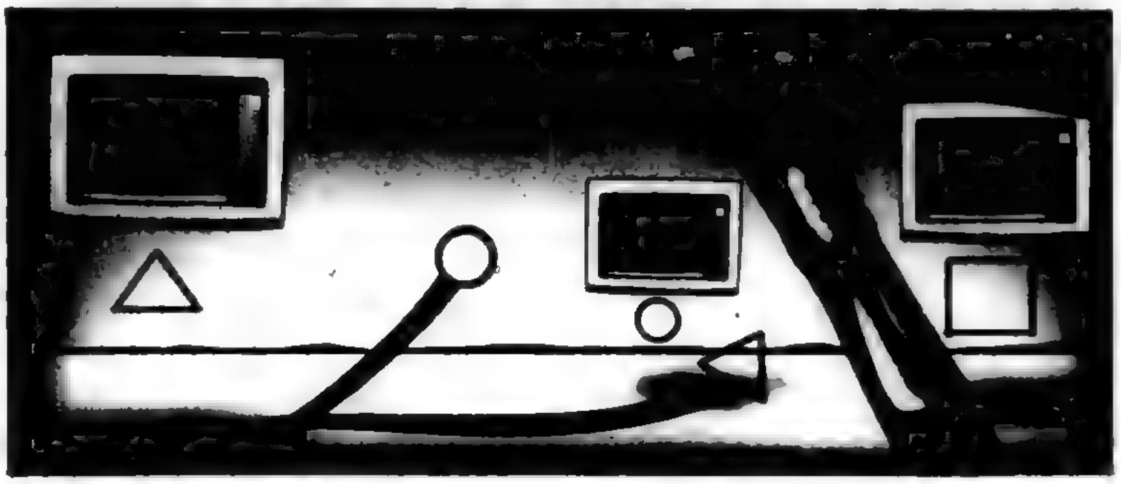

CARL WESLEY ILLUSTRATION

▶ **WILLIAM THOMPSON, senior planning analyst in communications, office automation and office information services at Black & Decker Corp.**

Black & Decker is looking for ways to manage its exploding population of personal computer users — particularly in the area of mainframe data base access. "We can't afford to install 200 more Digital Communications Associates, Inc. Irma cards and 200 modems" for each new batch of users, Thompson says. "Especially since we have to keep upgrading modems every time vendors introduce models with more speed."

The company has already solved this problem, at least partially, by installing AT&T's intelligent switch, Information Systems Network. The switch provides micro users with shared access to asynchronous and synchronous hosts as well as to a pool of modem-based connections to the outside world. This eliminates the need to equip each PC with its own Irma card and modem.

A larger problem faced by the firm, however, is making multiple data bases on multiple hosts available to hordes of PC users. Black & Decker is waiting for the right products to appear before it seriously considers a distributed departmental processing system. The company has been put off by the current high cost of "the hardware and of managing and maintaining data so that it stays synchronized across all of the machines" and so that users do not end up accessing 3-week-old data, Thompson says. "We don't need that kind of trouble."

A major user of Cullinet Software, Inc.'s IDMS data base management system, Black & Decker is consolidating its data "so that I can provide a connection from the user's desk to where the data lies," Thompson says. Cullinet's Information Center Management System and Infogate software will provide data base access to end users on the application level.

The company is experimenting with the idea of putting the Unix version of Information Builders, Inc.'s fourth-generation languages, Focus and PC Focus, on different models of AT&T's 3B computer line to support different-size work groups. "Down the road, we'll need to have one machine talking to another so that users can request data on one machine and it will know where to find it," Thompson says. A lack of products to make this happen "is what is holding back distributed processing," he adds.

"Sure I'd like to have it all handed to me on a plate, but you can't get that with new technology unless you wait until it's all perfected," Thompson says.

RESPONSE

MICHAEL ZISMAN, chairman and chief executive officer of SoftSwitch, Inc.

"When you have a large, multivendor network, you need a facility that maps a user or file name to a node. You need a directory of resources.

"Different vendors are attacking the problem from different angles: IBM, with its grand idea of a repository, the data base vendors like Relational Technology, Inc. and Oracle Corp. have a war on around their distributed data base products and we will have a solution of our own next year."

Continued from page 13

Friel notes. "A few companies, like Communications Solutions, Inc. and, to a lesser extent, IBM, support it; the real issue is when all systems used by us . . . will support fully functional LU6.2 and PU2.1 networking."

William Friel

A much more serious problem from J. C. Penney's point of view is the fact that the process of adding new nodes and addresses on the SNA network is still "tantamount to taking the whole subnetwork down," according to Friel. J. C. Penney has been waiting for IBM to come up with a way to dynamically add nodes without going through a system generation each time.

A third concern for Friel's people is "how to make the network management job easier." J. C. Penney is interested in IBM's Netview concept of SNA-based centralized network management. "We centrally manage our network right now from our three data centers, but it's costly and a real pain," Friel gripes. "We would like to see improvements."

RESPONSE

WILLIAM WARNER, director of business and systems management at IBM, responds to William Friel.

Continued on page 18

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STEVEN JACKSON, vice-president of systems and MIS and technological planning at First National Bank of Chicago.

Some years ago, First National Bank of Chicago made a policy decision to allow different user communities to choose whatever communications system best filled their needs.

Now, like so many other companies that provided that freedom to users, First National is pressuring its vendors to come up with products that can link their incompatible office automation networking architectures.

"What we need in our company is a homogeneous delivery mechanism that allows us to move information from one system to another — whether it is Wang Laboratory, Inc.'s Wang Office, Digital Equipment Corp.'s All-In-1 or a local-area network file server," Jackson says. The bank plans to introduce at least two more electronic mail systems to meet the needs of its users, he adds. "The good news is that the systems can be cost-justified. The bad news is that they need to be connected," he says.

Steve Jackson

The bank is looking for a communications system that enables a user to receive documents from users on other systems "as if they were part of his own system," Jackson says. The key component is a central directory that keeps track of where users are day and night and tells hosts where to send documents. Another component is peer-to-peer communications gateways that allow various hosts to trade documents between their respective electronic mailboxes.

"We don't care about peer-to-peer connectivity between workstations," Jackson says.

The bank shared its vision with vendors several years ago, but the vendors have been slow to respond, Jackson says. "They want to do it all. Over the last few years, market demand for intervendor connectivity has approached critical mass. Companies are saying, 'We won't buy any more boxes until we can integrate your systems,' " he says.

Vendors have begun to respond to this pressure by developing interconnection products, according to Jackson. While unwilling to go into particulars, he points to Softswitch, Inc. as a likely candidate for providing the eventual solution.

Jackson is also concerned with maintaining cost accounting and message verification for communications among and within user communities. "It doubles the cost of transmission if you have to verify delivery," he concludes.

RESPONSE

MICHAEL ZISMAN, chairman and chief executive officer of SoftSwitch, Inc., responds to Steven Jackson.

"Right now, our products provide some [distributed electronic mail directory] capabilities. Right now, a user can send a message to his Wang Laboratories, Inc. Office system, which knows that the recipient is on a Digital Equipment Corp. All-In-1 system.

"Integration of directory services is next; once people connect to electronic mail systems and the user population grows, the problem is to keep track of where people are, so you need direct interconnection between different vendors' electronic mail systems.

"We and the major host vendors intend to address that problem."

Continued from page 13

up data traffic as well. The remainder of the company's data traffic will be handled by dedicated terrestrial and satellite links as well as a variety of AT&T data services.

TRW plans to send voice, data and video transmissions through high-speed (9.6K bit/sec. or T1) dedicated links to AT&T facilities, where they will be routed to the appropriate service. The major difficulty lies in keeping track of individuals' use of different network services, according to Jankowski.

Once transmissions reach AT&T's central office, it becomes difficult to "separate out different transmissions and say who is working on what," Jankowski complains. "As we move toward electronic linkage with our suppliers and customers, accountability is crucial. AT&T will provide billing by site, but not on a telephone-by-telephone (or terminal-by-terminal) basis, he adds.

Right now, Jankowski knows of two equally unacceptable ways to deal with this problem. It can install black boxes at each site to keep track of network usage internally, "which is not cost-effective and creates maintenance problems," Jankowski says. Or, the company can have employees add an extra 5- to 11-digit authorization code each time they dial. This is likely to be unac

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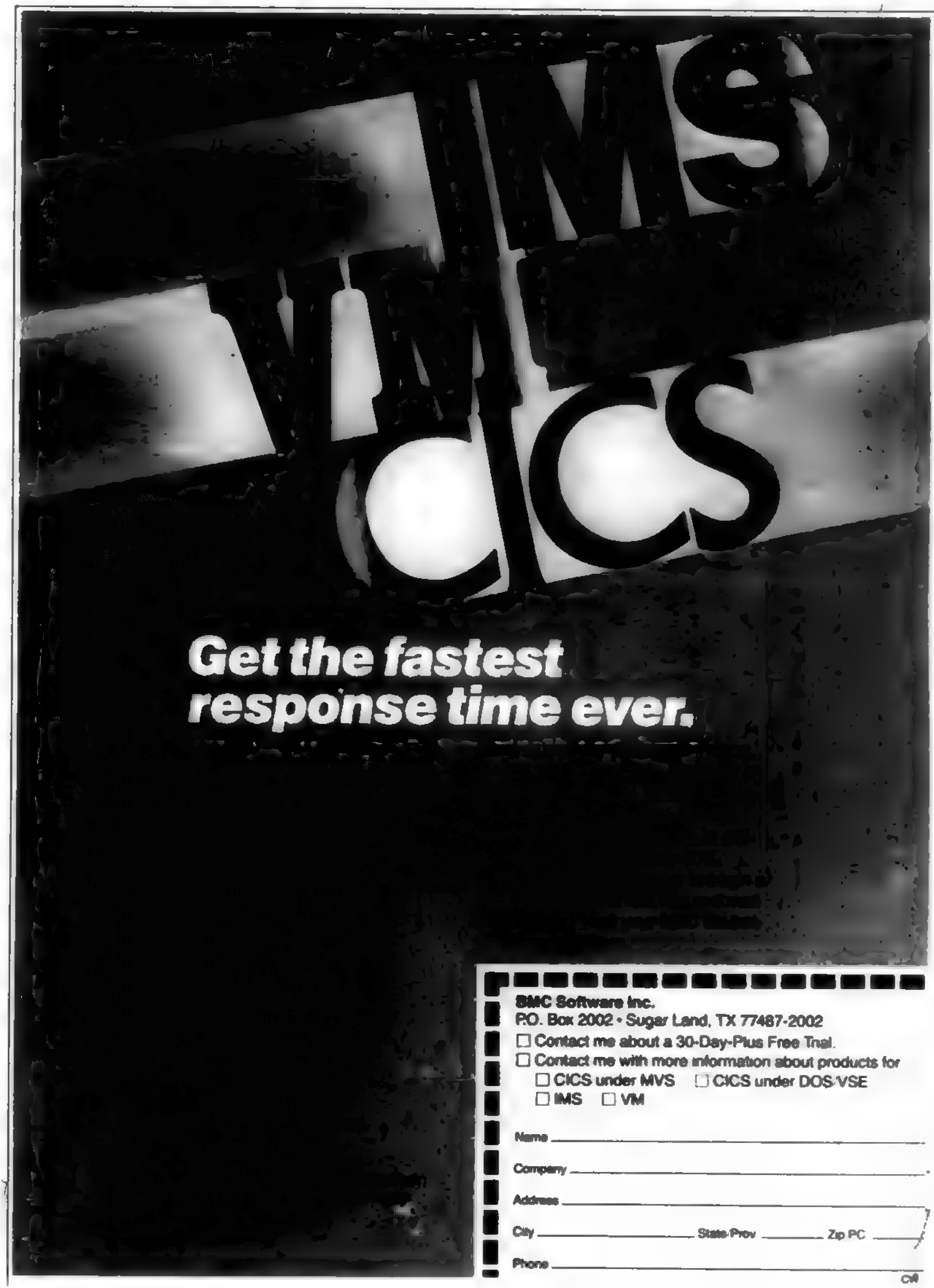
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"When a terminal or controller or communication line is added to an IBM Systems Network Architecture network, it is often necessary to take a portion of the network down, causing a certain amount of disruption of service and lower availability, which can cost money for some industries.

"This is an important concern for most of the customers I talk to that have large, widely dispersed networks.

"We already have something done within IBM's architecture that leads to a solution; we know it has to be provided to customers in the near term.

"IBM will continue to develop wider, more pervasive LU6.2 connections for our own products.

"What customers want is a richer implementation — which means opening up access to LU6.2 facilities, for example, and enhancing VTAM's programming interface to provide LU6.2 capabilities. We'll be doing that."

Continued from page 15

ceptable to most employees, according to Jankowski.

TRW's problem will be solved eventually, Jankowski hopes, when AT&T and other carriers adopt the Integrated Services Digital Network (ISDN) standard, which can handle complete accounting and network management information on a separate channel. In the meantime, the company is working with PBX vendors and with AT&T to find a short-term solution.

Jankowski is also waiting for ISDN to provide an effective way to integrate TRW's IBM host-based communications into a telecommunications network. The company recently passed up an invitation for TRW to participate in an ISDN trial because of the lack of a primary rate connection for TRW's IBM 3725 communications processors. The primary rate defines 23 64K bit/sec. digital channels as well as a separate channel for signaling. "I wanted a single T1 fire hose whose logical channels could be handled by ISDN. That will take a while to happen," Jankowski says.

RESPONSE

WILLIAM WARNER, director of business and systems management at IBM, responds to Kenneth Jankowski.

"It is clearly up to manufacturers that produce devices that interface with the carrier services to provide basic and primary Integrated Services Digital Network [ISDN] support — it is not the operating companies' responsibility to provide ISDN attachments for other companies' customer premise equipment.

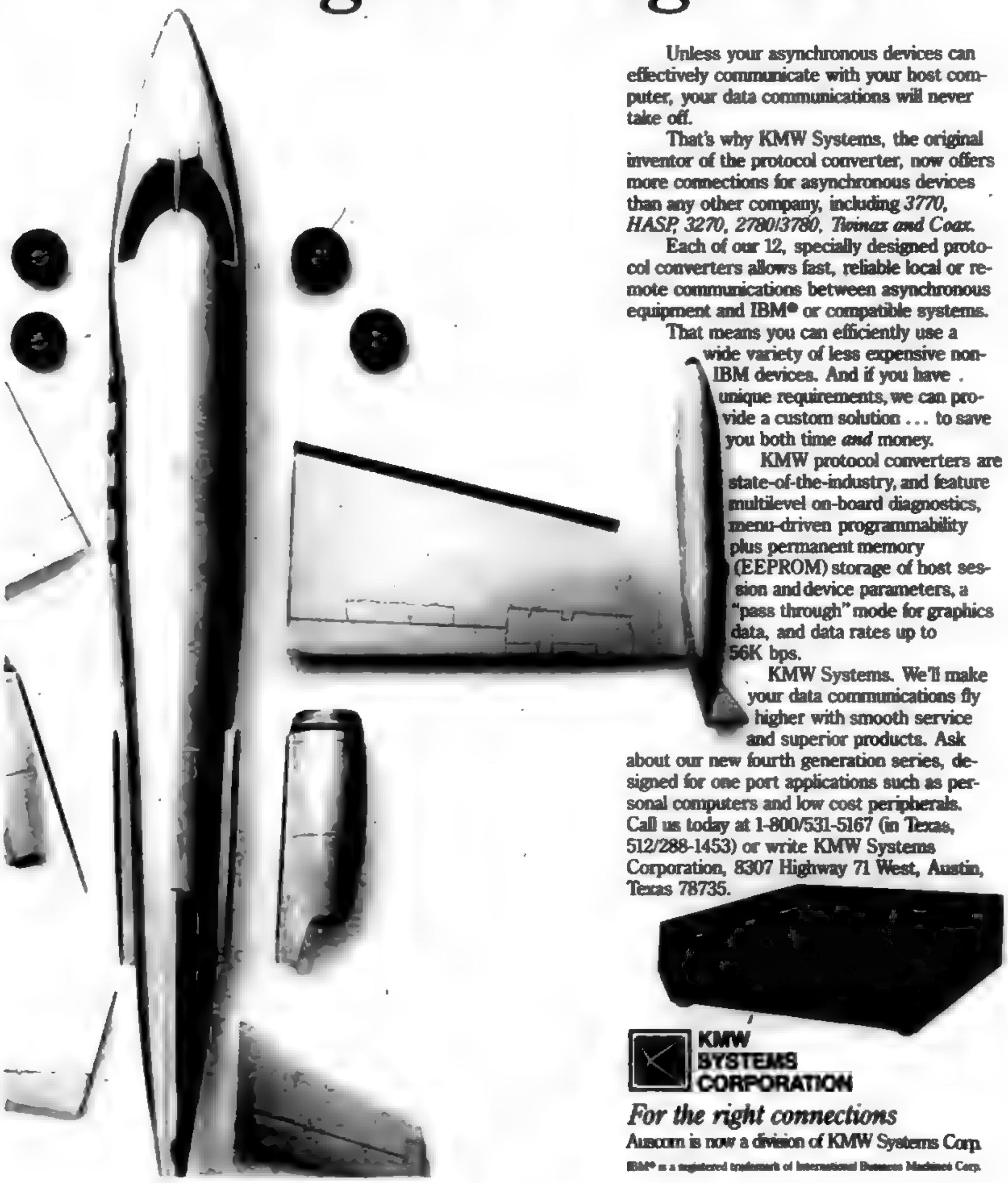
"ISDN support is part of our architecture direction. *How* we link to ISDN — through a separate product or integrated into our current products — is still under assessment."

PHIL STASAEWICZ, Software Defined Network product marketing manager for AT&T, responds to Jankowski.

"In the first quarter of 1987, we will provide a new type of billing arrangement for ISDN, a breakdown by project center and division, rather than an overall summary bill. We may not offer breakdown by originating location as a standard billing format now, but we could offer it through customized reports. We are also seriously looking down the road at customer access of our [accounting] data base on a real-time basis.

"Right now, we provide a magnetic tape that contains raw billing data which customers can manipulate themselves.

"Different AT&T services currently have discrete billing. As we provide call-by-call selection of services through ISDN, we will definitely be looking at how to provide billing for that arrangement."



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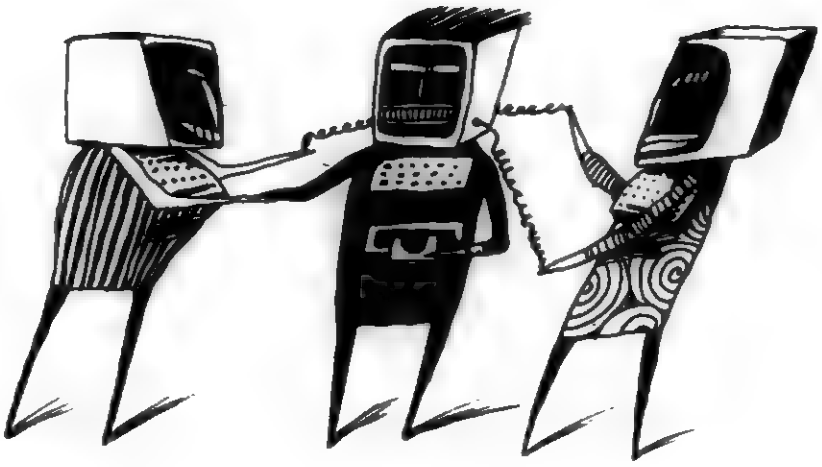
IBM ties its shoelaces

Loose lines have tripped Big Blue too often



BLAIR THORNLEY ILLUSTRATION

BY STANLEY GIBSON

IBM has begun the long and arduous process of tying its several incompatible architectures together. Connectivity products upon which IBM can be expected to build in 1987 include the Netview network management system, the merger of the System/36 and System/38 lines and the 9370 line of computers.

Despite IBM's sometimes Delphic pronouncements about the future, most analysts agree that, in general, the industry giant, will continue to move from hierarchical to peer-to-peer networks within Systems Network Architecture (SNA).

At the same time, IBM will continue to consolidate its architectures, a path that could lead to a single architecture sometime in the 1990s. In addition, IBM will hedge its bets by supporting both SNA and Open Systems Interconnect (OSI).

At present, IBM has three different kinds of peer-to-peer networking: IBM subarea SNA, IBM's mainframe coupling method; Advanced Peer-to-Peer Networking (APPN), for System/36 and 38 minicomputers; and Transparent Services Access Facility (TSAF), a VM-to-VM communications function announced with the 9370. How the three will evolve and possibly merge remains a topic of speculation.

"There will be years to go before you see IBM's subarea migrating to APPN structure," says Frank Dzubeck, president and chief executive officer of Communications Network Architects, Inc. in Washington, D.C. But, he cautions, "The APPN of today is not necessarily the APPN of tomorrow."

Bill Warner, director of business systems management at IBM's communications programming lab in Raleigh, N.C., says Low Entry Networking (LEN), sometimes referred to as APPN or PU2.1, is a key component in the evolution of SNA.

"It is a goal to bring the System/36 to backbone SNA through LEN. This enhancement to LEN is a key customer requirement." Of SNA he adds, "SNA has been and will continue to be our strategic networking architecture."

"SNA will be the center of IBM's multivendor strategy, but the basic nature of SNA will have to change," observes Claire Fleig, an analyst with the International Technology Group in Los Altos, Calif., adding that an eventual peer-to-peer SNA must extend beyond the mainframe world.

At an IBM-sponsored meeting for analysts in October, according to Fleig, IBM representatives said APPN will be extended to architectures other than the System/36 and 38 that it now serves but will not communicate directly with a mainframe. To do so, an APPN-to-mainframe interface will be required.

TSAF, now limited to the 9370, may evolve into a general-purpose mainframe link, Dzubeck suggests. "TSAF for mainframes, intermingled with APPN, may be the APPN of the future," he says.

Another key requirement for SNA users, Warner says, is in network availability — to allow users to add components to a network without taking the network down and thereby interrupting the work of end-users on the network. "You should be able to add terminals, multiplexers, even computers, without disturbing the network," he says.

In addition, he says, expanding the address limit of SNA is required in order to reach the ultimate goal of making SNA more like the consumer telephone network. "This will evolve over the next five years. It's not a next-year thing," Warner says.

What shape IBM's connectivity will eventually take will be contingent on what architectures emerge from today's current collection. In the mid-range, IBM will erase the differences between architectures, according to Brian Jeffery of International Technology Group. That process was begun in June 1986, with the announced connection of the System/36 and 38, he says.

Continued from page 17

However, linking 9370s with System/36s and 38s is also a goal. This process is already under way with the announced sharing of peripherals among the 9370 and System/36 and 38, Jeffery points out. Ultimately, he says, the aim is to give the user transparent access across the entire mid-range.

Despite SNA's status as a virtual industry standard of networking, IBM will continue to support OSI, according to Rudolf Strobl, an analyst with Arthur D. Little, Inc. in Cambridge, Mass.

"I think IBM will be the leading OSI vendor. They're the one vendor that's really implementing and moving rapidly," Strobl says. IBM has introduced OSI products in Europe and Canada and will implement more in the U.S., Strobl says. IBM will support both SNA and OSI on the System/36 and 38, Series 1, System 88, IBM Personal Computer AT, Rolm Corp. CBX, 9370 and MVS 370, Strobl asserts.

"Although we don't see a lot of OSI products from other manufacturers now, we know they are coming. . . . IBM has OSI products in Europe and will be introducing these in America," Warner says.

One such product could be the General Teleprocessing Monitor for OSI, which was unveiled in Europe in September. The product helps developers create OSI applications on 370-based processors running MVS/SP. It will also allow user-supplied SNA or OSI application programs to communicate with each other, IBM says.

'IBM will be the leading OSI vendor. They're really implementing and moving rapidly.'

RUDOLF STROBL
Arthur D. Little, Inc.

In addition to supporting OSI, Big Blue will continue the multivendor theme in the arena of physical media by supporting Ethernet as well as its own Token-Ring network.

IBM's RT Personal Computer supports Ethernet connections, which are necessary for its assimilation into the world of engineering. The 9370 was also announced with Ethernet connectivity.

Repeating the multivendor theme, Netview will tie together the equipment of many vendors into a corporatewide network management system. In addition to Rolm, seven other vendors announced Netview interfaces in 1986. Many more should follow suit in 1987, according to several observers.

Netview and support of OSI and Ethernet reveal a key business decision on the part of IBM: Openness will benefit its bottom line.

"IBM doesn't care whether they sell Ethernet or Token-Ring as long as the network helps sell computers," Strobl says.

Meanwhile, IBM's Token-Ring network will be upgraded in 1987 to transmit at 10M bit/sec. from its present 4M bit/sec. according to George Colony, president of Forrester Research, Inc. in Cambridge, Mass. IBM's Warner would not comment on when this might happen, but did concede that "customers will need this eventually."

Brian Jeffery

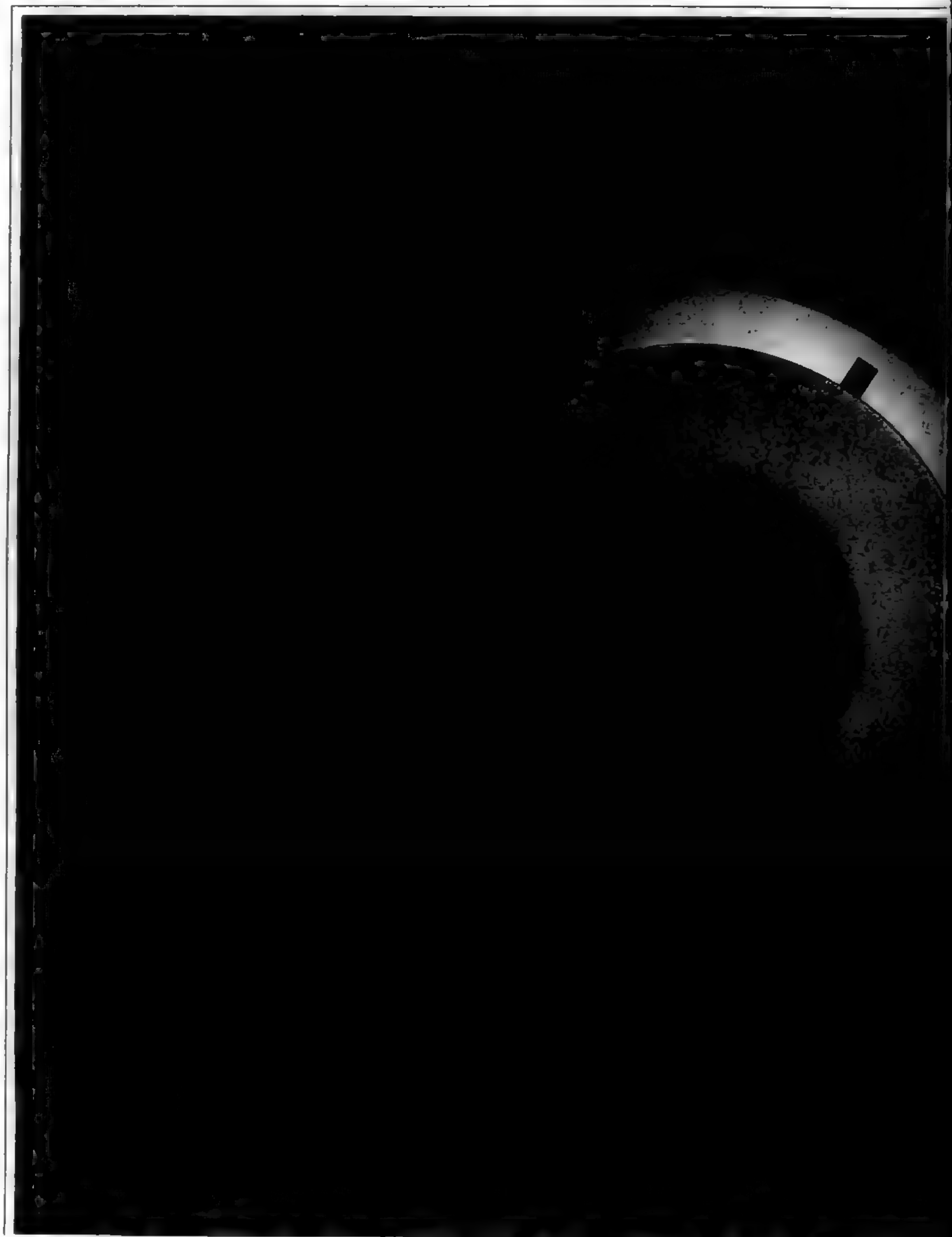
The connectivity progress that IBM makes in 1987 could not be more important to the company's future. Industry analysts point to connectivity problems as a cause of the firm's lackluster growth in sales and declining profits during the last two years. They also point to Digital Equipment Corp.'s ease of connectivity as a reason for its recent success.

"The difference between IBM and DEC has to be technological. Deliverable communications strategies — that's the problem. IBM has got to do what DEC has done, do it rapidly and do it accurately. It needs seamless data access," says Bernie Wess, a former consultant and now chief operating officer of Grand Alliance Insurance Co.

The changing nature of U.S. corporations means that IBM must act now, Wess says. In many organizations, mid-level management is being cut out. Consequently, computing is moving down to departments. Ease of data communications between departments will become an important strategic asset for companies, Wess explains.

But when the question comes to who will win the connectivity battle in five years, Wess concedes, "IBM can always still win."

The year 1987 will be when IBM delivers all the products it announced in 1986. The implementation of those alone should change the communications landscape considerably.



IBM 9370 set to do battle

As the strategic mid-range product responding directly to the connectivity challenge posed by Digital Equipment Corp., the IBM 9370 will play a key role in the coming year. But just how far IBM will go in tying the 9370 family of distributed processors into its other systems is an area of lively speculation.

Members of the 9370 family communicate with one another via Transparent Services Access Facility (TSAF), which provides VM-to-VM connectivity. However, TSAF raises eyebrows in that, although it has an LU6.2 programming interface, it does not include LU6.2 itself.

Rudolf Stroble

"IBM 9370 TSAF presents an LU6.2 programming interface to the user. However, the underlying protocols are not LU6.2 protocols. TSAF is intended for interconnecting 9370s in a collection," says Bill Warner, director of business systems management at IBM's communications programming lab in Raleigh, N.C.

Bill Warner

However, Warner says 9370s will eventually get a full LU6.2 implementation, as will all VM-based systems running VTAM, including 370s, 4300s and 3090s. Warner will not be specific as to when this might occur, but he won't rule out this happening in 1987.

According to Rudolf Strobl, a consultant with Arthur D. Little, Inc. in Cambridge, Mass., bringing a full LU6.2 to the 9370 world is a missing part of the puzzle that has to be announced sometime this year.

"The key issue is to position 9370s as hosts of distributed networks as well as distributed departmental machines," Strobl says.

To accomplish this, a full LU6.2 facility is necessary, he adds.

Guessing at IBM's rationale for announcing the 9370 despite incomplete connectivity features, Strobl says, "The 9370 was put together fast to respond to DEC. IBM didn't take time to put all the connectivity packages together." But, he adds, "The user will get hit with a slew of 9370 connectivity support in 1987 that will make the 9370 a viable product."

S. G.

IBM-Rolm eye CBX-SNA link

Although the consummation of the IBM-Rolm Corp. marriage may eventually be expressed in the integration of the Rolm Computerized Branch Exchange (CBX) with IBM's Systems Network Architecture (SNA), some observers say such a link may be years away. In the meantime, this year will bring a number of stepping stones along the path to that goal.

T. Doane Perry

"There will be more Phonemail announcements," says T. Doane Perry, a telecommunications analyst with International Data Corp. in Framingham, Mass., referring to Rolm's voice messaging system. He adds that a Phonemail link to IBM's Distributed Office Support System and Professional Office System is a logical step.

Linking IBM's computer equipment and Rolm's telephone equipment, however, is made difficult by architectural differences.

In addition, Perry says Rolm will need a new CBX eventually and that making it compatible with Integrated Services Digital Network will be a key issue. Frank Dzubeck of Communications Network Architects in Washington, D.C., concurs with Perry's assessment. "I'm looking for a new CBX. It won't be this year, though," he says.

Meanwhile, IBM's fall announcement of its Netview SNA-based network management system was highlighted by interfaces with Rolm's CBXs. IBM will likely build on this connectivity in the coming year.

S. G.

Microsoft pace gives life to alternatives

Operating systems find niche opportunities

BY JAMES A. MARTIN

Frustrated microcomputer users still await operating system advances that will deliver what the hardware technologies can only promise. Updated Microsoft Corp. MS-DOS and IBM PC-DOS systems are expected for Intel Corp. 80286-based systems in 1987, but in the meantime, other software developers and hardware vendors will be working to gain some ground with alternatives.

Despite disappointments, AT&T still has hope that its Unix multiuser system will catch on in commercial environments, while Apple Computer, Inc. and Atari Corp., among others, are expected to continue beefing up their IBM-incompatible systems efforts in bids to attract corporate America. In addition, MS-DOS enhancement systems from third-party vendors are looking to carve out niches for themselves.

Given the large installed base of MS-DOS-based microcomputers — about seven million — and MS-DOS's status as the operating system standard, there appears to be little chance that any alternative could become widely accepted in the near future. In 1986, for example, 68% of microcomputers sold will run MS-DOS, increasing to 84% by 1990, according to Future Computing, Inc.

But as the end-user and MIS communities await operating systems for 80286 and Intel 80386-based machines, the aperture is widening for alternatives, even if confined to niche market or also-ran status. "There is enough marketplace confusion to allow competitors to come in with technically superior or innovative systems to seize the moment," according to Tracy Licklider, chairman of Ontio Computer Products Corp. in Cambridge, Mass. "Where there are cleavages in technology between old and new, there is always the opportunity for someone to come in and make themselves known."

AT&T's Unix is seen as one of the main MS-DOS alternatives expected to gain in popularity, most likely as a secondary operating system subordinate to MS-DOS, observers say. Unix has been widely criticized in the past for being too complex for corporate environments, but the emergence of the 386 chip and its multitasking capabilities is expected by some analysts to give Unix a boost.

"Multitasking is going to be a critical application in the future, and with the 386 chip and the 32-bit data bus, you'll soon see Unix coprocessor boards on MS-DOS machines," says John McCarthy, research manager for Forrester Research, Inc. in Cambridge, Mass.

Unix and MS-DOS will begin to converge, with one operating system enhancing the other, according to Bruce Ken Huie, a Unix analyst with International Data Corp. in Framingham, Mass. "Unix was created on minicomputers and has been brought down to micros, while MS-DOS systems are climbing up to be like minicomputers." As a result, Huie adds, there should be a strong imitation of Unix in the next MS-DOS version.

"I don't see a lot of people putting Unix on an IBM PC," says Alan Gross, president of Micro-

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Continued from page 21

computer Managers Association in New York. "But I do think that MS-DOS will be moving toward providing some of the utilities provided now by Unix, and that it'll be more like Unix in the future, say five years from now."

Despite this anticipated merger, MS-DOS will continue to be the most important operating system into the 1990s, according to David Ahl, founder of *Creative Computing Magazine* and author of several books on microcomputers. "But it won't be as widely used as it is today," he adds. "Multiuser environments will become more important than they are now, and there just won't be this incredible dominance by IBM."

Unix faces competition not only from MS-DOS but from Unix derivatives, such as the Microsoft Xenix operating system. In addition, Pick Systems Pick operating system is seen by some as a Unix alternative expected to enjoy increased popularity in the next few years.

"For certain applications, Pick could be a real contender, rivaling Unix and other systems that run on 386 machines," Ahl says. "It's been around longer, and like Unix it's truly transportable over a number of different machines."

What is transportable, however, is not always easy to use. With microcomputers expected to spread through all levels of corporate America, there will be an increasing need for systems offering ease-of-use interfaces, and Unix, Pick and other multiuser systems are considered more complicated than their single-user competitors. On this level, Apple's Macintosh could make some strong inroads, providing it fulfills its promise of becoming a powerful business alternative (see story page 25).

Other alternatives, such as Software Link Inc.'s PC-MOS/386, Digital Research, Inc.'s Concurrent PC-DOS, Microsoft's Windows and IBM's Topview, could also gain in popularity in the next few years.

"There are a number of MS-DOS enhancement systems, but it's all chaotic," Licklider says. "Developers can't rely on those capabilities in their user environments. Also, it's been unclear what will happen to [Microsoft] Windows when the multitasking portion becomes part of the next MS-DOS, and IBM still hasn't announced its plans for a 386 operating system."

Those systems are expected to develop only "small niches," according to Meg Lewis, vice-president of Future Computing in Dallas. "They should develop a dedicated but small band of followers. In the PC market, application developers go after the biggest targets, and that's clearly MS-DOS," Lewis says.

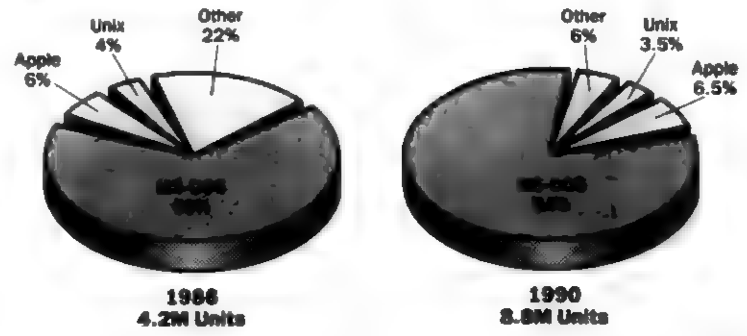
The bottom line is that the micro market is market-driven, while other segments, such as minicomputers, are more technology-driven, Lewis adds. "MS-DOS will change much more slowly than users would like, but it will eventually accommodate their needs, and they'll for the most part be satisfied. Simply increasing the speed of the computers improves their performance, and that makes most users happy.

"On the other hand, there'll be an outer edge of users with a need for real power. They'll be attracted to Unix. It's the same with the Macintosh; there will be users who need an easy-to-use system with good graphics, and they'll find the Macintosh attractive."

Despite the fact that MS-DOS will continue to be the standard and will offer some improvements in the year to come, there will always be room for alternatives, Lewis says.

"Market dynamics indicate that MS-DOS will get bigger and better, but that doesn't mean another company can't come in with an alternative and make some money," she says. "They just won't be able to dominate the market."

Operating systems
Business personal computers



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Apple's Mac: The art of successfully filling a niche

Apple Computer, Inc.'s Macintosh microcomputer will probably never rise far above its status as a niche machine, nor become a widely accepted challenger to the Microsoft Corp. MS-DOS standard, most analysts maintain. But, as one user says, "It sure fills some niches very well."

First introduced in 1984 and praised for its ease-of-use features and graphics capabilities, the Mac faced formidable competition as an office machine — IBM Personal Computers and compatibles running MS-DOS had staked out that territory three years earlier.

In January 1986, however, Apple made a bid for the Mac's future in the office with the Mac Plus, which had more memory, an improved keyboard, more floppy disk storage and the capability to be expanded by third-party developers. Further upgrades, including a larger screen, color graphics, additional memory and faster clock speeds, are expected in 1987.

Although improvements have been much delayed, they are a welcome sight to loyal users who feel the Mac still has a fighting chance. "I don't see a thing that MS-DOS has that the Mac won't do in the next year or two," says Gary Cosimini, senior art director of operations and technology for the *New York Times*, where four Mac Pluses are used to design page layouts.

"I don't see the use of MS-DOS equipment in most applications," Cosimini continues. "It's just an operating system that's not a whole lot better than CP/M," the operating system developed by Digital Research, Inc. for 8-bit microcomputers.

The Macintosh is more global in its design. The Mac and its use of Adobe Systems, Inc. Proscript page description language, Appletalk network and Laserwriter printer is more of an integrated system than MS-DOS, Cosimini adds. Most microcomputer applications do not require as much speed as the Intel Corp. 80386 chip offers, he says, and the Macintosh can also be connected to a mainframe computer.

"So there's no real advantage to MS-DOS. You can't beat an IBM PC for saving a long file to a disk, but for people who are not really power users and who routinely perform complicated tasks, the Mac can easily outrun the competition."

At Aerospace Corp. in El Segundo, Calif., the Mac Plus is used as a software development workstation for artificial intelligence applications, a low-cost alternative to engineering workstations from vendors such as Sun Microsystems, Inc. and Symbolics, Inc.

The operating-system standard at Aerospace Corp., however, is MS-DOS, and will continue to be, despite the Mac's popularity in certain applications. "It took too long for Apple to open up the Mac so it could become a real challenge to the MS-DOS standard," says Peter C. Coffee, engineering specialist for Aerospace

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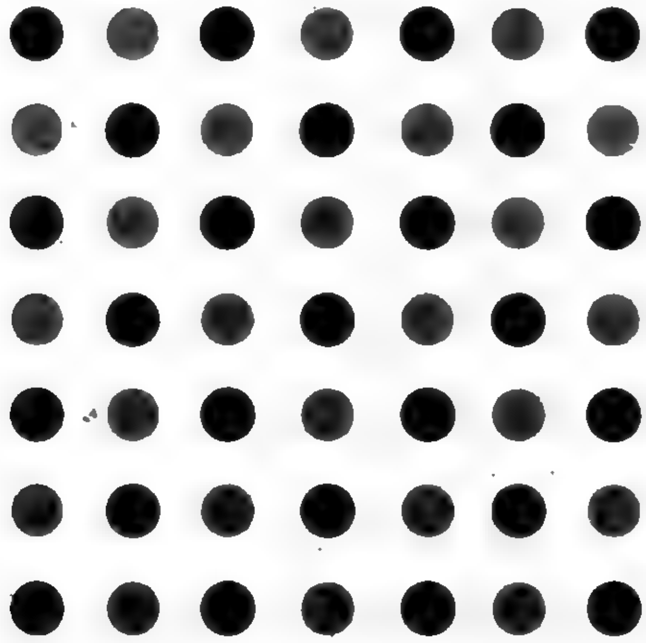

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Continued from previous page

Gorp.'s information technology research department. "It left a lot of us very frustrated."

The Macintosh does have an advantage as a uniform architecture, Coffee said. "That's one of the few things Apple succeeded in doing with the Mac, making it a standard machine in hardware and user interfaces. That means there are fewer problems with code being busted when you move up in a machine."

Despite its drawbacks, the Macintosh will continue to gain in popularity but will be relegated to also-ran status in a world dominated by MS-DOS.

Says Coffee: "As long as the rest of the world is MS-DOS and Intel-oriented, then any applications we deliver are going to be targeted toward that environment.

"The Mac is basically a niche machine," he adds, "and I don't see it breaking out from that role. But it sure fills some niches very well, and I'm glad to see it maturing."

"Clearly the Mac has found niches for itself, especially in desktop publishing, and a lot of people find that it's more friendly than MS-DOS and other systems, where the user needs to know a lot of unclear commands," agrees David Ahl, an author of several books on microcomputers. "As a result, more people will be interested in ease-of-use systems in the future."

Before it can become more widely accepted, however, the Macintosh must continue to be upgraded to offer more memory, an open architecture and better connectivity to incompatible systems such as IBM and Unix.

It also must overcome its image with some as a computer for the home and not the office.

"The Mac is basically a device driver for a laser printer," says John McCarthy, research manager for Forrester Research, Inc. in Cambridge, Mass. "If there's a Mac II that does away with slow speeds, a closed box and screen limitations, and if MS-DOS 5.0 doesn't fly and Microsoft stumbles badly, then the Mac could take off. But Microsoft would really have to stumble."

J. A. M.

FORE-CASTERS

"I'd like to say we're going to see a [software] revolution. The problem is I don't know if people are ready for a revolution," says Michael L. Schneider, vice-president of technology research at [redacted] Trust Co. in New York. "Until now, computers in the office have automated what we've done on paper. I think the revolution into office technology is when people allow the technologies to actually perturb, to change the way they operate."

The revolution Schneider speaks of will come "when people permit the technologies to change the way they work," he says. "I think we're going to start to see that within the office in the next five years. Right now, people have factory systems that are not tied to information processing systems, not tied to what I'll call office automation."

He says the industry will begin to see true office automation when the information from the factory flows into the entire corporation, when the manager can get information at his desk with no difference in whether it comes from the mainframe, another site or the factory floor — as simply as getting a memo.

E. G.

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Managers seek tools to exploit today's PCs

MS-DOS with more memory, faster software top wish lists

ANTHONY RUSSO ILLUSTRATION

BY DAVID BRIGHT

Despite the incredible advances in personal computing in the past 10 years, today's microcomputer managers are not satisfied. Many indicate that what they need is essentially a fulfillment of the promise represented by the microcomputers already installed at their companies.

The key will be to obtain operating system software and applications "that would take advantage of the hardware that we all have on our desks," notes Michael Perry, vice-president and controller at A. H. Belo Corp., a Dallas-based publishing company.

For several years, scientists and vendors have been predicting that users would someday have the power of a minicomputer or a mainframe available in a desktop personal computer. With powerful new machines like Compaq Computer Corp.'s Deskpro 386 now arriving on the scene, that time has come.

As many managers point out, however, the next challenges include harnessing that power with complementary, easy-to-use software, economically and efficiently tying systems together so as to share resources and making better use of existing technologies.

The one product that the majority of micro managers consider a requirement is a version of Microsoft Corp.'s MS-DOS operating system that offers, first and foremost, the ability to access greater amounts of random-access memory (RAM) and, second, multitasking capability. Another common concern is that even after a new MS-DOS becomes available, it will take software developers a long time to offer applications tailored to the new operating system.

Also topping micro managers' wish lists are a common user interface, improved local-area networking (LAN) and connectivity products and a merging of laptop and desktop computers.

Since IBM introduced its Intel Corp. 80286-based Personal Computer AT system in August 1984, micro managers have been longing for a revamped version of IBM's PC-DOS that would take advantage of the machine's extended capabilities. According to most reports, that operating system will probably not be announced until mid- or late 1987.

Without the new MS-DOS, not even the AT — let alone the new class of Intel 80386-based machines — is being fully utilized. For business purposes, the 640K bytes of RAM currently offered by MS-DOS is "woefully inadequate today and will certainly be worse tomorrow," according to Cheryl Currid, manager of sales, systems, planning and information at Coca-Cola Company Foods Division in Houston. "I'm sure that's holding back software development more than the hardware, because the hardware is there."

The 640K bytes of RAM is such a limitation, Currid says, that some AT users at her company have to reboot their systems between applications because of crowding from RAM-resident software. "There's some utilities out that work in that area, but they don't work well enough," she says.

With software packages getting better but larger, the memory limitation is becoming more of a problem, adds Rich Reed, a senior technical consultant at Cigna Corp.'s Cigna Systems Division in Bloomfield, Conn. "Better memory management. More memory, that's what I want," he stresses. "More real memory. Memory that I can get to, memory that's not only for *this* kind of file or *that* kind of data or *this* kind of application, but memory that I can use for anything. And lots of it. There's packages being written now that are real nice, but they just run out of room. You just can't use them to their full extent."

The extra memory will be particularly useful for data base applications, which cry out for more memory, Reed notes.

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Continued from page 27

He adds that expanded memory boards such as Intel's Aboveboard are nothing but patches until memory limitations are removed.

Hilarius Fuchs, information center director at Continental Grain Co. in New York, is anxious to obtain MS-DOS applications built for the 80286. Since it will naturally take some time for software developers to produce packages under the new MS-DOS, Fuchs warns that the new class of applications could be as much as a year and a half away.

When the new applications arrive, many managers say they would like them to have a common user interface, which would greatly reduce user learning time. Most packages are separate entities that need commonality of keystrokes, says Max Hughes, vice-president of systems communications at Pfizer, Inc. in New York.

Evan Carpenter, who manages personal computers at Litton Systems, Inc.'s Aero Products Division in Moorpark, Calif., agrees that software manufacturers should get together in making their products more compatible. "We have a big problem here with trying to integrate these packages, with getting them to talk in a reasonable language together to move information back and forth. I'm sure everybody has this problem," he says.

Mike Perry

A common user interface would serve the valuable function of "giving a lot of comfort to the end user," adds Cigna Systems' Reed. Toward that end, the division has developed a menu system that it hopes to make standard on Cigna Corp.'s more than 14,000 workstations.

Microsoft's Windows' graphically oriented environment would seem to address the problem, but Reed says it is not the solution right now because it is too slow. He adds that the product may have been ahead of its time and could have a better chance of success with the much more powerful 80386-based systems.

> 'We have a big problem here with trying to integrate these packages, with getting them to talk in a reasonable language together to move information back and forth.'
>
> EVAN CARPENTER
> Litton Systems, Inc.

As an enthusiastic Windows user, Carpenter predicts that "with the more powerful machines coming out, Windows is going to become very desirable very, very quickly."

Most non-data-processing end users know only four or five MS-DOS commands — "just enough to get them through," notes Fred Zickert, manager of the PC support center at Eaton Corp. in Cleveland. But greater availability of utilities such as those found in Peter Norton Computing's Commander package would help those users make better use of the operating system, he says. The utilities handle such functions as creating directories, copying programs and deleting files.

To make applications software faster, vendors should include in their programs the ability to take over the keyboard's type-ahead buffer, Zickert says, because the cursor movement in some programs is "so doggone slow." To help alleviate that problem, Zickert uses a package from Revolution Software called Cruise Control, which he says helps save time on many programs, including word processing and spreadsheet packages. "The vendors just have not taken control of that buffer," he says.

While many of the micro managers' gripes focus on software products, Kevin Dopp, of St. Louis-based footwear and apparel manufacturer Brown Group, Inc., wants to see improvement in laptop computers. "I'd like to see the technology merged between the desktop computer and the laptop computer," he says.

Cheryl Currid

There are some good laptop systems currently on the market, he adds, but in terms of capabilities, they haven't attained the performance offered in some desktop systems. "Why couldn't the same 7- or 12-pound unit that I carry around sit on my desk and have the same kind of capabilities? It wouldn't upset me a lot if I had to plug an external monitor into it," he says.

But regardless of the limits of the available hardware and software technology, there are steps that vendors can immediately take to make microcomputing a more pleasant and efficient experience. Echoing the wishes of many managers and end users, Pfizer's Hughes says he wants to see "manuals written in English, not by illiterate nerds."

Improve PC links, managers say

The common complaints from microcomputer managers focus on operating systems and application programs, but many managers are also looking for standardization and ease of use in products that link micros together and to minis and mainframes.

"Our biggest problem here has to do with connectability," says Evan Carpenter at Litton Systems, Inc. "We can connect with virtually anything, but it's a real pain in the neck to do it. There's half a dozen different ways to do it, and none of them do it the same way."

As the American Heart Association in Columbus, Ohio, gets more involved in file transfer, improved connectability products would help a great deal, says MIS director Cedrick Douglas.

"I wish I could get a better board for file transfer [between personal computers and IBM System/36s and between micros and mainframes]," he says.

Douglas would particularly like to see the hardware and software installation process simplified so as not to require any special expertise on the part of the end user.

"When I acquired an AST 5000 Plus series board and hooked it to a System/36, it was easy for me, but when I was trying to go through it with the accounting department, they said, 'Huh?' " he adds.

To improve local-area networks (LAN), software vendors should make their packages "more LAN-aware," says Cheryl Currid at Coca-Cola Company Foods Division. "Having had a local-area network for a year now, I see that this is the way to go. There's a lot of things you can do [on a LAN] other than just sharing printers and other devices. There's a tremendous capability for data sharing and building departmental-type applications. I don't think local-area networks are being used that way as much, but I think they will in the future," she adds.

D. B.

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HP battles doubts about systems, marketing skills

Haunted by delays, corroded competitive edge

BY JEFFRY BEELER

Two criticisms that Hewlett-Packard Co. has, with only limited success, battled for years will continue to influence powerfully the course and content of the firm's management strategy and product development efforts.

In 1987, HP will again pour considerable resources into its ongoing campaign to counter skepticism about the viability of its business systems line and the effectiveness of its marketing practices.

On the business systems front, the firm will undoubtedly go to great lengths to try to meet the revised shipment deadlines for its troubled HP 3000 Model 930.

"They need very badly to get that machine out on the market as soon as they can in the best possible shape," says Darlene Litcher, MIS chief for the Oakland, Calif., office of the U.S. Department of Energy. "For more than a year, they've experienced one glitch after another with the product, and they can ill afford to have any more.

"If they continue to have problems with the 930," Litcher warns, "they're going to be hurt seriously."

Luckily for the company, the I/O software problems that have dealt the 930 its latest setback apparently lend themselves fairly readily to a solution. "I think HP will fix the trouble and deliver the system on time," says Patricia Seybold, head of the Seybold Office Computing Group, Inc. "In fact, they may even start shipping the product sooner than they publicly said they would."

Barring a repetition of the snag that recently forced HP to announce a six-month delay in delivering the 930, the credibility of the processor's much-discussed Precision Architecture will remain largely intact. "After waiting patiently for a product that is already two years late, most customers are unlikely to be too concerned about another six months," says Craig Symons, a vice-president at Gartner Group, Inc.

Of much greater concern to HP users than deferred availability is the question of whether the 930's performance will meet buyer expectations, Symons says.

In launching the Spectrum development project that made Precision Architecture possible, HP sought to do far more than just match its rivals and counter criticism of its failure to announce a 32-bit business system. Above all, the vendor counted on Spectrum to produce a "quantum leap" in technology and enable it to "leapfrog the competition," according to Symons' associate, Gartner Group senior analyst Joseph McGrath.

But by repeatedly postponing the 930's first shipments, HP has undercut somewhat its own technological aspirations. "By the time they finally ship, their competitors will have had an awful long time to improve their own products and price/performance in response," McGrath says. "Spectrum will be an improvement, but it won't be the quantum leap they were hoping for."

RISC architecture

HP's decade-long effort

1981

Researchers from various Hewlett-Packard Co. divisions, including HP Laboratories, conduct research to measure precisely the internal performance characteristics of processors using conventional von Neumann architecture. Results of the research highlight the inefficiencies of traditional CPU designs and soon persuade HP to build its next-generation systems around a highly unconventional architecture that includes a reduced instruction set.

JANUARY 1984

HP announces an unspecified technology breakthrough that has prompted the company to redirect an ongoing effort to extend its 3000 series commercial systems.

JUNE 1984

HP publicly associates its secret breakthrough technology with reduced instruction set computing (RISC).

MAY 1985

HP reveals that 100 prototypes of its unannounced RISC processors are undergoing alpha tests inside company facilities.

FEB. 25, 1986

After nearly five years of research and development, HP formally announces the 3000 Models 930 and 950, two business systems that mark the first use of the company's Precision Architecture.

MAY 28, 1986

With the introduction of its 9000 Model 840, HP for the first time extends Precision Architecture to the technical side of its processor family.

SEPT. 25, 1986

HP stuns much of the industry with its announcement that first shipments of the Model 930, originally set for availability during the fourth quarter of this year, will be delayed.

NOV. 20, 1986

Customer deliveries of the Model 840 begin on schedule.

MID-1987

Revised target date for first shipments of the Model 930. Unless HP's delivery timetable slips again, the Model 950 will also become available at the same time, as originally expected.

CW Chart

Continued from page 30

Another factor that may dim HP's prospects for unchallenged superiority in superminis is Precision Architecture's inherent technological limitations. "Some systems elements like memory management, floating point and I/O gain no advantages at all from the new architecture," Symons says. "So when you integrate all the various pieces in a system, the design gets diluted and provides less performance than its developers expected."

The erosion of some of Precision Architecture's predicted edge will probably matter little to most of the companies that use HP equipment for office automation — and with good reason. Most of these customers rely far more heavily on the low end of the HP 3000 line than on its high-end, where the 930 sits, according to Lee Doyle, a senior analyst at International Data Corp.

So despite Precision Architecture's diminished appeal, HP's customer base is expected to remain relatively loyal — at least in the OA part of its 3000 series business. "HP will still have to commit a lot more blunders before users will be forced to migrate in large numbers to other vendors," Doyle says.

But among other classes of customers, especially those that require high capacity for applications such as manufacturing, the loss of some of Precision Architecture's technological luster may take its toll. "Users who already have applications running on HP products will likely move the software to the 930 to take advantage of its increased performance," Symons says.

"But when they buy or develop new applications, many of those same users will no longer consider HP as a supplier. They'll look elsewhere for their processors."

As for its purported deficiencies as a product marketer, no one is more acutely conscious of the firm's urgent need to improve than HP itself. This year, the company will move into full-scale implementation of an ambitious plan to increase the productivity and effectiveness of its direct sales force through the use of high technology.

"By mid-1987, all our field reps will be equipped with our own portable computers and will be participating in our sales productivity network," says Bill Murphy, marketing manager for HP's business systems sector.

At the same time, the vendor also plans to intensify its relationship with value-added business partners and thus expand its presence in narrow, specialized markets such as financial services, manufacturing, law, sales and distribution, Murphy adds.

How well HP addresses the perceived weaknesses in both its marketing skills and business systems family will determine in large measure whether the reverses the company suffered in 1986 will return to haunt it in 1987.

For the largest electronics vendor headquartered in Silicon Valley, the past year has offered a decidedly mixed bag of results. On the negative side, HP shocked the industry last September when it announced a six-month delay in shipments of the 930, the first business-oriented product of its Spectrum development project.

Like IBM and most other hardware suppliers, the Palo Alto, Calif.-based firm has also taken its fair share of lumps financially. During the fiscal year that ended on Oct. 31, the high-tech giant's revenue and earnings rose just 9% and 5% respectively — a paltry increase by HP standards.

The firm's lackluster performance in turn prompted HP earlier this year to take some highly uncharacteristic steps to cut its personnel costs. Through a combination of early-retirement incentives and voluntary severance programs, the company trimmed 1,515 employees from its work force but stopped short of abandoning its long-standing policy of no layoffs.

On the positive side, HP in 1986 preserved its high rank in desktop publishing and greatly strengthened its hand in office automation through a raft of software announcements that enhanced the company's networking and systems integration capabilities. During the past 12 months, the firm also solidified its position in the technical computing sector by introducing the HP 9000 Model 840, an engineering system that embodies the same Precision Architecture as the 930.

But although HP remains fundamentally sound and is well positioned in its target markets, the company has found itself unable to shake entirely two of its most persistent bad raps. One is the popular belief that HP, especially in the office systems arena, lacks the marketing prowess of leading competitors such as IBM and Digital Equipment Corp.

"HP isn't really known as a true marketing company," says Ray Pawlicki, assistant vice-president of Citicorp.'s asset-based Finance Division, which uses four HP 3000 Model 70s. "They're not great at coming in and giving you flashy brochures about how great things are going to be."

Continued on next page

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Continued from page 31

The other perennial knock against HP is that the 3000, its flagship product line in the commercial systems field, is technologically over the hill because of its 16-bit architecture.

Typical of the HP 3000's numerous detractors are some of the senior executives to whom Litcher reports at the Department of Energy installation in Oakland.

"In the opinion of our upper management, the 3000 line may be architecturally outdated," she says.

Litcher strongly disagrees with her bosses' assessment and with their further suspicion that HP may be unable to compete with 32-bit systems vendors like DEC.

"Everything works, and our downtime is less than 1%," she says. "We're spoiled and couldn't be happier without going up to a $1 million mainframe."

To a large extent, the nagging criticisms of HP's marketing efforts and business systems technology are a problem of perception rather than an accurate reflection of reality.

Although the firm may lack some of IBM's marketing glitz and pizzazz, "It does a good job of listening to users and finding out what their needs are," Pawlicki says.

"If you talk to individual customers, they'll defend HP to the hilt for just that reason."

HP's rapport with its installed base results partly from its recent adoption of a strategy that it calls "imaginative understanding of user needs," HP's Murphy says.

Among the strategy's manifestations is an HP-devised process known as Total Quality Control/Office, in which company representatives visit customer sites and analyze their work habits with an eye toward boosting their productivity.

Yet for all its vigorous efforts and noble intentions, HP is often still perceived as a Johnny-come-lately to office automation.

"Because offices are fairly new turf for them, they don't seem as willing as DEC to really dig into a customer's specific business requirements," Seybold says.

FORECASTERS

Earl Joseph, president of Anticipatory Sciences in Minneapolis, sees a big jump in information technology coming about between 1988 and 1991 to 1992, but first there must be an intermediate step, with today's technology made more cost-effective. This will require a step up in the level of integration for hardware and software.

He says that in order to be cost-competitive for that next wave, vendors will have to increase the cost/performance of their products by at least a factor of 10.

"At the present time, they're integrating the software still at the systems support level, with the typical automation type applications. I think we're going to see the next step of integration, where we'll get the more specialized applications with that system support software," he says.

Expert systems will play a larger part in corporate life, perhaps sooner than most expect, he thinks. The year 1987 is when "we'll be beginning to replace professional people at a pretty fast clip, killing the professional with expert systems," he says. The year "1988 should be when it really hits."

He says high-level experts might be the first to go, because expert systems will allow lower-level personnel to match the high-level expert and be paid less for it. "Why should you pay for it on your staff when you can just hire the experts back on a part-time basis when you need them?" he asks.

"It's going to especially hit middle management. We're already beginning to see that," he says. The increase in communications will hasten the arrival of distributed systems, which will further break down the central office, where there usually is the greatest overload of high-paid staff, he says. "I think that's where you're going be hitting them first — in the central office.

"I think from what I can gather, most of the professionals out there are underestimating the effects of the expert systems. They think it's going to be an evolutionary type of thing. I think that once expert systems crash the threshold of being useful, it's going to change, almost overnight, the mix of people. I don't think it's something that comes on slowly, and I don't see enough people preparing for that."

Some of this displacement also will hit the computer professionals, he says — "the chief information officer's staff and the MIS people, the middle types of staff."

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HP 9000 Series 800 Model 840 used as area manager on factory floor

HP on the offensive with plan to outrun current pacesetters

Hewlett-Packard Co., which encountered intense competition and technological ferment almost everywhere in its diverse product line in 1986, can expect a lot more of the same during the next 12 months.

In fields ranging from technical computing and desktop publishing to factory automation and office systems, HP is reportedly readying a flurry of upcoming product announcements aimed either at repelling aggressive market challengers or attacking current industry pacesetters.

In the technical workstation arena, users can expect the firm to make its first tentative forays this year into market niches where it has traditionally lacked a substantial presence.

HP launches assault

In particular, HP will mount its first limited assault against the likes of Sun Microsystems, Inc. and Apollo Computer, Inc., according to International Data Corp. (IDC) consultant Vicki Brown.

To date, most of the company's 9000 series technical workstations have gone to the same class of customers who have historically bought large volumes of the vendor's test and measurement gear. Among such users, HP enjoys "an incredibly loyal following that seldom even considers an alternative supplier," Brown says.

But as soon as HP ventures outside its traditional installed base, the firm's name recognition and market status shrink to near zero. "Most of the people who obtain their technical workstations from outfits like Sun or Apollo rarely even mention HP's name," much less seriously consider it for a major acquisition, Brown says.

This year, though, the company will expand its efforts to heighten its visibility in the Sun and Apollo domains. One way of doing so might be for HP to introduce the first Precision Architecture version of its HP 9000 Model 300 workstation family, Brown says.

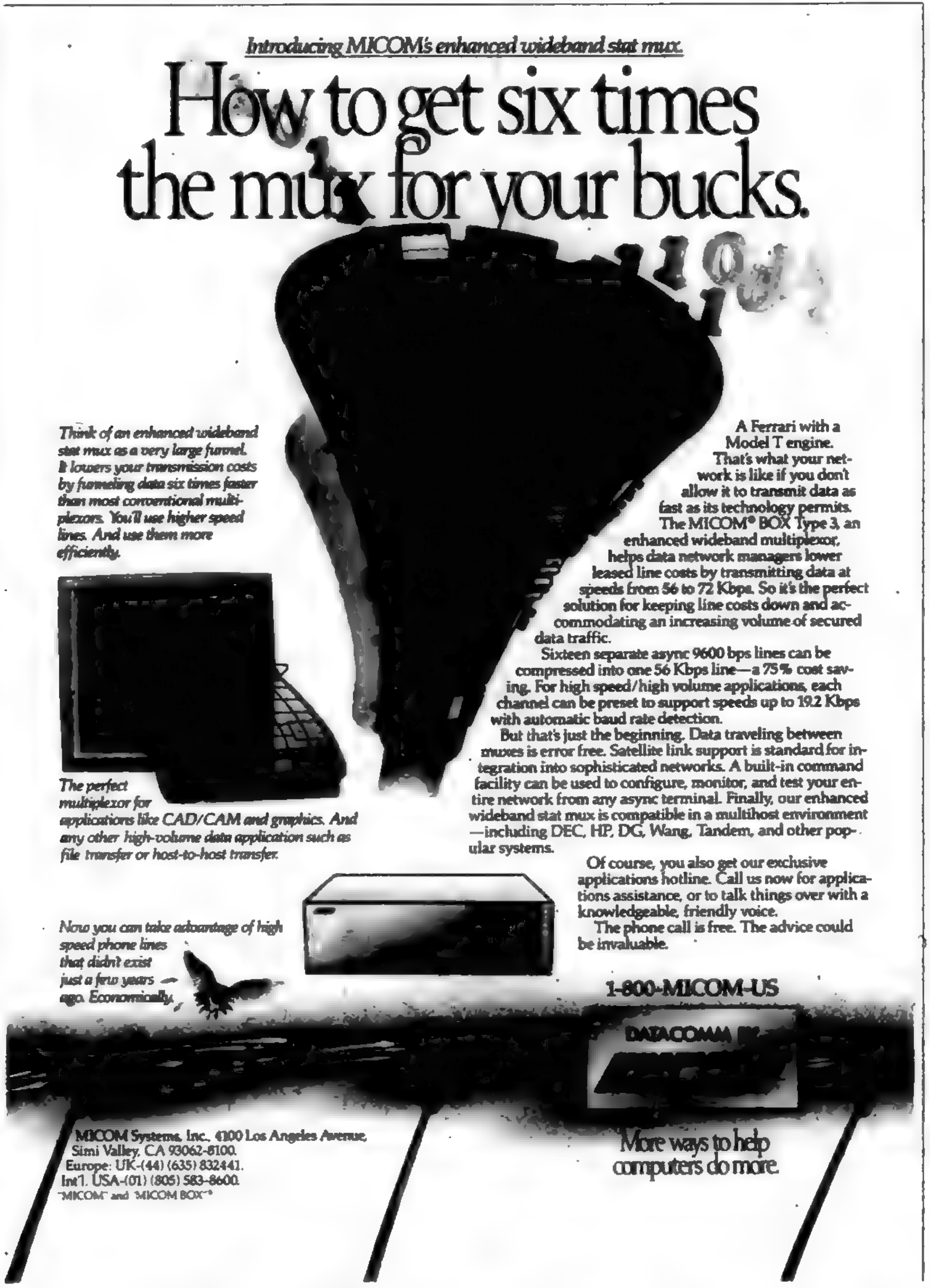
In its graphics and desktop publishing endeavors, meanwhile, HP will face growing competitive pressures on its already "tenuous" market leadership, according to Alan Paller, president of AUI Data Graphics, Inc.

At a time when most other players in the desktop publishing field have standardized on Adobe Systems, Inc.'s Postscript as their document description language (DDL), the Palo Alto, Calif.-based electronics giant has opted instead for Imagen Corp.'s DDL.

So, how well HP's desktop publishing system fares this year hinges chiefly on whether leading microcomputer software developers equip their products with Imagen DDL drivers, Paller says.

If, as expected, the software companies do support the necessary drivers, HP's short-term future in desktop publishing looks reasonably bright. But if the same vendors decide to do otherwise, many users of the company's laser printers may be forced to switch to rival systems to gain the benefit of Postscript availability, Paller adds.

As for the office systems sector, HP will likely announce support this year for both IBM's Systems Network Architecture Distribution Services and for the X.400 standard,



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according to Gartner Group, Inc. senior analyst Joseph McGrath. If the predicted move comes to pass, the firm will substantially enlarge its peer-to-peer networking capabilities and will maintain technological parity with Data General Corp. and Digital Equipment Corp., two firms which recently announced similar advances.

Long-awaited link

Also predicted to take place early this year is the long-awaited delivery of a software link between HP Access and Cullinet Software, Inc.'s Information Center Management System (ICMS). Introduction of the link will provide HP 3000 series users with transparent access to every IBM data base covered under ICMS, according to Royce Murphy, product line manager with HP's Office Systems Division.

In the factory automation market, meanwhile, HP may this year find itself unable to resist the temptation to announce the first 1000 series system that takes advantage of the firm's Precision Architecture.

The addition of such a machine would complete the unification of HP's three major processor lines under a common technology and "would look extremely elegant from a marketing standpoint," says IDC Vice-President Ralph Finos.

J. B.

FORE-CASTERS

Francis McDonough, deputy commissioner for federal information resources management in the Information Resources Management Service for the U.S. General Services Administration, has policy-setting responsibility and authorization for the whole business of the federal government. McDonough looks for big changes to occur as a result of coming changes in information technology, especially in the area of restructuring work. He says he sees the current level of technology reaching a plateau between now and 1990.

"In the government, we're building a base now, a foundation for the 1990s, so when the technology gets better, the government work force will be in a position to capitalize on it rapidly."

McDonough sees the necessity of better software, particularly easier-to-use versions of microcomputer data base products. "Data base software is just for techies now. It's too hard to use."

He does not subscribe to the hype surrounding the implementation of ubiquitous local-area networks. "We hear theories that everybody needs to talk to everybody, but that's not true," he says. "Why should a customs agent at an airport talk to people who print dollar bills or to budget analysts?" Instead, he says, electronic "tribes" of users will evolve, communities of users with common interests and communications needs.

In the meantime, as he awaits the improved software he expects during the next few years, McDonough plans to implement some clustering and get more experience with networking, establish data access rules for the networks and focus on aggregating purchase requirements and making large buys at big discounts.

In light of coming changes, it is premature to develop sweeping product standards, he says. "These are still the very early days now, so it's ridiculous trying to make decisions as if this were a mature industry."

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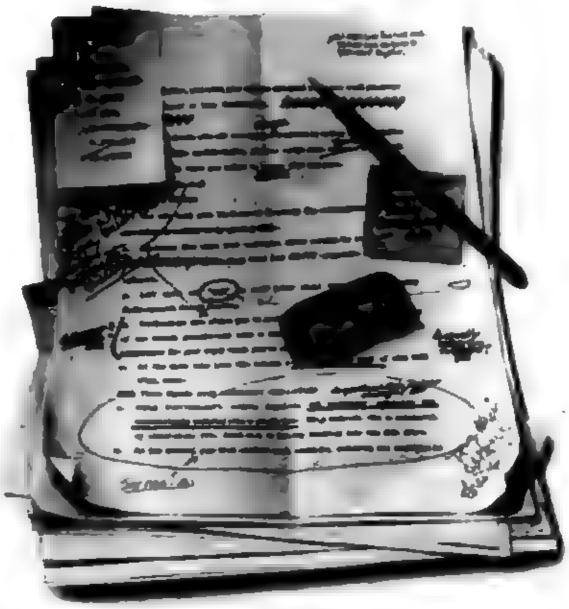

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Generic minis create market competition

Software, services may tip the balance

BY DONNA RAIMONDI

Plain-vanilla minicomputers, while not yet a mass market product, promise to triple in installed base by 1990.

Unix-based boxes built with off-the-shelf microprocessors — the most common types of plain-vanilla systems — account for 10% of the medium-scale systems market, says Bruce Kin Huie, senior industry analyst for Unix markets at International Data Corp (IDC). By 1990, they will corner 17% of that market, defined by IDC as 17- to 128-user minicomputers.

The advantages of generic minis to the MIS manager are clear, at least theoretically. Software that runs on a standardized Unix, Motorola, Inc. 68000-based machine, for example, should run on any other Unix/Motorola CPU, so it would not matter whose boxes customers mix and match. Off-the-shelf parts are cheap and easy to replace; the boxes can be produced inexpensively and cost the buyer less than proprietary systems. Unix, especially, and Pick Systems' Pick, to a lesser degree, are growing standards that have prompted OEMs and value-added resellers (VAR) to produce vertical market software. Upgrading systems should prompt little or no software recoding.

However, this theory does not yet hold up in practice. "When you get into the area of software availability and maintenance and service, it can make a difference who the system comes from," warns Brian Daly, senior associate editor at Datapro Research Corp., reporting on minicomputers.

Large companies with proprietary minicomputers — like Digital Equipment Corp., Data General Corp. or IBM — can provide the communications, software, support systems and upgrade paths users need, while small generic mini manufacturers often cannot.

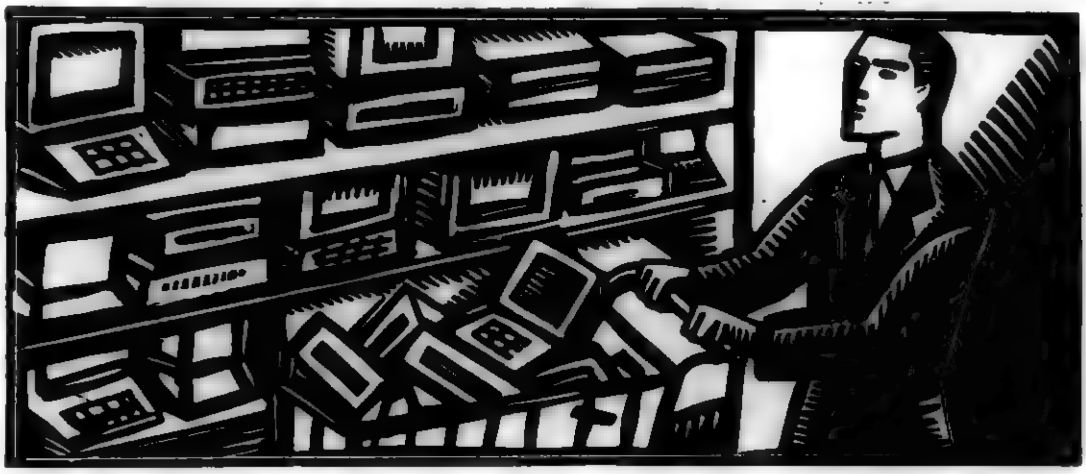
Buyers must be more careful in choosing hardware and software vendors. "We stay with McDonnell Douglas [Corp.] for our Pick-based systems because of its name and the service, and we know they won't be here today, gone tomorrow," says Sue Reinstein, senior programmer/analyst at Kirk Paper Co. in City of Commerce, Calif.

"Other companies that get on the Pick and off-the-shelf processor systems bandwagon might give us a better deal initially, but if they are gone tomorrow, what good is it?," she asks.

Unix, while becoming a standard because of AT&T's System V interface definition document, which describes the standard way it is supposed to operate, still comes in many flavors, not all of which are easily portable. The price savings of buying a generic box with off-the-shelf parts is only a savings if the buyer can see how it will fill future needs.

"Ask yourself where you are going to be five years down the road and whether you are going to be able to grow that system smoothly without having to go to a lot of sources and without creating a lot of headaches for yourself," Daly advises MIS managers.

Although Unix proponents have predicted bountiful supplies of application software, that promise has not been fulfilled. Many Unix generic box



ANTHONY RUSSO ILLUSTRATION

Continued from page 36

vendors sell primarily through OEMs and VARs, expecting them to develop vertical applications, Daly says.

Application software has grown by 100% during the past year, according to IDC's Huie, but the base it grew on was very small to start with. There are between 2,000 and 2,500 packages out there now, and many small VARs and OEMs are writing for Unix, he says. This growth is prompted by government insistence on the Unix standard and hardware vendors who have latched onto Unix as a cheap way to develop their niche products such as fault-tolerant or transaction-processing machines.

While Unix grows rapidly, it still has not penetrated day-to-day business environments, says Steven Young, senior consultant at New York's Pencom Systems, Inc. At the placement firm, Young finds jobs for Unix programmers nationwide. In the financial services, for example, Unix is used by research experts for financial analyses, but not for business functions like payroll or general ledger, he says.

Application software will increasingly be the driving force in systems choice, especially once distributed data base management systems take hold by the late 1980s, says John McCarthy, research manager of Forrester Research, Inc. in Cambridge, Mass. Software developers for the mini and supermini marketplace will boil down support to three operating systems — IBM's VM, DEC's VMS and maybe Unix, he predicts.

Native Unix

If Unix becomes the standard operating system, traditional minicomputer vendors will have to reduce the price of their boxes and offer Unix if they are to keep customers, Huie says.

Most traditional minicomputer makers already offer Unix as either a native environment or one that runs under the proprietary operating system.

"Those companies are losing business when they don't offer native Unix already because of government and university insistence on it," Huie contends.

Unix is not easy to use in its original form. Companies that sell Unix boxes must first develop interfaces to protect users from the operating system's arcane command structure, says Bernie Buesker, manager of technical support at Texas Instruments, Inc.'s data systems group. In order to promote Unix as the operating system on which TI's newer minicomputers are based, TI has had to build an unintimidating "business interface," as well as functions and facilities that are easier to use than Unix's own.

At the same time, to remain consistent with AT&T's definitions, the vender has to offer the operating system's own, somewhat difficult-to-use, functions such as the vi editor, leaving the user to choose the functions he wants to use.

"We also believe Unix was deficient in data integrity for the commercial world," Buesker adds. In standard Unix, data is written into the memory, and if Unix has a need for that buffer space, it will then write the data out to disk. TI had to eliminate that problem before Unix could be valuable to its commercial customers, he says.

Unix is not easy to use in its original form. Companies that sell Unix boxes must first develop interfaces to protect users from the operating system's arcane command structure.

Despite all the drawbacks, generic systems are becoming a reality. While Unix-based systems show the most promise as a standard, according to analysts, some vendors supply Pick Systems' Pick operating system. McDonnell Douglas Computer Systems Co., The Ultimate Corp., Applied Digital Data Systems, Inc. and General Automation, Inc. are four of the largest vendors to offer multiuser Pick systems, says Pick analyst Chandru Murthi of Opsys, Inc. in San Francisco. But a growing number of smaller companies and at least two multimillion dollar Japanese vendors — Fujitsu Ltd. and C.I.E. Systems, Inc. — are trying to get a piece of the U.S. market, he adds. While Pick is growing slowly in the U.S. — with close to 70,000 installed systems (all sizes except microcomputers), 430,000-plus users and a growth rate now of 10% per year — it accounts for 10% of all computer systems in Australia and is heavily used in Europe, Murthi says.

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Super microprocessor upheaval nears

A new generation of general-purpose microprocessor-based computers offering price/peformance advantages 10 times greater than currently popular mini- and superminicomputers will hit the market in force during 1987.

The systems will dramatically decrease the price for capabilities measured in million instructions per second (MIPS) and create chaos in distribution and support services, according to a report issued by William Welty of the investment firm Hambrecht & Quist, Inc. Borne of user demand for standardized hardware and software and powerful innovations like the Intel Corp. 80386 microprocessor, the machines will feature bus-oriented architectures loaded with board slots, the report says. This architecture allows the growth of a coprocessor industry that lets users build their own application-specific machines.

The prices of 80386-based systems will be much lower than those charged by traditional minicomputer manufacturers for similar throughput. A Digital Equipment Corp. 4-MIPS machine, CPU only, can cost $60,000 per MIPS, while an 80386-based 4-MIPS system with similar throughput will cost approximately $5,000 per MIPS.

More importantly, the architectural gap between mini- and microprocessor-based systems is closing. The relatively slow speed, moderate instruction set, small main memory and unsophisticated operating system of the microprocessor-based system compared with the mini has been banished by innovations such as 32-bit microprocessors, dynamic random-access memory chips, I/O processors and standardized software like Unix.

"The VAX killer has arrived," says the report in reference to DEC's popular VAX system, based on a proprietary architecture and operating system.

The 80386 chip promises to end the shortcomings of the Intel 8088 microprocessor, on which the IBM Personal Computer was based. In addition to overcoming the lack of resource sharing among processors, 8-bit data paths, no virtual memory, limited memory address, few data types, embryonie pipelining and low bandwidth buses, the 80386 will also equal the performance specifications of many superminis.

Numerous systems manufacturers will introduce 80386-based multiuser systems with cache memory in 1987. All of these systems will run a combination of Unix and Microsoft Corp.'s MS-DOS. This will allow the $6 billion MS-DOS software base to run under Unix. Because the 80386 allows this, there will be a shift in marketshare. Motorola, Inc. chips — currently 80% of the 32-bit microprocessor market — are projected to slip to about 25% of the market. Intel will rise to 50% of the market when the 80386 production ramps up.

At present, users see clear advantages to sticking with proprietary systems such as the VAX. DEC has a huge installed base of applications software that ties its customers to the company. But increasingly, the report says, users will not stand for overpriced MIPS when they have a clear alternative.

The big winners in the $5,000-per-MIPS world are users of computer power. The big losers: vendors that sell $60,000-per-MIPS machines. But $5,000-per-MIPS machines do not support nearly as many people as a $60,000-per-MIPS machine, the report warns. Change is coming, both in distribution channels and support. Value-added reseller franchises could burgeon, value-added distributors will be courted because of their closeness to customers and interconnectivity and interoperability companies will be seen as adding real value. But customers worried about reliability or support may have to face buying two of the systems to keep one going.

D. R.

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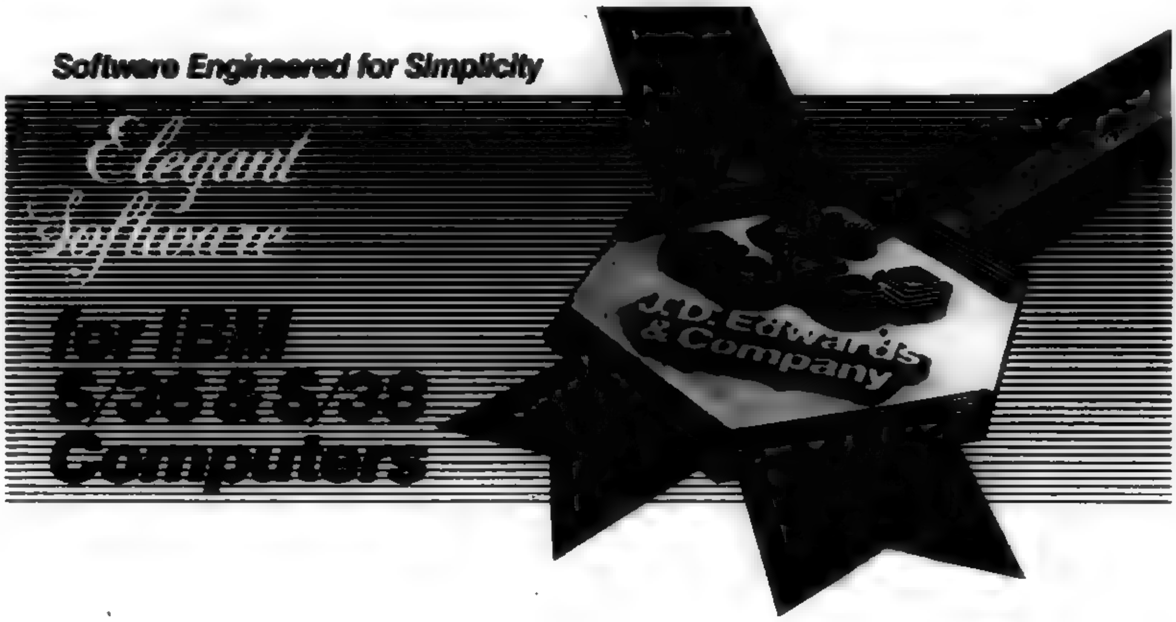

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TRENDSETTERS

Seven years ago, Walter Z. Budok oversaw K Mart Corp.'s pioneering step into distributed processing. Today, he is helping usher the corporation into space-age communications by equipping a continent of K Mart stores with advanced data and video networks.

The $50 million-plus project of linking 2,100 nodes around the country is second only in scope to K Mart's installation of more than 1,500 IBM Series/1 systems from 1979 to 1983, Budok says. He was director of DP/MIS at the time.

"We were into this before the industry as a whole claimed the term distributed processing," Budok says.

Now, as director of corporate communications and systems reliability, he heads the telecommunications upgrade project. The hub is an 11-meter satellite dish at corporate headquarters in Troy, Mich., communicating with the GTE Corp. G-Star 2 satellite. Each K Mart store, distribution center and regional office will have its own 1.8-meter satellite dish.

The project is intended to reduce the number of dataphone connections per store, Budok says.

Most K Mart communications are now on a dial-up basis. Callers retrieve data from point-of-sale controllers, dial from Series/1 systems that run accounting or call from pharmacy microcomputers.

K Mart originally opted for an X.25 packet network because the network would link the varying protocols on the different systems, but the firm had not specifically considered a satellite connection.

Prices of some early satellite solutions were so attractive, however, that the MIS department reopened bids. A combined proposal by GTE Spacenet and GTE Telenet Communications Corp. was the winner.

Savings could be as much as $100 million during a 10-year period — greater than a terrestrial system, according to Budok's management proposal.

The hub satellite dish is under construction now. The packet switching gear is installed, and K Mart has begun internal testing.

In March, a Detroit store will become the first to be hooked into the network, with 49 more sites in two states following shortly.

Budok expects to finish the pilot by summer.

P.W.

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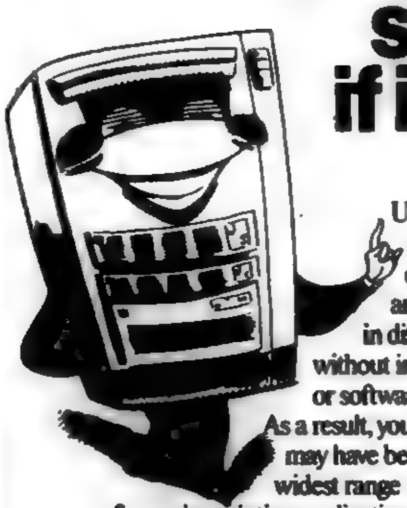
Your IBM mainframe could say a lot more if it spoke Xerox.



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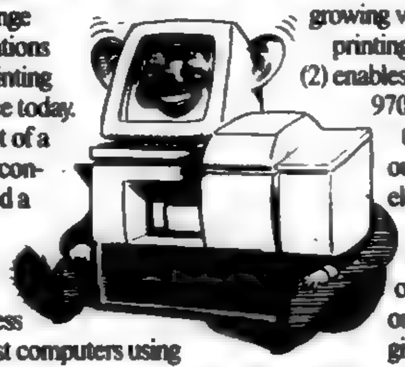

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T-2 ISDN—Status and Developments

Leaders: James G. Herman, Director, and Mary A. Johnston, Senior Consultant, Telecommunications Consulting Group, BBN Communications

In this tutorial you'll learn what ISDN will and won't deliver in the late 1980s, what the emerging ISDN standards will mean in terms of new services and improved network performance, what holes still exist in the standards and trials, how to make smart buying decisions while keeping open your options for ISDN compatibility, and more. *Level.* Intermediate.

T-3 Strategic Planning for Corporate Information Networks

Leader: Dr. Howard Frank,
Howard Frank Associates

Attend this tutorial to learn how to relate vendor offerings and technological trends to your organization's needs and requirements, and to develop a framework to plan future services and systems. You'll examine current issues in network integration, why communication departments must function as "mini telcos," and the pros and cons of software defined networks and private dedicated networks. *Level* Introductory–Intermediate.

T-4 Planning and Designing Networks with the New Technology

Leader: Dr. John M. McQuillan,
President, McQuillan Consulting

In this intensive seminar, you'll get acquainted with the key architectural principles used by today's leading network planners. You'll review emerging technologies such as T-1 networks, hybrids, VSATs, gateways between SNA, LANs and X.25, micro-mainframe links, and intercompany networks. You'll learn how to plan a corporate network using advanced technologies. *Level* Advanced

T-5 Building the Network Management and Technical Control Facility

Leader: Gabriel Kasperek,
President, Kazcom Inc.

This one-day course will help you understand the strategic value of network control, explore alternative technologies for managing your network, and discover how to evaluate current technologies for use in your own organization. You'll become familiar with the test equipment you need for successful network control, and understand industry trends and future directions. *Level.* Introductory–Intermediate.

T-6 Designing Voice and Data Networks Under the New Tariffs

Leader: Robert L. Ellis,
President, The ARIES Group Inc.

Take this tutorial to learn the structure of the post-divestiture tariffs, the latest January 1987 changes to these tariffs, how to price interstate private lines, how to configure and price interstate FX services, the new economics involved in configuring data networks, the LATA-pure strategy, and more. *Level:* Intermediate

T-7 Managing the Telecommunications Resource

Leader: Gerald P. Ryan,
President and Founder,
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This one-day course briefs you on how to develop a successful management environment. You'll learn what tools are available to do your job more professionally, how to plan a network management center, how to staff and train the department, and how to prepare and substantiate departmental budgets. *Level:* Intermediate.

T-8 IBM Token-Ring Versus Other LAN Choices

Leader: Dr. Kenneth J. Thurber,
President, Architecture Technology Inc.

This tutorial gives you an across-the-board overview of announced products, future plans, compatible products, and IBM's overall strategy with respect to Token-Ring technology. You'll discuss the Token-Ring's relationship to IEEE 802.5, the IBM cabling systems and hosts, get an in-depth look at NETBIOS and APPC/LU 6.2 interfaces, and more. *Level:* Intermediate.

T-9 VSAT Technology and Implementation

Leader: Dr. Jerome G. Lucas,
President, TeleStrategies

Learn the basics of applying very small aperture terminal (VSAT) satellite communications to your networking needs. You'll get acquainted with basic application requirements in SNA networking, data broadcasting, PC networking, video broadcasting, and teleconferencing. *Level:* Intermediate.

T-10 IBM's Systems Network Architecture (SNA): A Detailed Road Map

Leader: Daniel Zatyko,
President, Zatyko Associates

Enroll in this intensive one-day tutorial to understand the evolution of SNA, and learn fundamental SNA concepts—the seven SNA architectural layers, SNA's physical and logical addressing, strategic SNA products, components of NetView, Token-Ring networks, functionality and capabilities of the LU 6.2/APPC and NETBIOS interfaces, and more. *Level:* Intermediate.

T-11 An Introduction to Data Communications Today

Leader: Gary Audin,
President, Delphi Inc.

This course introduces you to the basic concepts, terminology and technology of data communications. You'll learn how various networks operate and how to select them; how best to interconnect computers, terminals, and PCs using different protocols; and what software is necessary to support protocols and network management. *Level:* Introductory.

T-12 Understanding the Communications Regulatory Environment

Leader: Richard E. Wiley,
Senior Partner,
Wiley, Rein & Fielding

Enroll in this tutorial to learn how telecommunications policy is made and changed, what agencies are active in policy making, how industry segments are affected by current policies, what key issues are now under consideration, and how you can influence future decisions. *Level:* Introductory.

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TRENDSETTERS

Common concerns provided the incentive for the formation of the Personal Computer Professionals Association (PCPA) in Southern California, and the emerging result is influence beyond its members' individual voices, with benefits for both [redacted]

Central to the effort is Joel Isaacson, technical systems consultant for Carter Hawley Hale Information Services in Anaheim, Calif., who is serving his third year as president of the 75-member organization. The group's monthly meetings include forums on site licensing, training, standardization and upgrades.

"It appeared to many of us that vendors seemed to be directing their efforts toward the individual user, and acting in response to those requirements," Isaacson says of his inspiration in organizing PCPA. "Our role is not to be an antagonist, but perhaps a catalyst, a partner. We like their products, and we want the vendors to recognize our needs."

[redacted] ognize corporate buyers, the members found they had more influence as a roomful of like-minded managers.

"Often, unless you're a corporation with massive numbers of machines, you don't feel like a big deal to vendors," Isaacson says. "If you're General Motors and buying 50,000 copies, that's another story. But we're not all GM."

Among the most successful fo- [redacted] ternational Corp., before its acquisition by Ashton-Tate, Isaacson says. "We had the opportunity to provide some good feedback," he says. "They responded as we hoped a vendor would respond. They redirected some of their services for corporate [redacted]

The PCPA also took aim at Ashton-Tate's upgrade policy when Dbase III was announced, Isaacson says. "From what we understand, they did make some changes," such as not requiring return of all disks, he says.

The quintessential corporate vendor, IBM, is in the spotlight at the closing PCPA meeting each year.

"We have them come and present some of their thoughts and ideas, talk about directions as much as possible, give information on services and give us a chance to give feedback," Isaacson says.

"I don't know that we can point to anything that prompted them to change their directions, but I think we've seen IBM come up with some new support opportunities" that [redacted]

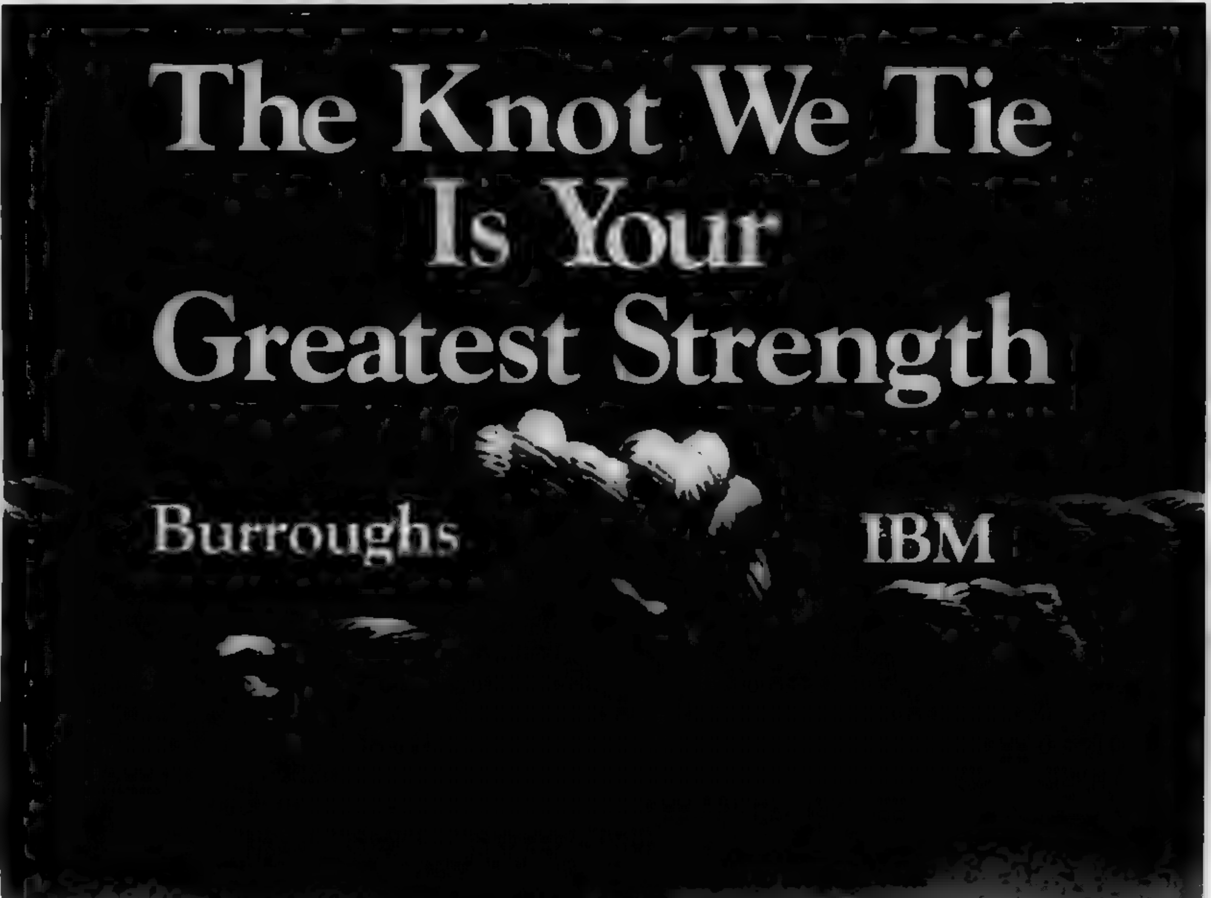
The reception from vendors has been "almost always positive. They're often surprised; they haven't heard of us. But any time they can get 30 or 40 corporations in one room and talk about our concerns and why their products have not been received, they take the opportunity," Isaacson says.

Isaacson says he also wants PCPA "to provide the kind of intercompany information that will help us all to learn and improve our own operations and become better professionals."

At Carter Hawley Hale, Isaacson provides guidelines and standards for microcomputer installations, which now number more than 450.

"The PCPA has mostly helped me in that I've been able to obtain contacts that are more direct, and therefore clearer, and able to define and understand where things are going," he says.

P.W.



[illegible] requirements. Both interface systems are easily installed mainframe to mainframe data communications links.

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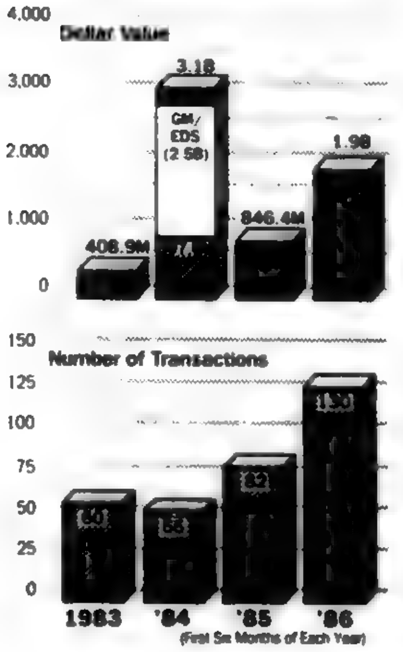
Software and services industry



Information provided by Broadview Associates

BY CLINTON WILDER

From their experiences in 1986, users of Sperry Corp. and Honeywell, Inc. products know better than anyone that the computer industry is a highly volatile one. With the industry experiencing both a rapid maturing and a slowing of the heady growth rates of the early 1980s, even the largest vendors are ripe for consolidation.

By most industry tracking indexes, the pace of mergers and acquisitions reached record levels in 1986. The general industry conditions that have sparked such activity are expected to prevail throughout this year, indicating that the industry's merger mania will continue unabated in 1987.

Although the impact of federal tax reform will probably dampen deal-making early in the year, most industry watchers feel the overall upward trend will continue. More and more computer users will find their hardware and software products being marketed by different parent companies than the vendors with which they began the year.

Although the software and services industry does not usually generate the billion-dollar numbers of a Burroughs Corp.-Sperry acquisition, its structure continues to be dominated by buyouts and sell-offs. The industry ranked fourth out of 50 in the volume of mergers and acquisitions between 1981 and 1985, according to W. T. Grimm & Co., a Chicago research firm that tracks merger and acquisition activity. Computer hardware, by contrast, ranked 21st in the same time period.

In mainframe software, virtually every leading vendor has acquired smaller software companies, and two — McCormack & Dodge Corp. and Applied Data Research, Inc. — have been acquired by companies previously outside the computer business.

Several of the largest mainframe software developers, including Computer Associates International, Inc., Management Science America, Inc. (MSA), Uccel Corp., Sterling Software, Inc. and Pansophic Systems, Inc., have made it clear that they intend to grow by acquiring. Conversely, for smaller niche companies and start-ups, the increasingly logical expansion path is to grow by being acquired.

"Since the software industry has fairly low barriers to entry in terms of capital requirements, a business is relatively easy to start up," says Anthony Wang, president and chief operating officer of Computer Associates. "But it is not that easy to grow that business to a meaningful size. Over a period of time, many small and mid-size companies realize that they have peaked out and that the better way to leverage their product is to have it marketed by an established organization."

"Historically in software, acquisition has been a hallmark of success, not failure," adds Gilbert Mintz, cofounder and partner of Fort Lee, N.J.-based Broadview Associates, the software and services industry's leading deal-maker. "Good companies now have the option of playing the game either way. You may have the cash to make an acquisition, but it's fun being seduced, too."

The final two months of 1986 saw a flurry of software and services acquisitions as vendors sought to wrap up deals before the unfavorable tax changes for capital gains treatment took effect Jan. 1. The timetable of Computer Associates' purchases of both Integrated Software Systems Corp. and General Electric Co.'s Software International unit was affected by tax considerations, Wang acknowledges.

Other late-year mergers included MSA's purchase of Comserv, Inc., Bell South Corp.'s buyout of Dataserv, Inc., Emhart Corp.'s acquisition of Planning Research Corp. and the sale of most of Honeywell Information Systems to Honeywell's joint venture with NEC Corp. and Compagnie des Machines Bull.

Continued from page 43

Because many deals were rushed through at the end of 1986, the first half of this year may be a relatively quiet period for computer industry consolidations. Although most industry observers believe the pace will pick up again in short order, the tax changes may mean that vendors will structure their deals differently.

"It will not be as advantageous for the seller to sell individual product lines or parts of the business," says Charles Varga, publisher of "The Cerberus Report," a biannual survey of industry acquisitions. "Sellers will come to the table saying, 'You are going to have to buy my company and its stock, not just the assets.' "

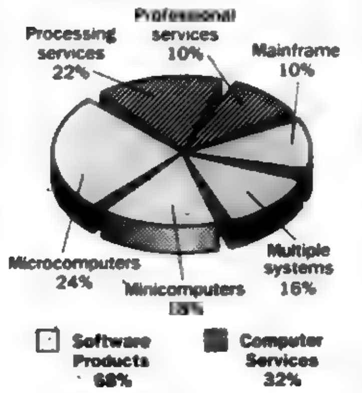
Such a change could spell trouble for firms like Atlanta-based microcomputer peripheral vendor Intelligent Systems Corp., which is attempting, so far unsuccessfully, to sell off pieces of its business.

Intelligent Systems and other would-be sellers may have a more difficult time this year trying to market themselves to companies outside the computer business, according to some observers.

Acquisitions breakdown

Primary business of software and services companies acquired

First Six Months 1986



Information provided by Broadview Associates

The acquisition of a compatible "corporate culture" may have become an overused buzzword when discussing merger possibilities, but the recent fireworks surrounding the services industry's largest buyout illustrate the potential risks of acquisitions.

The highly publicized management feud between Electronic Data Systems Corp. (EDS) founder H. Ross Perot and General Motors Corp. Chairman Roger Smith may cause other noncomputer firms to reconsider major high-technology investments.

"Old-line industrial companies will have to stop and think a little more about whether it's the right thing to do," says James Kelly, president of W. T. Grimm.

"Are the problems between GM and EDS just a conflict of personalities, or are there deeper factors that have kept the transaction from being successful?"

"My gut feeling tells me that companies not already in the business will shy away from it," says Computer Associates' Wang.

An interesting test case in 1937 will be the marriage of Emhart, a large, diversified manufacturer of adhesives and industrial materials, and Planning Research, a provider of computer-related professional services.

Moving into high tech

Another non-computer firm expected to continue its move into high tech by acquisitions is Citicorp, which purchased Quotron Systems, Inc. last year for $680 million.

Despite the preponderance of acquisitions within the computer industry, the business has generally been a safe harbor from the wave of hostile takeovers sweeping corporate America.

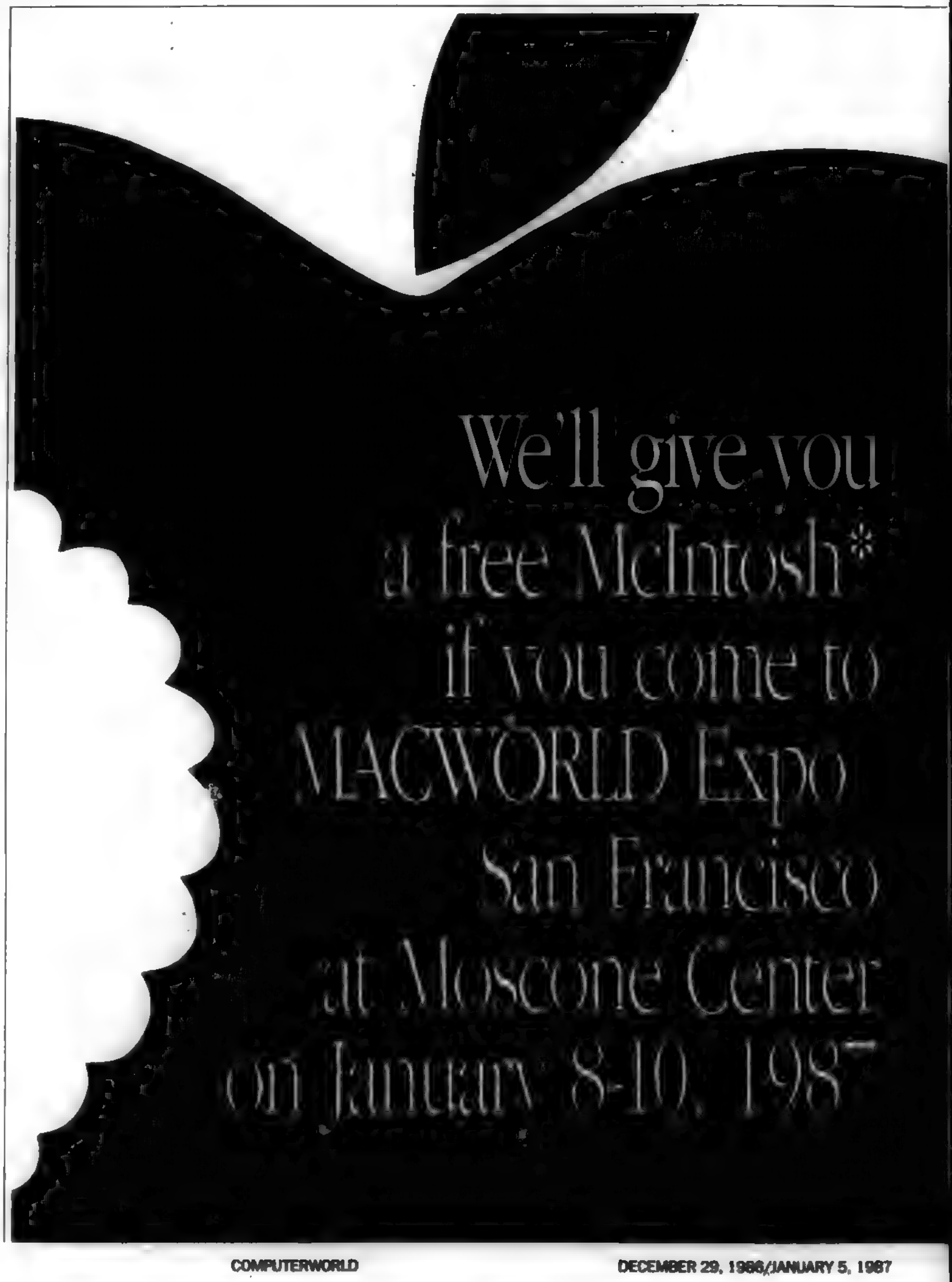
But that could very well change this year as potential buyers continue to monitor the two notable exceptions that so far have been successful: Burroughs' buyout of Sperry to form Unisys Corp. and Sterling's takeover of Informatics General Corp.

Concern increases

"You can tell the public companies in our industry are increasingly concerned about it, adopting poison pill plans and changes in shareholder voting rights," says Broadview's Mintz. "Before Sterling succeeded with Informatics, companies wondered how they could run a software company after a hostile takeover.

"Now the targets will be those firms where management has not been doing a spectacular job. We will see several hostile attempts in 1987, and it will be a growing trend," he adds.

Mintz does not expect the participation of corporate raiders like Carl Icahn or Sir James Goldsmith in the software industry, however. "They generally like larger companies with hard assets," Mintz says. "But we may see our own versions of these people — raiders more conversant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with the computer industry."

Another predictable trend is the increasing participation of the Japanese, as well as the South Koreans, in the ownership of U.S. high-tech companies. In addition to realizing the financial attraction of U.S. equity because of the strength of the yen, Japanese firms recognize the importance of U.S.-based distribution channels for the U.S. market.

Nonetheless, the Japanese will generally stop short of making outright acquisitions, says "Cerberus Report" publisher Varga. "They would much rather enter the market through joint ventures," he says. "That is a simple cultural fact, regardless of the value of the yen."

Telcos ring up computer mart

Computer industry watchers will continue to keep a close eye on the seven regional holding companies, virtually all of which have entered the computer business, some aggressively. But there, too, potential acquirers are sobered by the experience of Ameritech.

The Chicago-based holding company purchased Applied Data Research, Inc. (ADR) in late 1985, just as the mainframe data base management market was slowing down and IBM was launching a highly aggressive market share war with DB2.

Last year, Ameritech sent one of its own executives to head ADR's management team, although both firms involved insisted the move was not related to current business conditions.

"We're spending a lot of time understanding the software business and whatever we may do there, we'll do it very carefully," says Joseph Ambrozy, vice-president of marketing and strategic planning for Bell Atlantic Enterprises, the unregulated arm of Bell Atlantic Corp.

"We're looking for aggressive growth in the computer area," Ambrozy continues, "but we will not do anything until we are absolutely sure that it is logical for us."

Nonetheless, Ambrozy expects the regional holding companies to continue to be acquirers. During 1986, Bell Atlantic bought the computer leasing unit of Greyhound Corp. to add to its already large stake in the computer business through computer maintenance subsidiary Sorbus, Inc.

"Once a customer knows he wants a specific piece of computer equipment, we can handle everything," Ambrozy says. "We can finance it, maintain it, repair it, refurbish it and resell it. We are an alternative distribution channel for the hardware vendors."

C. W.

FORE-CASTERS

"I think the single most important issue from a user standpoint is information as a competitive advantage, that information and technology are important for competitive advantage," according to Melvyn E. Bergstein, a partner and a managing director in the management information consulting division of Arthur Andersen & Co. in Chicago.

"Next year, and over the long term, we'll see more of American senior management recognizing that. This is the overriding issue facing us into the next decade," he says, adding, "American senior management has yet to embrace this concept."

E. G.

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Japanese team up with U.S. marketers to penetrate mart

An oft-repeated axiom within the mainframe computer industry holds that Japanese vendors must establish strong relationships with U.S. marketing partners to successfully penetrate the American market.

That dogma has remained unchallenged during the last 25 years, as Japanese companies have entered the IBM-dominated U.S. mainframe market through various and sundry relationships with domestic computer vendors.

In 1962, NEC Corp. teamed with Honeywell Corp. to share technology. Eight years later, Fujitsu Ltd. became an investor and technology partner with Amdahl Corp. Hitachi Ltd. joined up with National Semiconductor Corp.'s National Advanced Systems Corp. (NAS) in 1979 after its original partner, Itel Corp., went bankrupt.

"Originally, it was a process that resulted from IBM's dominance of the industry," notes Bob Djurdjevic of Annex Research, Inc., a Phoenix market research concern. "It was a reaction by vendors that to compete, they had to form joint ventures at the R&D or marketing level to exploit each other's strengths."

For the future, partnerships will continue to be the only way Japanese vendors can survive and flourish in the domestic mainframe computer market, industry analysts say. While Japanese mainframe computer makers do have the technological prowess to compete with mammoth IBM on its home turf, they still lack the marketing clout and software aptitude necessary to seize market share on their own, analysts declare.

NEC's proposed participation with Compagnie des Machines Bull in France in the purchase of the bulk of Honeywell Corp.'s computer business provides the most recent evidence that the partnering trend is here to stay (CW, Dec. 8). By taking an equity stake in the company to be formed from Honeywell Information Systems — and which resells NEC's mainframes — NEC is protecting an installed base that relies heavily on its technology.

Frank Gens, mainframe analyst at International Data Corp. (IDC), a market research firm in Framingham, Mass., says partnerships enable Japanese vendors to quickly build demand for their mainframes and create economies of scale.

"What these partnerships are about is the necessity for the Japanese vendors to drive as much volume through as many channels as possible," Gens says.

Still, rumors persist that both Hitachi and Fujitsu will eventually bypass their U.S. partners that market IBM plug-compatible mainframes (PCM) and sell directly to domestic customers. NAS resells Hitachi-made PCMs, while Amdahl designs its PCMs using Fujitsu components and subassemblies and IBM-licensed operating systems.

For the foreseeable future, partnerships will continue to be the only way Japanese vendors can survive and flourish in the domestic mainframe computer market.

Both have set up U.S. subsidiaries to sell a wide range of computer and communications products. Hitachi will soon open a manufacturing plant in Norman, Okla., to produce large-scale disk drives; the move has spawned rumors that direct sales of PCMs in the U.S. may not be too far behind.

Amdahl and NAS executives bristle at the suggestion that their Japanese partners would leave them high and dry.

"It's something we don't think will happen," says Jerry Ungerman, vice- president and general manager of U.S. business operations at NAS. "Hitachi has had a similar relationship with General Electric Co. for power generation equipment since 1937. It's their way of doing business."

Amdahl President Jack Lewis agrees. "We have a set of agreements with Fujitsu regarding the use of patents. They use some patents we own, and we use some of theirs. Their computers are not sold here for that reason," he explains.

While some analysts contend that PCM distribution agreements between Japanese vendors and their

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U.S. vendors are not set in concrete, Hitachi and Fujitsu have too much to lose by cutting NAS and Amdahl loose.

"I was at Hitachi one year ago, and they said it was not their intent to cut their tie to NAS," Annex's Djurdjevic recalls. "They're a conservative company without an aggressive marketing organization. What would they gain from such a move, considering how well NAS is doing?"

Fujitsu, Djurdjevic points out, owns 47.5% of Amdahl and therefore would not make a move that could hurt its U.S. partner. "Fujitsu is a more aggressive and younger company than Hitachi. They're considered an upstart," he notes. "Although they don't do things by the book, I don't think they'd enter the mainframe market here directly."

IBM software compatibility

One thing is clear: Fujitsu is slowly moving away from strict IBM software compatibility. Fujitsu, analysts say, is adopting a proprietary architecture in response to IBM allegations that the Japanese company continues to infringe on its systems software copyrights. The case is being decided by a panel of arbitrators.

Some analysts therefore believe that Fujitsu is preparing to either enter the U.S. mainframe market with a proprietary architecture or attempt to sell Unix-based processors via a joint venture with AT&T.

Either way, Amdahl's Lewis claims his firm will survive.

"That's why we design all of our products and why we don't reverse-engineer from IBM," he says.

Meanwhile, both domestic PCM vendors are riding the crest of demand for their top-of-the line IBM 3090-compatible machines.

Both claim they are increasing PCM market share at the expense of IBM by hewing closely to the age-old philosophy of offering increased functionality at a 15% to 20% discount over Big Blue. Amdahl and NAS currently account for approximately 10% and 8% of the PCM business, respectively, and are expected to lift their shares by a few percentage points this year.

The domestic PCMs believe they owe their recent success to end users who do not want Big Blue to dictate how they run their shops.

"Business was up 60% [in 1985] over last year," NAS's Ungerman claims. "We are a real alternative to IBM in the market, meeting the needs and wants of the customers."

IDC's Gens says he believes that the PCMs' success is more a result of product life cycle circumstances than actual long-term shifts of loyalty. PCMs are just now seeing a revenue jolt from their 3090-compatible processors, while IBM's shipments of its high-end mainframe have already climaxed.

"It's only a matter of a few percentage points," Gens says of the market share gains the PCMs have made. "That probably will turn around once IBM enhances the 3090 or brings out its next mainframe generation.

"In reality," he continues, "the PCMs are not really battling IBM; they are battling each other."

The inheritors of Honeywell's computer business face more pressing problems.

Honeywell has continually lost market share during the last few years, as many of its customers have jumped on the Big Blue bandwagon. Honeywell held 5.4% of the domestic mainframe market in 1985, according to Dataquest, a San Jose, Calif., market research firm, compared with IBM's 68.3%.

Honeywell Information Systems' customers, however, will probably benefit most from the change in ownership, notes Kimball Brown, a mainframe analyst at Dataquest.

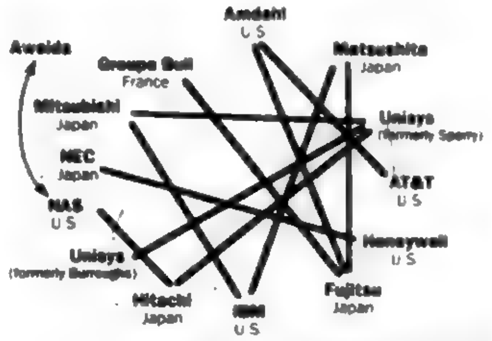
"If I was a Honeywell user, I'd applaud this move," Brown says. "NEC will provide the price/performance enhancements that customers will need and save them from Honeywell, which stopped investing in computer industry a long time ago."

Brown says it's NEC that IBM has to watch, not the PCMs. "They've got a proprietary machine but have a lot of software dug in it. They could get a lot of conversions because of the cost-effectiveness of their technology," he says.

A.A.

International connections

Joint ventures among major vendors



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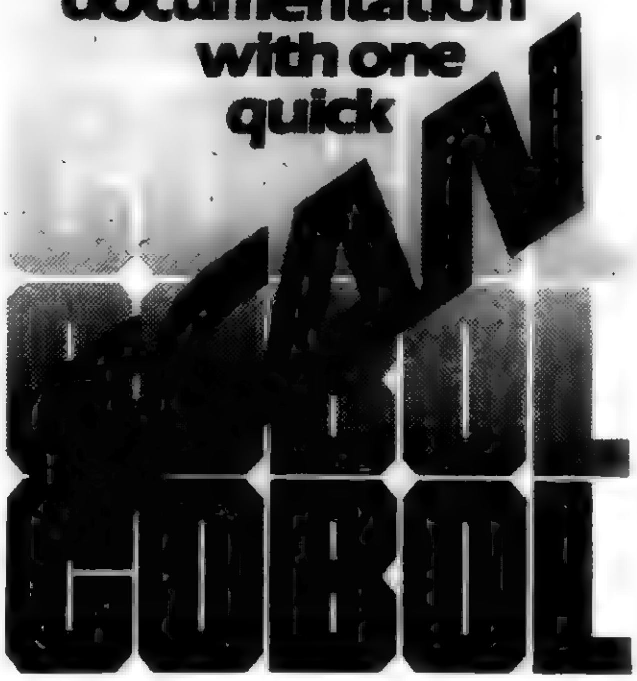

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Programmer power

Expert systems-based front ends speed design process, enhance user satisfaction

BY CHARLES BABCOCK

At a software conference in Phoenix recently, an IBM executive noted that artificial intelligence has been added to a development system in a way that speeds the quality and output of applications.

A murmur went around the room as his listeners exchanged glances of anticipation and disbelief. Ways to reduce the application backlog have been advanced over and over again — yet the backlog remains largely intact, stretched two to three years beyond available resources at most MIS shops.

Much has been promised from artificial intelligence as well, and yet software development remains a tedious, labor-intensive process. But Robert Berland, IBM's director of strategic planning, appeared to think that this time a solution of sorts was at hand.

"One of the companies here is using AI in an extremely exciting and innovative way, which is applicable to almost everybody," he said at the 25th-anniversary conference of ADAPSO, the software and services company association.

"This company is using knowledge system techniques to interact with the end user, to quickly prototype the end user's front end of the application. . . . They're quoting not only significant productivity improvements in the front end of the cycle but a significantly higher return in user satisfaction," Berland said.

The company he described is believed to be Transform Logic Corp. in Scottsdale, Ariz., which employs a forward-chaining expert system in building applications, according to knowledgeable observers.

But it could be a number of other firms working with expert systems or some form of rules-based programming with the goal of bringing new power to software development, such as Bachman Information Systems, Inc., Reasoning Systems, Inc. or Cortex Corp.

CARL WESLEY ILLUSTRATION

A user of Cortex's application development system The Application Factory says his firm, Texas Eastman Co. in Longview, Texas, is getting a "4-to-1 or 5-to-1 productivity increase" by developing Cobol applications with it on a Digital Equipment Corp. VAX 8650. When a rule-based, diagramming front end is added to the system, which is expected later this year, it will speed up the specification and design process, the front end of application building that has traditionally been most resistant to automation, says Raymond Johnson, supervising analyst for manufacturing systems at Texas Eastman.

"It's absolutely certain that over the next few years artificial intelligence concepts are going to work their way into the software development field," predicts George Schussel, president of Digital Consulting, Inc. in Andover, Mass.

Although there is still far to go, software development is subject to the same mathematical rules and logic that computer-aided design and manufacturing has brought to the hardware engineering process, according to Richard Phelps of Cortex, a Waltham, Mass., firm.

When applied to software development, AI "can do the classic expert system job of capturing the expertise of world-class people and putting it at the fingertips of people who do that job day to day," says Arnold A. Kraft, former project manager for DEC's Xcon expert system, one of the most successful applications of artificial intelligence to date.

DEC uses Xcon to configure the equipment needed to fill orders generated in the field, saving an estimated $18 million a year.

Kraft now works with Charles W. Bachman, inventor of Bachman Diagrams and an originator of data base management systems, on expert systems for software development. They are working together at Bachman Information Systems in Cambridge, Mass.

Skilled software developers, including author James Martin, have developed techniques that automate one or more of the

Continued from page 51

steps of software development, but the automation "at point A doesn't connect to point C," Kraft says.

With software development proceeding through a series of dissimilar steps, artificial intelligence must help developers "make the transition from one level to another, from specification to design and from design to code," says Esther Dyson, publisher of "Release 1.0," a computer industry newsletter.

The biggest gains, says Marietta, Ga.-based consultant Vaughan P. Merlyn, will come when AI is used to provide an interface through which the end user "expresses the rules that the business is all about," and those rules are translated automatically into the specifications, design and code of the application.

Although the exact form of such an interface cannot be foreseen, Merlyn says he believes it will be "some sort of graphics approach" readily understood by end users. Such an approach would allow "the end user to do the application development. It will externalize much more productivity to the end user," he adds.

Schussel says English-language interfaces will make it easier for end users to invoke system power in developing applications, such as an interface that can transcribe English-language queries into IBM SQL statements.

Automated front ends

If new assistance on the front end of software development — the analysis, specification and design phase — can be combined with more traditional development methods, the result will be a step forward for application development. Automated front ends could, for example, be combined with rapid prototyping, which incorporates user feedback as the application is developed, according to observers and software developers.

Several well-muscled systems exist to provide assistance in automating much of this process in the mainframe world, such as Pacbase from CGI Systems, Inc., Telon from Pansophic Systems, Inc., APS from Sage Software, Inc., Use-It from Higher Order Software and Gamma from the former Tarkenton Software.

In the mainframe world, "pieces of the development process have been automated, but no one has a coherent system," Bachman observes. Bachman Information Systems is attempting to develop an integrated development system using expert system modules.

Many organizations are not waiting for a new generation of development systems. They are proceeding with the biggest and best mainframe development systems available, although the expense of these systems, which cost from $150,000 to $300,000, represents a major commitment to a particular technology and does not encourage experimentation, notes John Landry in his report to ADAPSO on software development technology.

Nevertheless, several companies report they are making productivity gains that whet their appetite for what the next generation of development systems may bring. One example is IDS/American Express in Minneapolis.

When IDS, a personal financial services company, was taken over three years ago, its new parent, American Express, directed it to rewrite all of its financial systems and organize them on a customer basis rather than spreading each account across several unrelated applications, recalls Alan F. Bignall, vice-president of corporate systems.

The unit was going to have to undertake the process while experiencing a 20% annual growth rate and while managing the assets of $29 billion of its customers' investments, he adds.

Bignall's unit chose CGI

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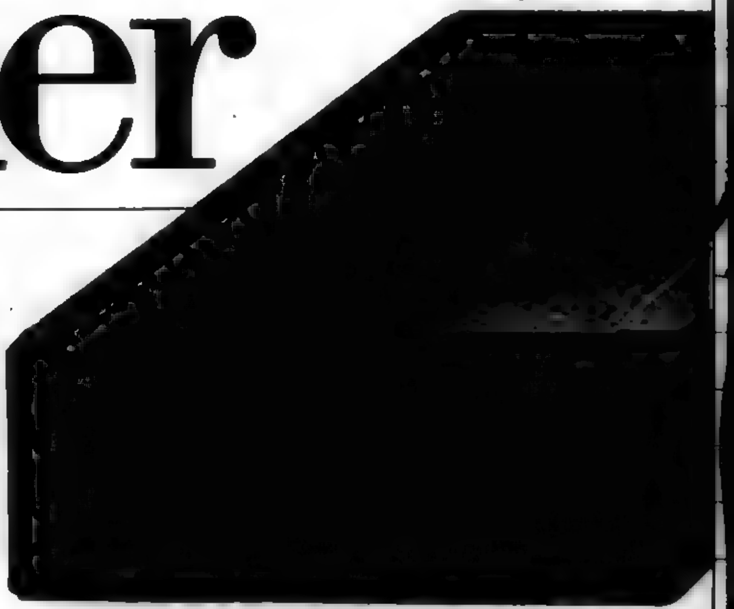

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Systems' Pacbase to launch a data driven development process controlled by a data dictionary and exploiting stored modules of reusable code. IDS generated its first major application, client administration and management, in six months.

Pacbase generates about 88% of the Cobol needed for each application, with the rest provided by custom programming. Furthermore, Bignall finds he can devote an unusually high percentage of his 400 programmers — more than half — to new development, although he says it still takes a lengthy two to three months to learn Pacbase's fourth-generation language and system procedures.

Integrated development emerges

A glimpse at how an integrated development system might function is provided by an example from the minicomputer world.

Cortex Corp. has tied an IBM Personal Computer AT-based graphics workstation to a code generator on the Digital Equipment Corp. VAX, using the PC to create and capture diagrams that are precise enough to represent program specifications.

The process resembles author James Martin's active diagramming techniques in that the diagrams' symbols can precisely capture data entities and their relationships, according to Richard Phelps, vice-president of marketing.

The diagrams can then be fed automatically from the AT into the Application Factory's code generator on the VAX, which in turn produces a Cobol application.

The diagramming front end is due to become available in the first quarter of 1987.

Two users of the VAX-based application development system without the diagramming front end have reported productivity gains of 4-to-1 or higher.

It allows developers to build prototypes with end users in the product's fourth-generation language, which is then converted into a Cobol application.

At Texas Eastman Co., a subsidiary of Eastman Kodak Co. located in Longview, Texas, shop floor manufacturing applications are generated by the Application Factory.

Even when Fortran subroutines have to be added to the applications by programmers, Texas Eastman realized a gain of 4- or 5-to-1, according to Raymond Johnson, supervising analyst of manufacturing systems.

At the Du Pont Co., a process that exposes the end user to rapid cycles of prototypes has led to productivity gains of 6-to-1 using the same development system, says Scott R. Shultz, manager of Information Engineering Associates.

The recently announced merger of former football star Fran Tarkenton's firm, Tarkenton Software, Inc., which features its Gamma application development system, and James Martin's diagramming tool firm, Knowledgeware, Inc., aims to bridge the gap in the mainframe world, spokesmen for the companies say.

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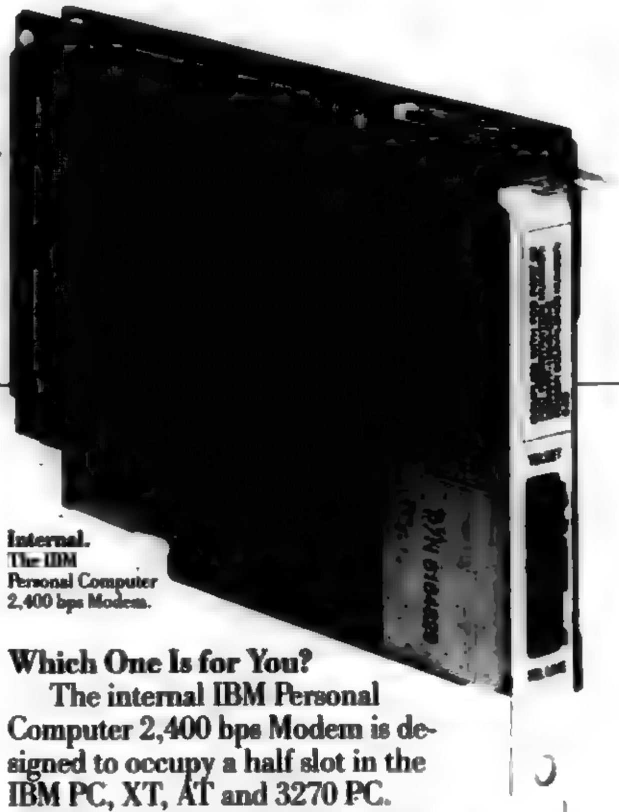

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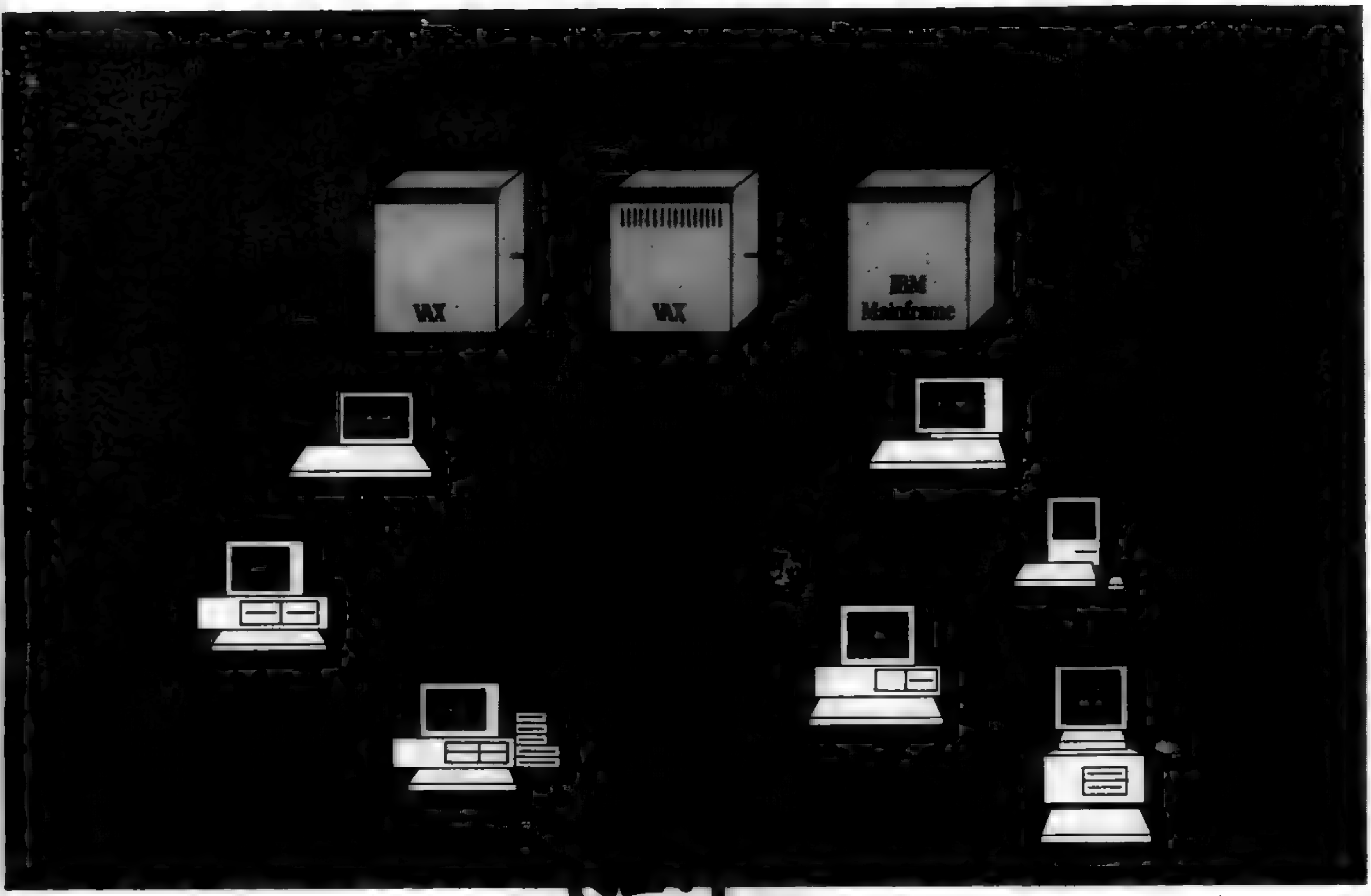

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Powers to be: Distributed data bases

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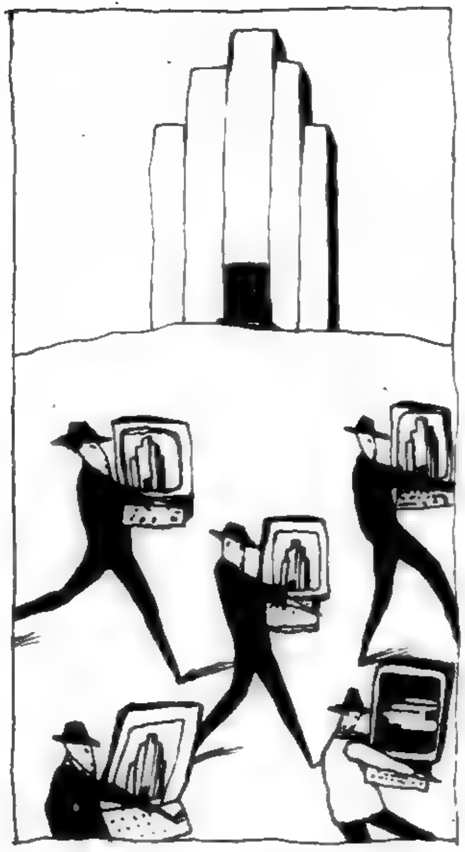


BLAIR THORNLEY ILLUSTRATION

BY NINAMARY BUBA MAGINNIS

Distributed data base software has the potential of paying off in more CPU power and greater computing flexibility, according to John Rector, technical staffer at the California Institute of Technology's Jet Propulsion Laboratories (JPL), where a pilot distributed data base has been implemented.

MIS managers are beginning to examine distributed data base as a means of giving users the information they need without having to locate data on a network. In a fully distributed environment using a relational data base management system, users do not have to worry about where the data is filed. They just ask for information using a standard data access language, such as IBM's SQL, and the data base management system finds and delivers it.

Margaret Herrick, president of the Cambridge, Mass.-based data base consulting firm Margann Associates, says distributed data base systems were delayed by the personal computer revolution, which sidetracked its development. "Most vendors were looking to upgrade software toward distributed environments in the late 1970s. Then personal computers hit. Most vendors put resources they would have used for distributed data base products into personal computers. It looks to me now that they're gearing up again," Herrick says.

George Schussel, president of the Andover, Mass.-based Digital Consulting Associates, Inc., predicts that the most effective computing environment in the 1990s will consist of large numbers of local and regional computers running concurrently.

"In the 1990s, corporations using relational data base software over minis and mainframes will be able to have integrated, controlled, distributed data base software and spend less for computing than a company using one mainframe controlling 500 different terminals," Schussel says.

One problem with distributed data base technology is that no completely functional product exists today, observers say.

Distributed data base technology is emerging slowly because it entails a different way of thinking, says E. F. Codd, creator of the relational data base model and president of Relational Institute, Inc., a San Jose, Calif.-based nonprofit corporation. "I felt that in the computer field, if you don't have a precise underpinning or foundation for what you are doing, that you're leading people astray.

"The reason the relational approach is terrific for distributed data base is that it's the only approach that satisfactorily answered a number of user needs. One of the most important is distributed independence. That means programs you write should not be logically dependent on the way the data is presently distributed. They shouldn't be dependent on whether it's distributed at all. The same data should work in one central location or distributed."

Last year two vendors, Alameda, Calif.-based Relational Technology, Inc. (RTI) and Belmont, Calif.-based Oracle Corp., introduced data base products with some distributed capability. RTI's Ingres/Star and Oracle's SQL*Star (used by the JPL) support an open architecture that will allow data base distribution across multiple vendors' hardware and operating systems. Ingres/Star runs on Digital Equipment Corp. VAX hardware and the VMS and Unix operating systems. Support will extend to IBM VM/CMS, MVS and PC-DOS operating environments sometime this year. SQL*Star's distributed query capability runs under IBM's VM/CMS operating system, PC-DOS and DEC's VAX/VMS system. MVS and Unix capabilities will be available in mid-1987.

Both fall short of what a distributed data base environment should offer, although they do provide some distributed data base functionality, Codd says.

"The two products do enable one system to communicate with another, but they are weak in support of insert, update and delete," Codd notes. "And they are

Continued from page 55

not very strong in handling distributive independence. But they are first steps."

In Codd's estimation, IBM's R*Star distributed data base prototype is a superior model, but it is not yet available commercially.

The ability to insert, update and delete data throughout a distributed data base environment remains the Achilles' heel of the new technology. Data base consultants cite the example of a bank that has a distributed data base with its checking account data in New York and its savings account information in Boston.

If a customer wishes to transfer $100 from checking to savings, the distributed data base would deduct the sum from the New York-based information and add it to the Boston data base.

In a worst-case scenario, the distributed data base would allow the checking account to be depleted by $100 without updating the remote savings account data. Reliable distributed data base transaction processing would make sure that either both transactions happen or neither does, the observers explain.

> **There has to be a very powerful component that analyzes various different ways of executing the command and chooses the one that's calculated to be the most efficient. And that is called optimizing.**
>
> E. F. CODD
> Relational Institute, Inc.

This type of guaranteed transaction processing is not possible in a distributed environment today, Codd and data base software consultants say. Vendors have not been able to ensure data integrity without tying up an inordinate amount of system resources. Until they do, the distributed data base environment is gravely limited, they say.

JPL, for example, views Oracle's software as a query distributed data base, according to JPL's Rector. The nonprofit JPL designs and develops satellites for the National Aeronautics Space Administration. Rector's branch of the lab uses two DEC VAX 750s and four Vaxstation IIs, tied together via a local-area network (LAN).

"I can get quite a bit of functionality with SQL*Star," Rector says, explaining that its distributed environment allows the union and joining of tables and insertion of data across various nodes.

SQL*Star can bring users a snapshot of remote data base information that can be queried and manipulated locally, Rector says. "A frozen picture of data is brought to a local node for use," he explains. "You can use the data to produce a weekly report.".

Oracle's distributed data base also saves on network overhead by holding remote connections open for as long as a session continues. If a user accesses the same long-distance table again, the system does not incur another connection and logon overhead to the remote data base, Rector notes.

Initial remote data base connections are slower than if information resided locally because connection and logon takes time, Rector says. "After that slowdown — I really can't say. I imagine there's a little slowdown, depending on network traffic that runs on the Ethernet LAN at any given time."

Oracle's Cohen

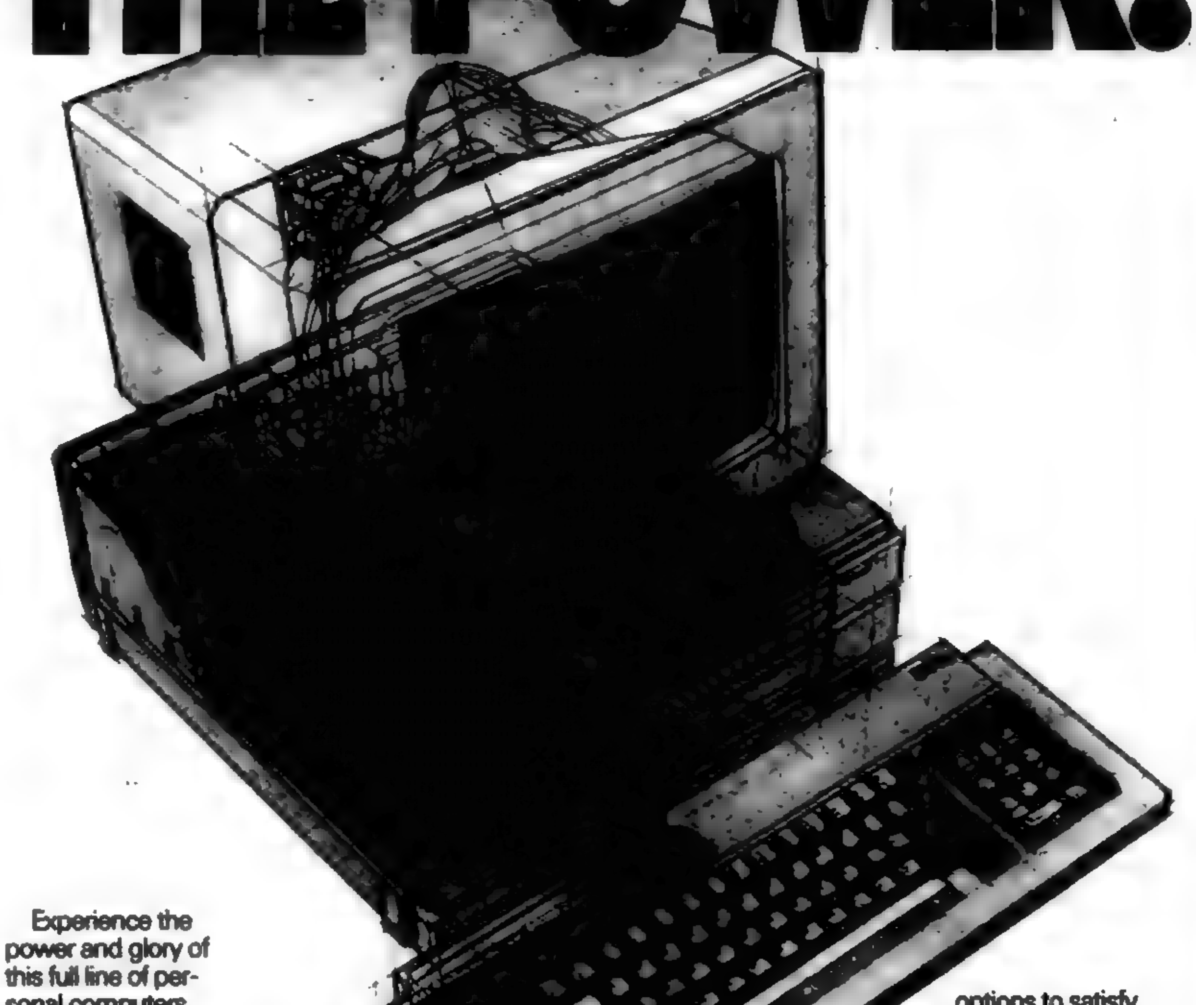
Codd says a key component of performance is the system's ability to use a data access language. "The language is such a high-level language, much depends on how the system does the translation from that high-level language to its own machine language," he says.

"That means there has to be a very powerful component that analyzes various different ways of executing the command and chooses the one that's calculated to be the most efficient," Codd says. "And that is called optimizing."

Optimization is something both RTI and Oracle claim to have incorporated in their commercial distributed data base software. "One of the open-ended challenges is that query optimization is an endless task," notes Oracle's Ken Cohen, director of product marketing.

Even with its present shortcomings, a few users are committing to a future distributed data base environment and claim the move will pay off. Carnegie-Mellon University in Pittsburgh, for example, has signed a five-year technology agreement with RTI.

Under the agreement, Carnegie-Mellon can expand its distributed data base across its computing envi-



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ronment, which includes 75 DEC VAX 780 computers, a VAX 8700, 400 Microvaxes, 1,500 IBM Personal Computers, more than 200 IBM RT PCs and 2,000 Apple Computer, Inc. Macintoshes, without having to purchase a license each time the university adds a new machine to the DDB network, says Len Brush, Carnegie-Mellon's director of administrative systems.

Herrick

In exchange, the will serve as a test site for Ingres/Star, sharing benchmark data with RTI. At this point, Carnegie-Mellon has conducted a series of performance tests on Ingres/Star to measure speed in delivering query results.

Using nine different transactions against data bases of 40,000 to 50,000 records, the university found response times to match or exceed its performance criteria, such as update a single record in five seconds, Brush says.

Carnegie-Mellon ran its benchmark with 25 to 200 concurrent users. The systems director refused to cite specific numbers and results, however.

When RTI announces its Ingres/Star Version 6.0, reportedly within the next several months, Carnegie-Mellon will begin implementing its distributed data base. "Version 6.0 will make sure other folks get locked out when one person is trying to update the data base," Brush explains.

"There has to be some locking control to make sure the data base maintains its integrity while it's being updated. If 6.0 doesn't include this feature we'll wait until it becomes available."

Oracle's Ellison

Tony Schaller, Carnegie-Mellon's manager of system development, says the implementation of a distributed data base will require more upfront analysis. "The introduction of the network creates more variables for users out there to access data. The software will take care of maintenance and integrity, but we'll still have to support it," he notes.

Even with drawbacks, Carnegie-Mellon system officials say the distributed data base environment will solve data problems. "We see using a distributed data base environment as key to providing real service to the decentralized operation of the university," Schaller says.

A smaller post-secondary school, Earlham College in Richmond, Ind., is an alpha test site for Oracle's SQL*Star. Earlham College, a Quaker liberal arts college, uses one DEC VAX 11/750 for administrative functions and one for academic work. It has been using Oracle software since 1982.

Morgenthaler

"We've set up a situation where users are logging into one of the two nodes and running the Oracle kernel on that node while acessing data from either node," explains Charles Peck, Earlham's administrative analyst/programmer. "I'm not going to construct a distributed data base with a beta test site. The school is now non-distributed."

Earlham College, like Carnegie Mellon, will proceed to a distributed data base enviroment slowly. "It's not something I want to throw out to users very quickly," Peck says.

TREND-SETTERS

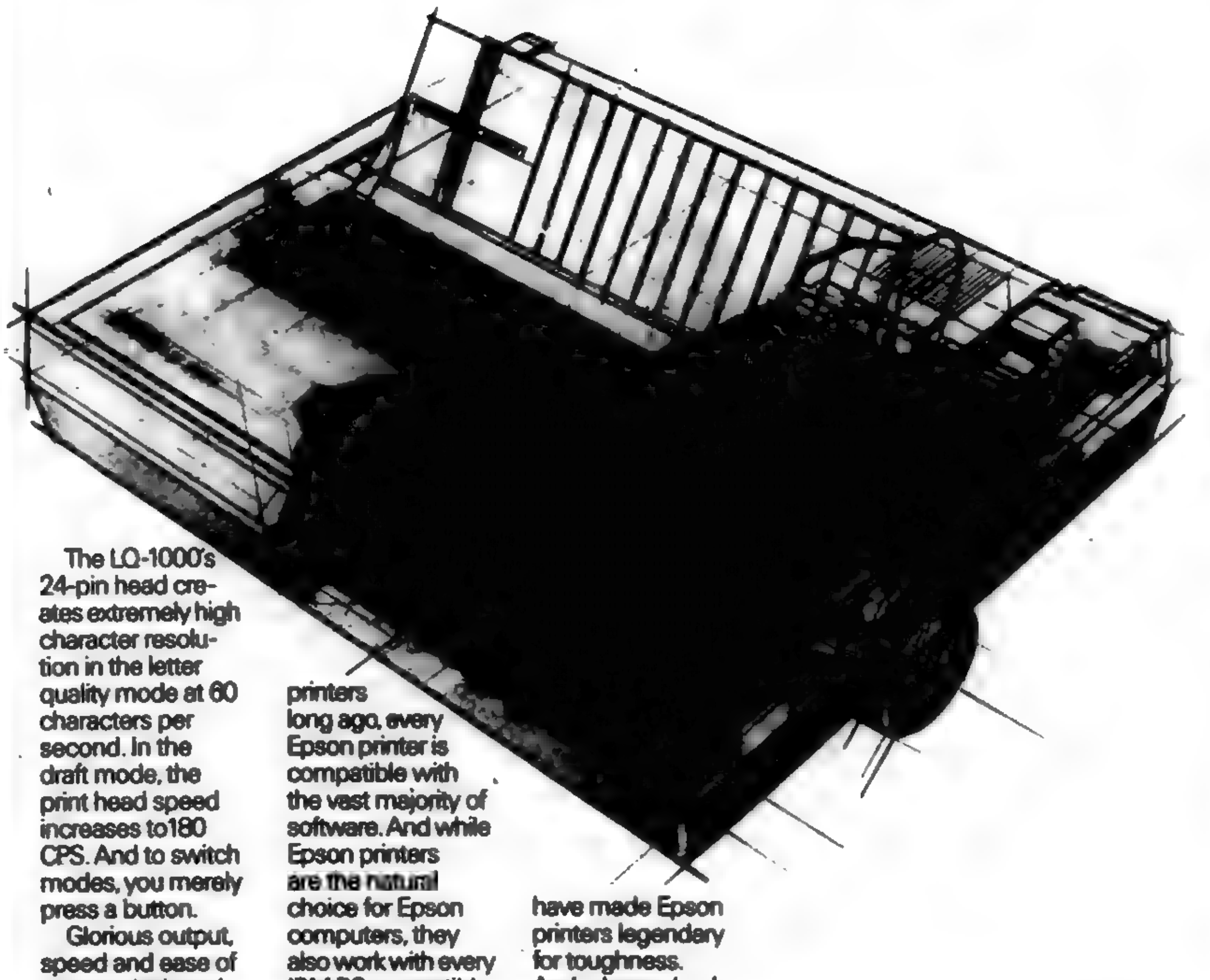
An information center SWAT team is helping users tackle data base management with a strategy leading toward self-sufficiency and away from traditional MIS roles, at the brokerage firm Smith Barney Harris Upham & Co.

The innovator is not a solo star, but a constellation: The redesigned information center/time-sharing staff is a team of five who help the user community discern their needs and design their solutions, and then free themselves to concentrate on maintenance or meeting user needs that used to be too low on the priority list to be done.

"In some cases we actually do design a full-blown system," said Michael Totoro, software developer. "But most of the time, we're a SWAT team. We help customers set up systems, and they run it."

Continued on page 60

THE GLORY.



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TRENDSETTERS

Continued from page 57

The division is little more than a year old, but has already shown results, with more success expected in the months to come, according to Michael Levine, manager of the information center and time-sharing department.

He heads a team of four developers, each with a specialty in a fourth-generation language, which is the basis of their services.

"The whole division got started because of exorbitant outside time-sharing costs," Levine says. "We were brought in to replace and supplement that and realized you could do more with a time-sharing system."

The information center equipment includes an IBM 4381 Group II system devoted to VM. "We have eight to 12 3380 devices off the machine, two control units and two tape drives, expandable to four," Levine says.

The data bases they maintain are not huge, but are numerous. Accurate and easy access is crucial to Smith Barney's consulting services.

Previously, clients purchased time-sharing services. Now, they are fitted with fourth-generation language applications to meet their needs.

"The point was for investment bankers to get hold of much-needed data bases," Levine says. "Now they can do things they couldn't do before, because of the cost or because they were not aware of their resources."

For example, he adds, the corporate planning and analysis groups "had a hodge-podge of technologies."

The team consolidated those into an Information Builders, Inc. Focus data base that will be consistent among users, and more durable in case of personnel changes, since everyone in the department uses the same kind of tools.

Ambitious customers

"We help customers set up systems, and they run it if they're ambitious," Totoro says. Candidates are users "who are aggressive enough to come up with new things. With the technology we're presenting, we're not coding in traditional Cobol syntax.

"We're taking the VM/CMS environment and converting it to an information systems setup," Totoro says.

Totoro says he has about a dozen clients at any one time, in different areas of development ranging among corporate finance, inventories, budgeting, sales, stocks and securities.

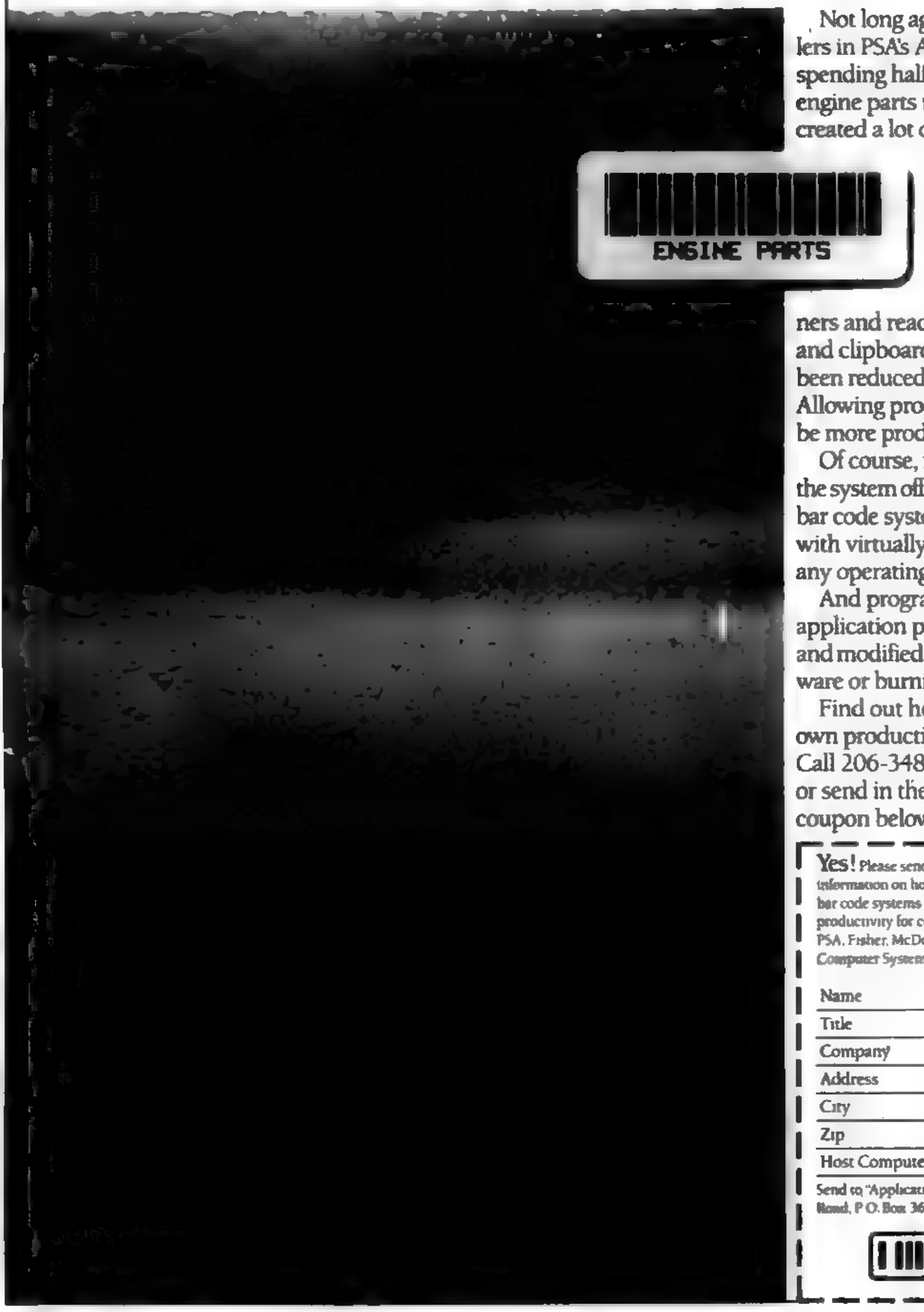
"We give them a structure development approach." He will splice in the old code, add new and try again. "It gives them something to play with in trial and error."

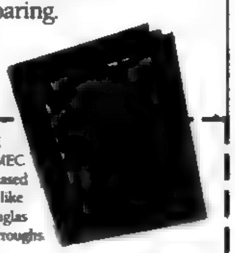
Turnaround can be from a day to a week's work. "Usually it takes a day or two to get started coding," he said. "In about two weeks, they're up and running."

Education is a priority, Levine said. "We have courses in several areas, including languages and operating systems as well as Smith Barney data bases."

"It's really a new development in addressing application background," Totoro adds. "There's not a big consultant push here, but a role of information source. And we're the heart of it."

P. W.





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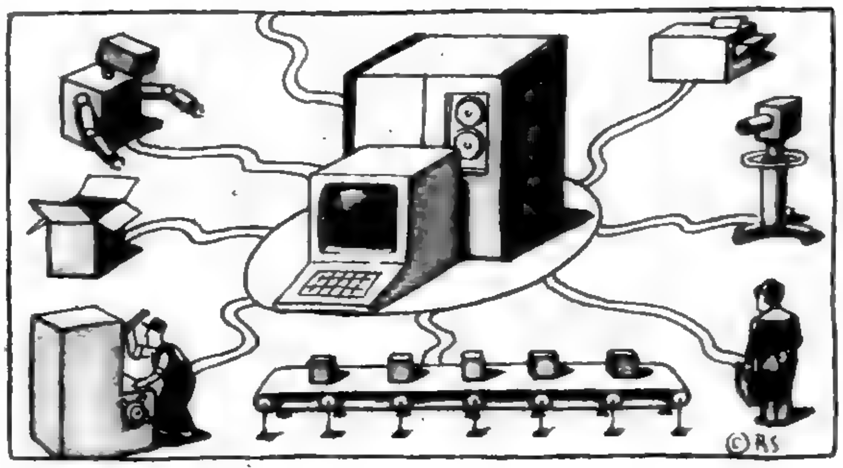


ROB SAUNDERS ILLUSTRATION

BY ROSEMARY HAMILTON

In Detroit, home of the U.S. automobile industry, the word around town is CIM. It's the word around Schenectady, N.Y., Greenville, S.C., and Wausau, Wis., too. Users and vendors alike are pointing to computer-integrated manufacturing (CIM) as the answer to America's smokestack industries' woes.

But CIM is a highly challenging issue that entails the automation and integration of an entire manufacturing enterprise. Its complexity has generated plenty of confusion, from which only a handful of manufacturers have emerged as successful CIM implementors. While each factory environment is unique, there are common threads that weave these early success stories together.

Both the Cone Drive division of Ex-cell-o Corp. and the Turbine Business Group of General Electric Co. have been involved in CIM planning since 1980, and both have been recognized by their peers through the Computer and Automated Systems Association of the Society of Manufacturing Engineers as successful CIM implementors. Although the two concerns have little in common regarding products and company size, recent interviews show that Cone Drive and GE share similar CIM philosophies: Both firms emphasize planning and management while downplaying technology.

Cone Drive's CIM system is based on an IBM Mapics system, a manufacturing resource planning system running on an IBM System/38 and an IBM Cadam system for engineering design work running on an IBM 4341, according to Paul Brauninger, director of MIS. Both systems, he says, have helped streamline operations.

Mapics, which was installed in 1980 and went fully operational in 1982, has helped reduce inventory by 25% and reduce quoted lead times by 50%, according to Brauninger. It has also enabled Cone Drive to cut the number of employees in the materials control department in half. Meanwhile, the Cadam system, which has been in use for three years, has reduced drawing time by 60%, getting part drawings to the shop floor at a quicker rate, Brauninger says.

Yet he is quick to add that the two IBM systems would have been useless had it not been for the management and planning portions of CIM that were concurrently implemented.

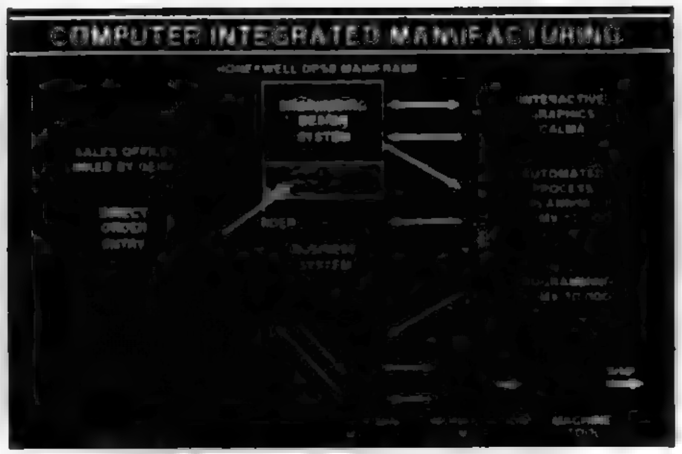
Back in 1980, Cone Drive was faced with "increasing pressure from our customers to do a better job of supplying the product to them on a timely basis with shorter lead times," Brauninger explains. The need to respond was critical. Customers could turn to Cone Drive competitors that were new to the scene from Japan, West Germany and Asia, Brauninger adds.

The original intent was not to automate but simply to find a better way to do business, he emphasizes. The computer systems were of secondary importance. In fact, well before computer systems were chosen, Cone Drive launched a training program.

"Before we actually ordered anything, we told our people what our situation was competitively," he says. "We had to find a better way of doing things and we made sure that every person that worked here understood that."

Giving employees a hard dose of reality made other elements of the CIM plan easier to implement, Brauninger contends. Certain departments, such as engineering, moved to a round-the-clock schedule. Brauninger says the three-shifts policy surprisingly met with little resistance. Of the 12 draftsmen in engineering, only two had to be assigned a shift by their manager, he adds.

Cone Drive mapped out a strategy to automate the manufacturing and engineering end of the business, the first phase of which focused on establishing



GE Turbine Business Group CIM system

GE Turbine Business Group, Schenectady, N.Y.

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Continued from page 61

more control of the products and processes — for instance, reducing inventory and shortening lead time. The second step, begun last year and expected to be the focus of this year's efforts, is a more advanced level of automation — flexible manufacturing cells. Since it is a small company, integration has been a manageable issue. IBM Personal Computers are set up on the shop floor as well as in office areas throughout Cone Drive.

GE's Katronis

PCs are linked to either one or both host computers depending on the job function of their operators. This direct host-to-workstation cabling allows an operator on the shop floor to view a Cadam drawing file or to request shipping information from the Mapics program that resides on the System/38, according to Brauninger.

Brauninger adds that the CIM plan was guided by Cone Drive's top executives, a factor consultants consistently point out as critical. Since 1980, the management team that runs the day-to-day business at Cone Drive has also been responsible for the CIM program.

"We didn't set up a special group just to handle automation," Brauninger explains. "We used the same group that handles all of our problems, from labor contracts to price increases, so it became a normal part of the management of our business."

GE, too, reaps CIM benefits

When the Cone Drive team was hashing out its plan six years ago, a similar effort was underway at the GE plant in Schenectady. Since that time, the turbine plant has seen production cycles reduced by 30% along with a direct labor cost reduction of 20% and a 10% drop in indirect labor costs, according to Laki Katronis, manager of the technical systems group.

These results were achieved primarily through homegrown software for such phases of the manufacturing process as order entry and job scheduling. The backbone of this system is the batch processing environment of the Honeywell, Inc. DPS-8, to which information is uploaded from Data General Corp. equipment, processed and then downloaded to the DG systems.

Interfaces were written to integrate the software — a process that was completed in 1984 — so data from one program could be applied to another, Katronis says.

Along with the application programs are two data bases, one for storing raster drawing files, which resides on a Digital Equipment Corp. VAX-11/785 in the engineering department. The other data base is for maintaining digitized part-recognition codes, and it resides on the Honeywell mainframe.

As was the case at Cone Drive, the first phase of CIM implementation concerned controlling manufacturing data. The plant is now looking to expand its networking capabilities to broadband cabling as well as expanding various software programs to remote locations.

'We established a 10-year master plan for a total CIM approach. We directed it to a specific area, the small parts business, and then expanded to different areas.'

— LAKI KATRONIS
General Electric Co.

Katronis attributes the success of the CIM system to a number of factors but tops that list with management commitment to integrate not only systems but the various departments. Katronis also cites long-term planning.

"We established a 10-year master plan for a total CIM approach," Katronis notes. "We directed it to a specific area, the small parts business, and then expanded to different areas."

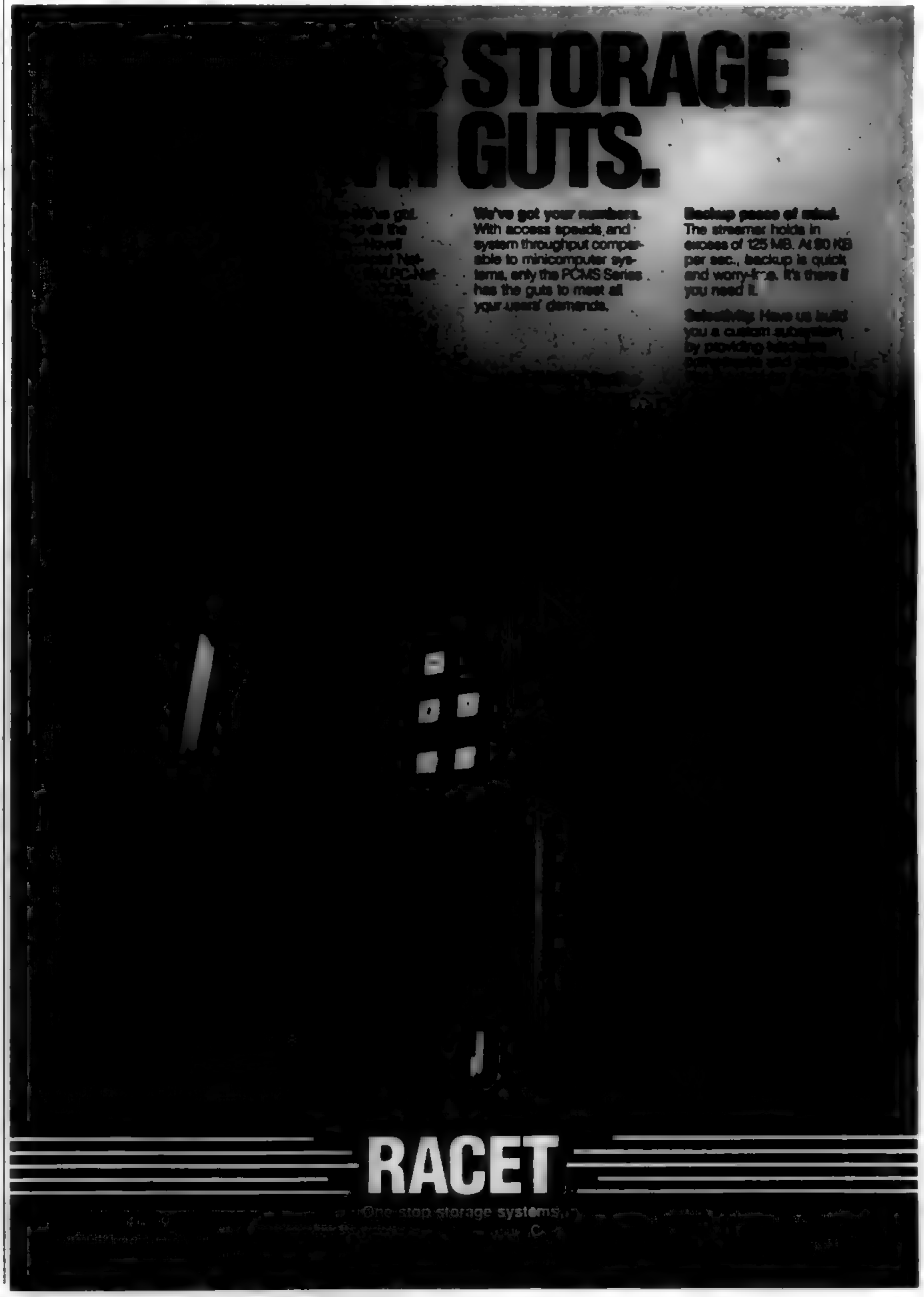
Systems reorganization

Management established a separate organization to handle the CIM efforts, a move that was part of an overall reorganization of the systems department in 1980 that ended the traditional MIS organization. The new systems group, called Turbine Business Systems Operations, consists of many divisions, such as Katronis's technical systems group.

"The idea is to use systems as a strategic weapon. It's a proactive organization," Katronis says.

"We had a top-down commitment for this, which is very important because CIM is a very hard road," he adds.

Cone Drive operations at Ex-Cell-O Corp.



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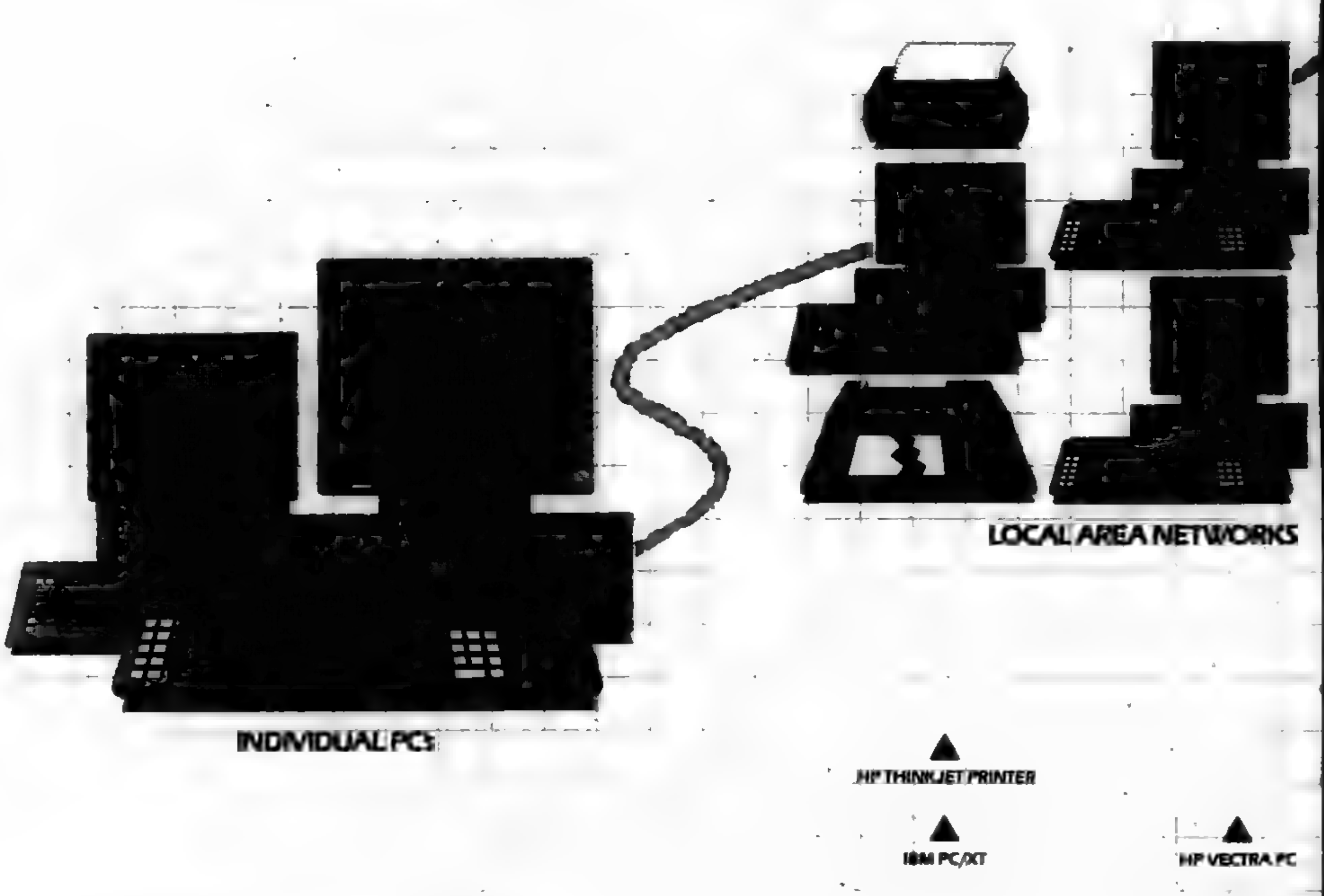

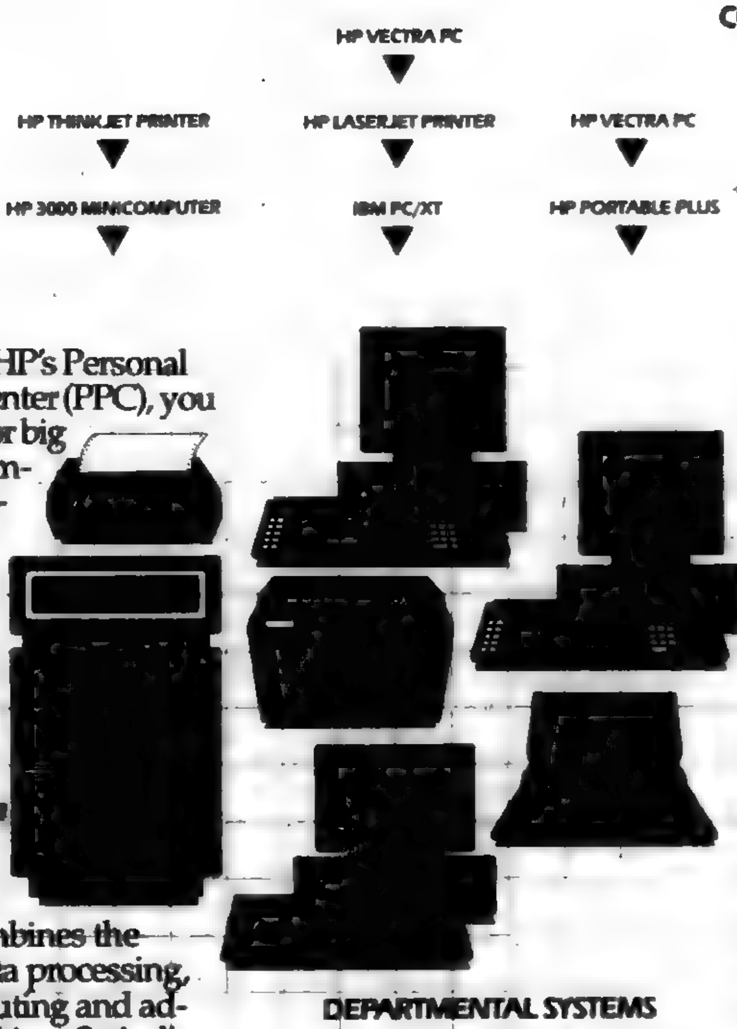

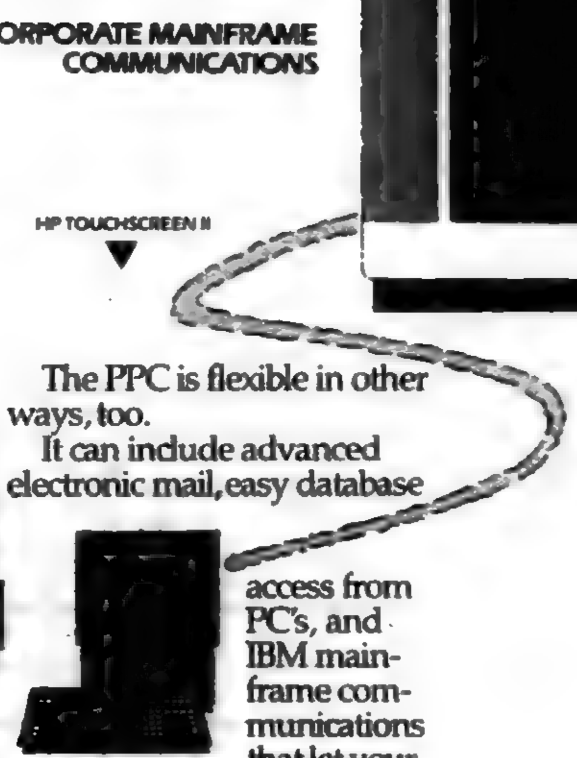

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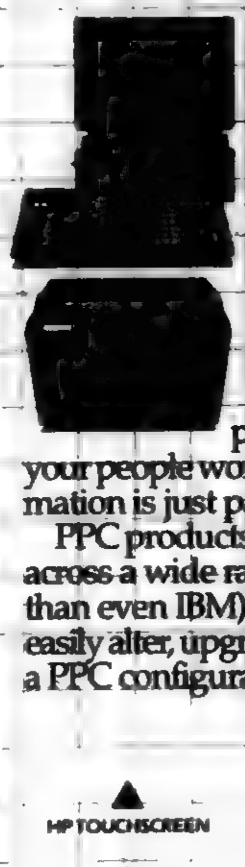

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Swinging into the fast lane on the CIM highway

This year, Ex-cell-o Corp.'s Cone Drive Division and General Electric Co.'s turbine plant in Schenectady, N.Y., plan to go the next mile on the computer-integrated manufacturing (CIM) road. It is a long journey that is far from complete, both companies say, but it is also one that is necessary to maintain a competitive position.

Laki Katronis, manager of the technical systems group at GE, says the CIM plan has helped his plant respond faster to changing market conditions. Prior to the 1970s energy crisis, the bulk of the turbine plant's business was new systems, many of which had lead times of up to four years. Today, more than half of its business is replacement parts.

"Now we're talking about delivery in weeks, not years," Katronis says. "We have to react more quickly to customers' needs. A more flexible system helps you come up with the required information fast. I don't have the opportunity to continue to build on the CIM foundation they now have in place. I have to turn it over overnight. The setups, processes, all those things have to be flexible and modifiable so I can respond to a different environment."

Plans include expanding the basic CIM system at Schenectady to remote locations. The GE facility in Greenville, S.C., for instance, is scheduled to receive the factory management system. Katronis says his department will also be evaluating broadband cabling as an option for enhanced communications. They will also review the engineering graphics systems, currently from Calma Co., and will review both Calma and other vendors for possible upgrades.

Cone Drive's Brauninger

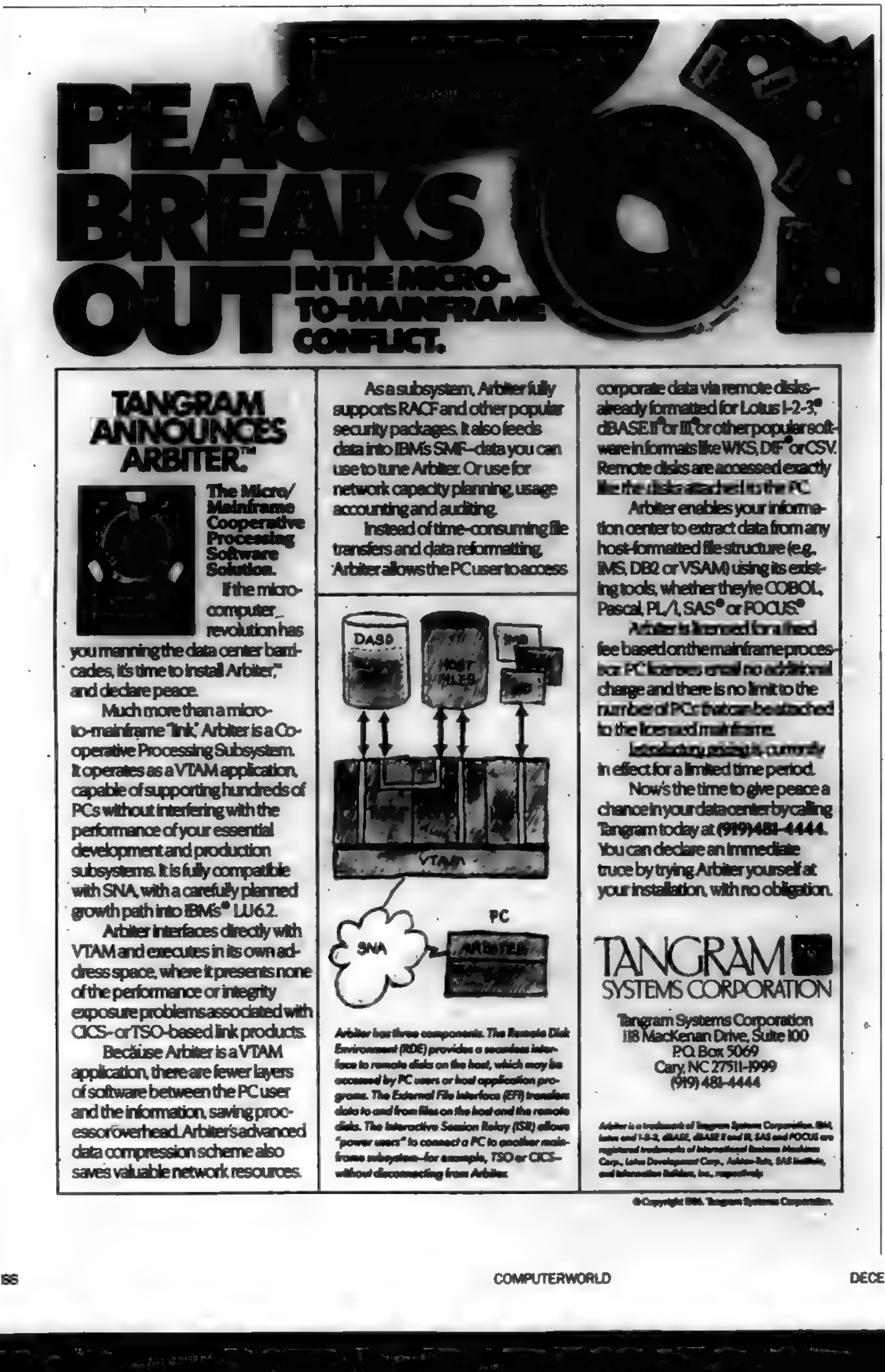
Finally, Katronis says it is likely that the facility will eventually convert to a packaged manufacturing resource planning system, although that move has not been approved for this year.

"Our system is functioning and serving the purpose," he says. "But a real-time system and more capabilities are eventually going to be needed. What we have is working well, but that doesn't mean it doesn't need improvement. All systems need improvement."

Paul Brauninger, director of MIS at Cone Drive, says the first flexible manufacturing cell, which incorportates just-in-time principles, will be completed this year. The company has also scheduled the review of bar code technology for next year, and Brauninger says he hopes to incorporate a bar coding system this year.

To Brauninger, the flexible cells and bar coding add to the ammunition Cone Drive has been stocking up for six years against its competitors. "If you can't do a good job of supplying a product at a low cost, your life expectancy is very short," he comments.

R. H.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Different managers, similar CIM

While the two men who head up the computer-integrated manufacturing (CIM) efforts at Ex-cell-o Corp.'s Cone Drive Division and at General Electric Co. are responsible for vastly different operations, they also have much in common.

Both take a realistic approach to CIM that involves using existing technology or homegrown software programs, contrasting sharply with the flashy factory-of-the-future picture painted by many consultants.

In fact, both Paul Brauninger, director of MIS at Cone Drive, and Laki Katronis, manager of the technical systems group at GE in Schenectady, N.Y., downplay the role of technology in their CIM efforts, saying that planning and management are just as critical to their CIM programs.

"In 1980, we turned toward technology to see how to best apply it. Computer technology was almost an afterthought," Katronis says. "Our intention was to create a flexible manufacturing system that takes care of the total business. We didn't go so much for robotics or manufacturing cells because we were facing a problem where it seemed like management of information was the most critical thing to do."

Brauninger agrees. "You basically have to do a good job of running your business, and you use the computer just as a tool. It does give you a better tool than had previously been available to you, but you still have to run the business like a business."

R. H.

CIM firms miles apart

More than 850 miles separate Ex-cell-o Corp.'s Cone Drive Division's Traverse City, Mich., headquarters and General Electric Co.'s Schenectady, N.Y., turbine plant.

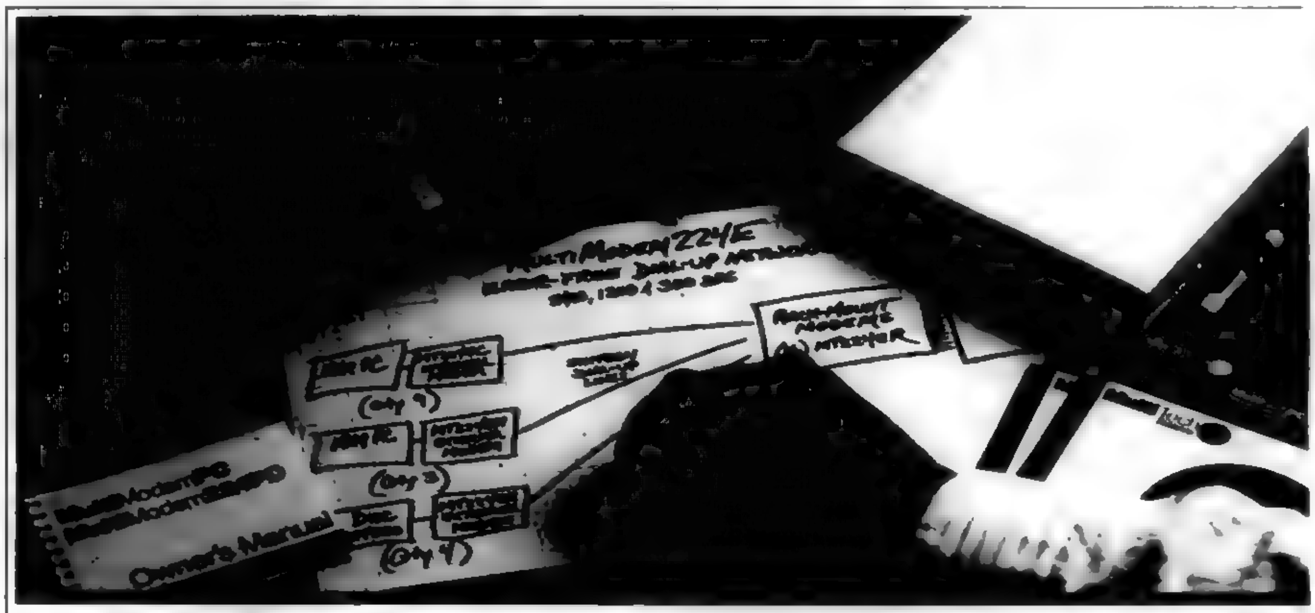
Aside from their similar computer-integrated manufacturing (CIM) philosophies, they are worlds apart. Cone Drive's primary motivation to launch its CIM program was increased foreign competition, while the GE turbine plant was faced with a basic shift in its market — customers, with less money to spend, bought less.

Acquired in 1955 by Ex-cell-o, Cone Drive manufactures capital goods machinery. The GE plant, which shipped its first product in 1903, makes the massive steam turbine engines used primarily by public utilities to generate power.

Cone Drive found that its customers were turning toward competitors from Japan, West Germany and Asia, MIS director Paul Brauninger said. The GE plant found that with the 1970s' energy crisis, customers were making do with existing products. Laki Katronis, manager of the technical systems group at the GE plant, says what had once been a business ratio of 70% new systems to 30% replacement parts has now completely reversed itself.

Cone Drive, which has spent about $1.2 million for its CIM efforts, has relied on one vendor: IBM. GE, which estimates the steam turbine plant's CIM expenditure at $50 million, has equipment from Digital Equipment Corp., Honeywell, Inc. and Data General Corp.

R. H.



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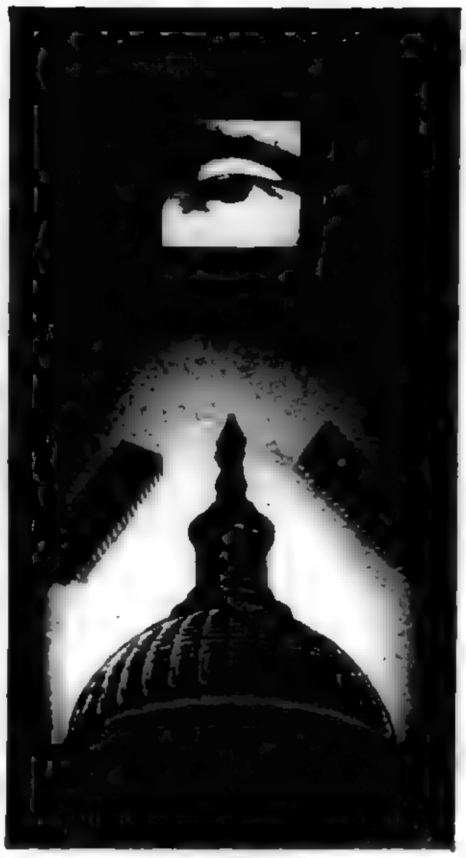
U.S. turns inward to deal with challenge

Government looks at business to place blame, repair deficit



CARL WESLEY ILLUSTRATION

BY MITCH BETTS

The "international competitiveness" of corporate America will surely be the buzzword in the nation's capital in 1987.

"A lot of the U.S. Congress's time will be spent on trade and competitiveness, and of course the computer field will come up for a lot of attention," says John Clement, director of governmental activities for the American Federation of Information Processing Societies (AFIPS) in Reston, Va.

The fears underlying the buzzword already have spawned a bevy of think tanks and commissions whose goal is to come up with policy recommendations for reversing the downturn in U.S. competitiveness in the world economy. Proposals for beefing up high-technology education and research and for creating new agencies are likely, but it is not clear whether these ideas will prevail in the budget-cutting climate of 1987.

The competitiveness theme has triggered a round of surprising business-bashing speeches by Reagan administration officials, who charge that "bloated, risk-averse, inefficient and unimaginative" corporate bureaucracies are to blame. "We underinvest in R&D while some high-priced private managers seem to spend less time developing R&D budgets than they spend on reviewing their golf scores," says Richard G. Darman, the deputy treasury secretary.

Analysts say that what the usually pro-business Reagan administration is trying to do is to subtly deflect Congress's attention away from protectionist trade legislation and toward flaws within U.S. business management.

"The overall theme seems to be the necessity to look inward as well as to foreign trade practices in addressing the problems associated with our large trade deficit, which is unlikely to melt away quickly despite the dollar's depreciation," says Stephen D. Cohen, an analyst with Washington Analysis Corp. in Washington, D.C.

But Cohen says the trade legislation that the Democratic-controlled Congress produces will not be protectionist anyway, if protectionism is defined as the unilateral imposition of import barriers to protect ailing industries.

"An aggressive — not protectionist — U.S. trade bill is likely to be enacted into law in 1987," Cohen predicts.

That's good news for the computer industry, which, although it generally opposes protectionist legislation on the grounds that it invites retaliation that would hurt the multinational computer industry, supports a tougher policy than exists now.

Few members of Congress believe that protectionism works in the long run, Cohen says, so trade legislation is more likely to knock down perceived protectionist barriers in other countries and reduce the president's flexibility to act against unfair foreign trading practices.

Consequently, it seems likely that Congress will resurrect the industry-supported telecommunications trade bill that came close to enactment in 1986. The bill was intended to open foreign markets to U.S. telecommunications products and services [CW, June 9].

Aimed at trade policies in Japan and Europe, the bill would require the president to negotiate trade agreements that remove foreign barriers to exports of U.S. telecommunications products and services. If the talks fail, the president would be forced to restrict foreign access to the U.S. market.

Industrial competitiveness is one of the topics to be studied by a proposed Information Age Commission. Industry and government sources predict that Congress will pass legislation in 1987 to create a two-year, privately funded commission for studying Information Age issues [CW, Oct. 27]. Strongly supported by ADAPSO — the computer software and services trade association based in Arlington, Va. — the bill is sponsored in the Senate by Sens. Sam Nunn (D-Ga.) and Frank R. Lautenberg (D-N.J.).

"I think it will breeze through the Senate and meet a rocky road in the House, but it will eventually be passed," AFIPS's Clement says. "Senator Nunn is in a position of great power, and if he really wants it, he'll get it."

Joseph E. Collins, manager of governmental affairs for the Data Processing Management Association (DPMA) in Park Ridge, Ill., says he agrees that the commission bill will pass in 1987 and notes that DPMA will focus its lobbying efforts to support it.

Although Clement and Collins foresee passage of the bill — partly because it would not cost the government any money — there are opponents who view the commission as unnecessary. "I think there are people against an Information Age commission fundamentally, and there are people who are just bored with the idea of another commission," Clement says.

The 23 members of the proposed commission would study such Information Age issues as employment, innovation, competitiveness, national defense and privacy.

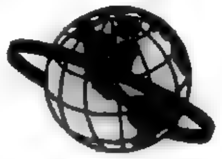
Privacy issues are expected to get direct legislative attention in 1987 when Sen. William S. Cohen (R-Maine) reintroduces a bill called the Computer Matching and Privacy Protection Act. The legislation is designed to protect the privacy of citizens whose computerized records are cross-checked by government agencies [CW, Sept. 22].

Cohen says that government use of computer matching has tripled since 1980, but citizens are rarely notified and have little chance to correct the data. His bill would establish procedural and notification rules for computer matching and create Data Integrity Boards to oversee computer matching programs.

The bill is supported by the American Civil Liberties Union and the American Bar Association, but the Reagan administration opposes it on grounds that it would hamper the use of computer matching to catch fraud and abuse in government aid programs.

International competitiveness

A slew of think tanks and councils to study U.S. business competitiveness in the world economy



The Council on Competitiveness. Founded by Hewlett-Packard Co. President John Young and assisted by the National Association of Manufacturers. Council will try to implement the recommendations of the President's Commission on Industrial Competitiveness, chaired by Young.

The Congressional Caucus on Competitiveness. More than 100 Senate and House members intend to develop and pass "pro-competitiveness" legislation.

The Congressional Economic Leadership Institute. Launched by Pat Choate, a futurist with TRW, Inc. and author of the book, *The High-Flex Society*. Will analyze legislative proposals and help the Congressional Caucus (above) enact its program.

American Electronics Association is establishing a blue-ribbon industry task force, chaired by former Congressman Ed Zschau, to produce an agenda for the electronics industry's renaissance.

Information provided by American Electronics Association's "Update" newsletter, December 1986.

TRENDSETTERS

Fitting human expertise into a box is the puzzle of building a knowledge base, and the desktop box is still often too small. But Renee Barling, project director of Applied Artificial Intelligence at the Equitable Life Assurance Society of the United States, looks forward to a new year that will bring more practical applications from her research as well as downsized implementations.

1986 was a year of experimentation, but 1987 will see working models in the office environment, Barling says. She looks forward to more powerful, Intel Corp. 80386-based microcomputers that will have the memory and power to be a development tool. "Now, we separate the environment from delivery," she says. "The idea is to get it on conventional hardware. But with 1987 and the 80386, I think we'll be able to deliver."

Barling's team of three developers work on dedicated AI workstations, including the Texas Instruments, Inc. Explorer and Symbolics, Inc. systems. All design work has been in LISP, much of it using Inference Corp.'s Automated Reasoning Tool. "Our charter is to identify technology that appears to offer potential to solve business problems. We explore and experiment," Barling says.

Expert systems have been the team's focus, but Barling expects to explore other AI applications this year, particularly regarding development tools. Barling says she always focuses on the eventual user. "We don't get into the corner of the lab by ourselves," she says.

The user is the focus of Barling's own critical development guidelines, which are the following:

- "Make sure what you're automating will be used." Barling focuses on practical applications, especially with her group's charge of applied artificial intelligence.
- "Don't underestimate training." An expert system can change the way work is done, and the staff needs to understand how to use it.

Barling, a 13-year veteran of Equitable Life development, says she approaches AI as another new, capable development technique.

"To me, it's just software development," using AI technology as another of the new techniques that have appeared in recent years, she says. "It's not magic. The machine only does what you tell it to do."

P. W.

Policy issues worth watching

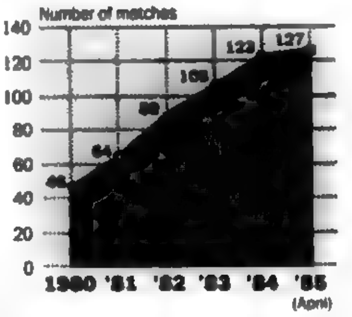
A few more policy issues to watch for this year:

- U.S. District Judge Harold H. Greene is expected to have made a decision by Labor Day as to whether the divested Bell operating companies can enter the equipment manufacturing, information service or long-distance network businesses. Analysts predict the operating companies will get the green light for manufacturing.
- The Occupational Safety and Health Administration has promised to respond to union complaints about "killer robots." The administration may require lock-out devices that shut down computer-controlled machinery, in the interest of protecting humans.
- The Data Processing Management Association will be lobbying state legislatures to strengthen their state computer crime laws and to prevent regulation of VDT usage.
- The American Civil Liberties Union hopes that the House Government Operations Committee will review the Pentagon's effort to restrict access to on-line data bases and government information.

M. B.

Computer matching

Federal agency activity 1980-April 1985



Information provided by: "Electronic Record Systems and Individual Privacy," U.S. Congress Office of Technology Assessment, June 1986

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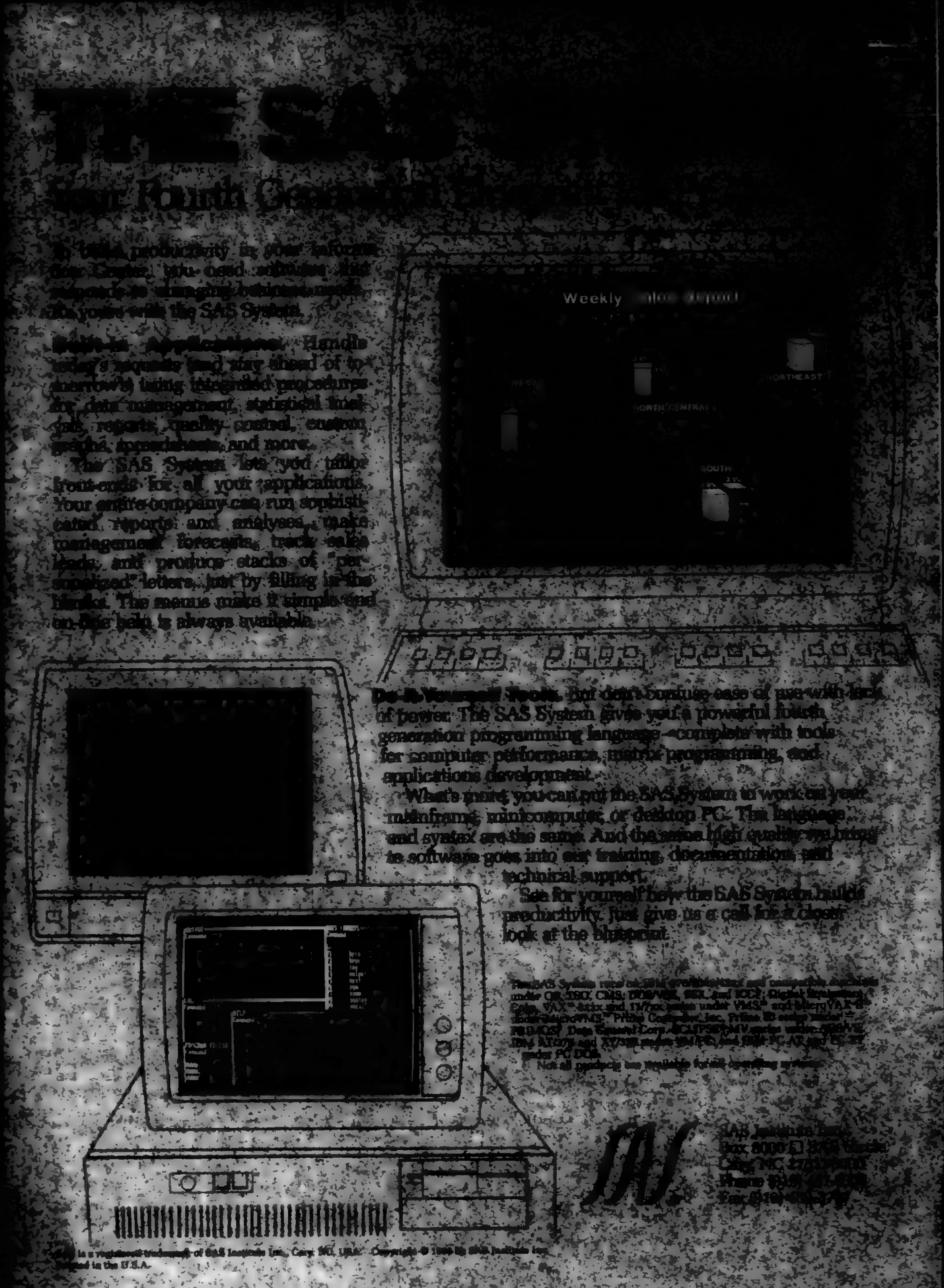

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MICROCOMPUTERS

MICRO BITS
William Zachmann

Inexpensive peace of mind

It is getting so that only those users with little influence in a company have to use personal computers without a hard disk. With prices typically less than $20 per megabyte on Winchester drives, and as low as $12 to $15 for careful shoppers, rigid disks are no longer a luxury item.

The only disadvantage of hard disks is that they sometimes go bad. When they do, some or all of the data on the disk may be lost. That is about the most unpleasant experience a user of a personal computer can have.

Having a backup copy of files on a hard disk can make the difference between a mere inconvenience and a major disaster in the event of a disk crash. But hard-disk backup that is inexpensive, convenient and fast hasn't come easily.

Cassette tape drives offer a relatively fast, high-capacity hard-disk backup option, but they have always been rather expensive.

Backing up hard disk systems to floppy disks is much less expensive, since no additional hardware is required. However, it has typically been very slow, and many users go without any backup at all, at least until their first hard-disk disaster.

New Orleans-based Fifth General Systems offers Fastback at a suggested retail price of $179, which provides a convenient and remarkably fast hard-to-floppy disk backup capability. If you are quick-fingered, you can back up a full 20M-byte IBM Personal Computer

See INEXPENSIVE page 72

Zachmann is vice-president of research at International Data Corp.

Apple improvements to be highlighted at Macworld

By Peggy Watt

CUPERTINO, Calif. — The communications capabilities that Apple Computer, Inc. has promised for its Macintosh personal computer should surface this year, although few will be ready for the Macworld exposition in San Francisco this week.

Industry analysts who have seen the system say Novell, Inc. in Orem, Utah, will soon unveil Appletalk capabilities for its Netware network operating system, allowing Macintosh computers to hook into that local-area network. Apple is said to be preparing a server, possibly with a multiuser data base designed by a French third party but sold under Apple's label. And a handful of third-party developers are readying or refining announced communications products and networking applications.

The products that will be shown this month, however, are primarily improvements on established themes. They include a Macintosh data base product from the Culver City, Calif.-based Nantucket Corp. that reads Ashton-Tate's Dbase files; The Adobe Illustrator, a sophisticated drawing program from Adobe Systems, Inc., in Palo Alto, Calif.; a multiuser accounting package from Los Angeles-based Monogram Systems; and an upgrade of existing products from Living Videotext in Mountain View, Calif.

Novell's Netware support of the Macintosh is expected in March, several analysts familiar with the product said. "An Appletalk interface will plug into a Netware server, probably an Ethernet one," said Robert Clark, vice-president of the Seybold Group, Inc.'s consulting division in San Jose, Calif. "Eventually, you'll be able to put IBM Personal Computers on Appletalk on the same wire as you have Macs."

See SHOW page 72

Some XT wholesale prices cut

Move said to clear way for low-end 8086-based PC

By David Bright

IBM has cut the wholesale prices of two IBM Personal Computer XT models by 42%, a move that observers said sets the stage for IBM's forthcoming low-end personal computer.

"This means that the new low-end 8086 machine is certainly coming soon," said Aaron Goldberg, vice-president of Microcomputer Services at International Data Corp., a Framingham, Mass.-based market research company. "This is definitely an inventory clearing move."

The wholesale price of an XT with one floppy disk drive fell from $1,287 to $750, and the price of a system with two floppy disk drives dropped from $1,377 to $800, an IBM spokesman said. IBM's single-unit prices for the two systems remain firm at $2,145 and $2,295, respectively, the spokesman added. The price reductions took effect Jan. 2.

Goldberg and many IBM watchers said the new Intel Corp. 8086-based system could debut by late January or early February.

Most observers said they expect the new machine to be targeted primarily at the educational and home markets.

Goldberg said the price would probably be in the $1,200 to $1,400 range. While that price is still considerably higher than many of the clones', the machine may come bundled with extras such as a Color Graphics Adapter and as much as 1M byte of on-board memory, according to Goldberg.

The price cuts follow reductions in IBM Personal Computer prices made last summer. IBM reduced dealer prices on selected PC models by as much as 18% in July 1986, and a month later cut the direct sales price of PC models by up to 22%.

NEW THIS WEEK

- Hayes enhances its Smartcomm II networking software

■ For more on this and other new products, see pp. 89-100.

INSTANT ANALYSIS

"It is not an official product in the sense that we have announced it or announced any dates."

— Bill Gates, Chairman of Microsoft Corp., on his firm's next-generation operating system that will exploit the power of the Intel Corp. 80286 processor

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Oracle launches ALLIANCE program for software VARs

Oracle Corp., supplier of the ORACLE distributed relational DBMS and application development tools, has announced a new program for software value-added relicensors dubbed the Oracle *Alliance* program. The program offers broader markets, simpler, faster selling cycles, and shorter time-to-market for VARs who build or convert their applications to use Oracle's products.

According to Larry Harman, Oracle's Director of the VAR program, "We offer major business benefits to VARs who choose to use ORACLE with their products. Chief among these benefits is ORACLE's portability and the portability of ORACLE-based applications, allowing applications and data to be shared among different machines. Oracle also provides the link software to exchange database information among the different machines."

Broader VAR Markets

ORACLE runs on the widest array of hardware: IBM mainframes under MVS and VM, most vendors' minis under both proprietary and UNIX operating systems, and PCs under MS/DOS. Oracle also developed SQL/RT, marketed by IBM on the RT PC.

Harman states, "Only with ORACLE can an application developer produce software on one system and *inherit* a vast market of users of multiple vendors' hardware. Basically, we let our software VARs do *blindfold selling*."

"Blindfold Selling"

The company described "blindfold selling" as the ability of a VAR's salesman to walk into an end-user site blindfolded and say, "I don't know what types of hardware you're using, or how many types there are, but my applications run on all of them."

Harman points out that VARs have a tough decision to make concerning what hardware to implement on. With ORACLE, that decision needn't be made. Software VARs who establish a niche in a particular vendor's install base can take advantage of ORACLE's portability to sell in other hardware environments.

Shorter Time To Market

The company also cited the high level of productivity offered to VARs by Oracle's broad range of application tools, including a forms system, integrated spreadsheet, graphics and other tools. These yield development and maintenance efficiencies that translate into shorter time-to-market and lower costs.

And, Harman adds, "ORACLE is the most complete and mature SQL-based DBMS on the market. SQL is becoming a national standard, so developing applications with an IBM-compatible, portable DBMS makes business sense in both private-sector and public-sector markets."

Harman concludes, "Generous discounts plus support, training and co-marketing combine to make the Alliance program an outstanding opportunity for software VARs."

Oracle Corporation, founded in 1977, builds and markets the ORACLE distributed relational DBMS, 4GL and DSS tools. ORACLE was the first commercial SQL-language DBMS, and is compatible with IBM's DB2 and SQL/DS DBMSs.

ORACLE provides a standard software environment across a wide range of computers and operating systems, including IBM mainframes, minicomputers from DEC, DG, ATT, HP, Stratus, IBM, Apollo and many others, and IBM PCs. ORACLE runs with IBM's MVS and VM/CMS, DEC's VAX/VMS and DG's AOS/VS among others, as well as with UNIX on most systems.

All versions of ORACLE, from the mainframe to the PC implementation, are identical. ORACLE is the only relational DBMS which provides the complete portability of data and applications across a wide variety of systems. Oracle's SQL*Star architecture links dissimilar systems running ORACLE.

Oracle Corporation markets its products worldwide through 30 direct sales offices, 11 distributors and the Authorized Oracle Dealer network. In addition, ORACLE is sold by numerous hardware manufacturers, including IBM, Honeywell, Sperry, Stratus and Prime.

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For additional information, contact Larry Harman, Director, VAR Marketing, Oracle Corporation, 20 Davis Drive, Belmont, CA 94002 or call 800-345-DBMS

MICROCOMPUTERS

Inexpensive peace of mind

From page 71

AT disk onto 14 1.2M-byte floppy diskettes in about eight minutes.

My rather eccentrically configured IBM Personal Computer, with a Microsoft Corp. Mach 10 board and a Plus Development Corp. Hardcard 20, was slower. It took 27 minutes and 49 seconds to copy 12,130,304 bytes in 632 files to 31 standard 360K-byte floppies. Still, that's pretty good, since almost five minutes of that time the program was waiting for me to find and insert another diskette. In addition, I used unformatted diskettes.

Prior to Version 5.13, Fastback was copy protected, which was a characteristic that kept the program off my list of software to take seriously.

With the newest version, however, Fifth Generation Systems has responded to similar sentiments from customers and released the program unencumbered by copy protection.

Fastback is straightforward and easy both to install and to use. The backup program can be used to back up an entire disk, selected directories and/or files or simply those files that have been changed since the last backup. By backing up only those files that have changed since the last backup, the typical user will be able to reduce backup time to only a few minutes a day.

A catalog of the backup diskettes and their contents is kept on the Fastback directory on your hard disk. This is very convenient in speeding selective backups and locating individual files you may want to restore. The restore program will identify the disk to be mounted. This is actually more convenient than tape backup systems in which the drive may have to wind through the tape to reach the file you want.

Although used for convenience, the hard-disk backup directory is not required. The restore program can also read directory information directly off the diskettes. If the hard disk is lost or if you want to restore to another system, Fastback uses the directory information on the backup diskettes.

Automatic format

Backup diskettes do not have to be formatted prior to use. Fastback automatically formats them as it does the backup. It uses a proprietary format to get more than the standard amount of information on a 360K- or 1.2M-byte floppy.

Fastback also includes error detection and correction routines that will repair up to one erroneous sector in each track of each side of the floppy disk. It is also possible to specify a 720K-byte format that allows for the use of less expensive standard diskettes on a high-density 1.2M-byte IBM PC AT-type floppy drive.

All things considered, I found Fastback to be an extremely useful option for hard-disk backup. Its speed and ease of use make Fastback well worth considering if you are concerned about hard disk backup. It delivers value and performance that compare favorably with more expensive backup alternatives.

The Seybold Group's Conference on

Desktop Communications

The Hyatt Regency
San Francisco
January 28–31, 1987

Information on key issues that will prepare the corporate decision maker to meet today's communication challenges.

Desktop communications has become a major area of financial commitment for companies of all sizes. The Seybold Group has developed panel discussions and seminars to present you with as much meaningful information as possible in as short a time as possible.

Topics

- Communication from desktop to mainframe — what are the options?
- Multiuser computer systems vs. local area networks — what's the right choice?
- Successes and failures in implementing LANs — a user's perspective
- Desktop publishing — how does it fit within an office communications environment?
- Today's multiuser software — does it really meet user's requirements?
- Implementing workgroup networks — what are the real costs?
- Coaxial, twisted, fiber — how do you choose wiring media?
- The emerging role of departmental computers — what are the needs, what are the benefits?
- The future of office communications — an outlook from the industry's most experienced analysts

Speakers

High-level executives from some of the industry's most prestigious companies will take part, including

- John Sculley, Pres. and CEO, Apple Computer
- Joseph Gottlind, Div. Mgr. Customer Serv End-User Support, AT&T
- William Krause, Pres. and CEO, 3COM
- Dr. Robert Carberry, V.P. Product Line Management, IBM
- Max Toy, Sr. V.P. Marketing, ITT
- Craig Burton, V.P. Corp. Marketing, Novell

Along with such industry analysts as:

- Stewart Alsop, Editor, P.C. Letter
- David Bunnell, Publisher, PC World
- Jerry Pournell, Columnist, Author

Other companies that will be represented include:

- Ashton-Tate
- AST Research
- Convergent
- Corvus
- Data General
- DCA
- DEC
- Hewlett-Packard
- Lotus
- Microsoft
- Northern Telecom
- 3M
- Toshiba
- Wang
- Xerox
- . . . and others!

Product Announcements

A number of major companies involved in desktop communications have already indicated that they will be announcing significant new products in conjunction with the conference.

Registration Information

- Dates: January 28–31, 1987 (Wednesday, Thursday, Friday, and Saturday)
- Cost: Conference, $595. Hotel rooms available at specially discounted rates. Call the Hyatt Regency, (415) 788-1234, to make your hotel reservation. Be sure to indicate that you will be attending the Conference on Desktop Communications.
- For additional details about the conference, please contact The Seybold Group, Phone (213) 320-9151 or (408) 257-[illegible].

Exhibits

- Dates: January 29–31, 1987 (Thursday, Friday, and Saturday)
- Exhibits: Products needed to set up effective desktop communication workstations and networks. For information on exhibiting at the conference, contact The Seybold Group.
- Cost: Free for conference participants; $25 per day for nonparticipants.

Show to highlight Mac rollouts

From page 71

Even without an IBM PC connected to Appletalk, the system can have a network link with a Macintosh for file sharing by using a Netware bridge between networks, Clark said.

Mountain View, Calif.-based 3Com Corp., manufacturer of an Ethernet network for the Macintosh called Ethermac, was developing such a PC-Macintosh network for several months, Clark and other industry sources said.

"3Com thought they had an OEM marketing agreement with Apple," Clark said. Novell was willing to handle its own marketing as long as the company had Apple's assurance of compatibility, analysts said.

Apple will also show its own network product in January, Clark said. "They're sticking with Appletalk," he said. "The tendency is to bridge between systems. Everyone who wants to connect to the Macintosh has to use Appletalk protocols. The open Mac will allow more communications options, but what do you do with the other Macs out there? You still need Appletalk."

Dove Computers, in Wilmington, N.C., expects to release IBM Token-Ring and Starlan interfaces for Macintosh this year. Dove already produces a Macintosh Ethernet LAN that is compatible with Digital Equipment Corp.'s Decnet. "We have targeted the LAN area as wide open for the Macintosh," said President David Valliere. "It is also clear bridging micros to large mainframe networks is wide open."

The Nantucket product is a relational data base from the makers of Clipper, a Dbase work-alike compiler. Nantucket bought Dmac III from Format Software in San Diego, revamped the product and will rename it in time for shipment in February, said Edward Brassard, vice-president of product marketing. According to Brassard, it will be priced at less than $400.

The Adobe Illustrator, from the developers of the Postscript communications language, is intended as a professional graphic artist's tool and allows finer control of artwork because it does not use bit-mapped graphics, said President John Warnock.

COMMUNICATIONS

Rolm CBX II links to AT&T

By Stanley Gibson

SANTA CLARA, Calif. — Rolm Corp. announced last week that its CBX II 9000 had passed tests for compatibility with three AT&T Communications digital services: Accunet T1.5, Megacom and Megacom 800.

With the announcement, Rolm offers its customers access to AT&T digital services across its entire Computerized Branch Exchange (CBX) product line, according to Graham Chloupek, T1 product manager at Rolm.

"It's something they need to do. Most everyone else has done it. It makes connections to T1 easier by making them an inherent ability of the switch," said Duane Perry, a telecommunications analyst with International Data Corp. in Framingham, Mass.

"T1 and these other services have a variety of framing standards. AT&T keeps adding control overhead to the transmission for management. This raises the ante for customer premises equipment vendors. AT&T ratchets up what's involved in sending information over the pipe. If vendors want to sell, they have to watch AT&T's moves," Perry added.

Accunet T1.5 is a high-speed digital service that provides private line voice, data, facsimile or video transmission at a rate of 1.544M bit/sec. Megacom and Megacom 800 are digital services targeting business customers.

Compatibility with AT&T switching and framing protocols enables the CBX to interface directly with these services over a T1 special-access facilities link to the AT&T central office, according to Rolm.

"By connecting these T1 services to the CBX II 9000 instead of using other types of media, Rolm users have new opportunities to save money on their network transport costs," Chloupek said.

"The announcement is significant because Rolm is an IBM unit. Even IBM recognizes the need to interface with AT&T. It's almost a tactical issue," said Joaquin Gonzales, a telecommunications analyst with the Gartner Group, Inc. in Stamford, Conn.

The verification tests included transmitting voice from a Rolm CBX T1/D3 interface through multiple AT&T Digital Access and Cross-Connect Systems to ensure compatibility with AT&T's D4 framing convention for signaling, according to Rolm.

Rolm announced in March 1986 that its CBX 8000 had passed the same tests for interface compatibility.

Gateway joins 3+, SNADS

Users on network or host can exchange documents

By Elisabeth Horwitt

TORONTO — An electronic-mail gateway between 3Com Corp.'s 3+Mail and IBM's Personal Services/370 is likely to become commercially available in the first quarter of this year. The product will allow document exchange between users on 3Com's 3+ local-area network (LAN) products and users on IBM hosts running Systems Network Architecture Distribution Services (SNADS) and Distributed Office Support System (Disoss).

The product was jointly developed by 3Com and Toronto-based system integrator Linkage, Inc. at the request of Merrill Lynch Canada, Inc., which needed a "cost-effective way to integrate PCs with a Disoss backbone," explained 3Com product marketing manager Alan Kessler. "[Merrill Lynch] users have to receive their quote information on the mainframe, so the question is, do you install another mainframe to run PS/370? LANs are a much more cost-effective way to link the brokers who have to use dumb terminals and the mainframe with IBM PC users."

The gateway, which consists of software running on an IBM PC, automatically performs format and protocol conversion so that 3+Mail documents can be sent to PS/370 users. "We know the product works; we're just evaluating demand so we know who will offer it and how," Kessler said. "You have to recognize that different resellers have different levels of expertise when it comes to SNA products. If 3Com is going to put its name to a package and shrink-wrap it, we want to be sure customers will be satisfied if a computer store sells it without third-party support."

If the product proves too complex for retail outlets, 3Com will be "happy to have the product offered by Linkage with value added," Kessler said.

3Com and possibly Linkage are discussing profit-sharing terms with Merrill Lynch Canada, which currently owns the gateway. The investment firm will use the product to link work groups at multiple sites, some of which will be on 3Com's token-ring network, others on a corporate mainframe running PS/370, located at Toronto headquarters.

"Smoothly integrating local-area network technology is the key for companies with substantial investments in IBM host-

See **GATEWAY** page 74

MCI to upgrade digital services

By Elisabeth Horwitt

WASHINGTON, D.C. — Striving to remain competitive in the burgeoning high-speed digital services market, MCI Communications Corp. recently announced it would be lowering prices on and upgrading its Terrestrial Digital Service (TDS 1.5). MCI is also in the process of increasing the number of miles of microwave and fiber-optic lines that support the 1.5M bit/sec. offering, the company said.

The announcements were "part of MCI's strategy to remain competitive in the market in terms of quality, pricing and availability," stated MCI spokesman John Houser.

Effective Feb. 1, rates for TDS 1.5 connections over distances of 141 miles or more will decrease an average of 30% per circuit mile, according to Houser. Transmission rates for connections over distances of less than 141 miles will increase an average of 29% per circuit mile.

The pricing changes are designed "to keep our prices 10% lower than AT&T's," Houser noted.

Also effective Feb. 1, MCI will offer 3% discounts to customers with monthly bills equaling or exceeding $150,000 and 5% discounts to those with bills equaling or exceeding $300,000, Houser said. Term discounts for one-, three- and five-year contracts will also be offered.

As of Feb. 1, MCI will offer its customers the option of having their transmissions routed only over fiber-optic connections "where they are available," Houser said. No additional monthly charge will be levied for this option, but customers will pay a $400 one-term administration charge, he added.

The company made known its plans this year to increase its network of digital fiber-optic and microwave lines. At the end of 1986, the network covered approximately 32,000 route miles, 12,700 of which were digital. By the end of this year, the network will extend over 40,000 route miles, 50% of which will be digital, Houser said.

INSIDE

AT&T, Northwestern Bell to link Switched 56 services/**74**

FCC accounting method to replace structural separation for telephone companies/**74**

NEW THIS WEEK

- Control Data expands its Redinet electronic data interchange system

- For more on this and other new products, see pp. 89-100.

INSTANT ANALYSIS

"IBM says anything written for Netbios will run on Advanced Program-to-Program Communications, but how well can that work when APPC offers so much more functionality?"

— Steven Berte, project manager, office systems, Metropolitan Life and Affiliated Companies

T1 switches to gain DACS power and support subrates

By Stanley Gibson and Elisabeth Horwitt

The next two months will see several significant T1 switch introductions, particularly in the area of Digital Access and Cross-Connect System (DACS) compatibility and subrate digital multiplexing, industry sources say.

AT&T developed DACS as a central office device to route 64K bit/sec. DS0 transmissions among T1 lines. "What users need is smaller DACS switches that can also do subrate digital multiplexing" says William Rahe, vice-president of Enterprise Network Strategies at the Gartner Group, Inc., a research firm in Stamford, Conn. Subrate digital multiplexing (SDM) allows a 64K bit/sec. DS0 channel to be broken up into smaller bandwidths so multiple transmissions can share the same DS0 link.

At Communications Network '87, in February, Tellabs, Inc. will unveil its long-awaited DACS customer-premise switch, analysts predict. A Tellabs spokesman told *Computerworld* that the company would announce a DACS-compatible switch at the industry conference and that AT&T would be the OEM for the product.

It is very likely that the switch will also perform subrate digital multiplexing, Rahe notes. Several of Tellabs' major competitors also claim to be working on DACS-compatible switches with SDM, he adds.

Later this month, Avanti Communications Corp. in Newport, R.I., will introduce a "high-end T1 multiplexer that significantly boosts port capacity, intelligence, routing and network management capabilities" compared with the vendor's previous products, according to Avanti spokesman William Geasey.

Avanti would not confirm or deny that the product would also feature SDM, but the Gartner Group's Rahe says it is likely. Approximately 22 T1 multiplexer vendors already offer the capability. Timeplex will begin shipping its Link/2 DACS-compatible multiplexer in mid-January, having successfully completed beta testing, an industry source told *Computerworld*. Timeplex announced SDM capabilities for its switch last fall

AT&T Switched 56 gets local access

By Elisabeth Horwitt

WASHINGTON, D.C. — AT&T has proposed a revised tariff that enables users to access its Accunet Switched 56 through similar services offered locally by divested Bell operating companies. This will enable customers to cut local loop costs by more than 80% for the digital 56K bit/sec. service, according to AT&T.

Right now, approximately 90% of Switched 56 customers use AT&T's Dataphone Digital Service (DDS) to move data from their premises to the nearest AT&T central office, according to Switched 56 Service Marketing Manager Martha Churchill. The revised tariff will allow them to replace this $700 per month dedicated service with a local telephone company's Switched 56 offering, which costs approximately $120 per month, according to Churchill.

Linking local and long-distance Switched 56 services also enables users to send both voice and data over the same lines, Churchill noted.

If the revision is approved by the Federal Communications Commission, the new access service will become available on Feb. 6, 1987, to customers originating digital calls at Northwestern Bell's central offices in Minneapolis and Omaha. While several divested Bell operating companies offer Switched 56 services within their regions, last October Northwestern Bell became the first company to win FCC approval for Switched 56 services with access to long-distance services.

Other divested Bell operating companies have filed similar tariffs with the FCC and expect approval by the second quarter of this year, according to Northwestern Bell spokesman James Atkinson.

"We've been anxiously waiting for the local companies to file inter-LATA [local access and transport data] services so that we could file our half," Churchill said.

FCC ends structural split

By Elisabeth Horwitt

WASHINGTON, D.C. — The Federal Communications Commission recently approved an accounting method that will finally eliminate the existing structural separation of regulated and nonregulated businesses within AT&T and the divested Bell operating companies.

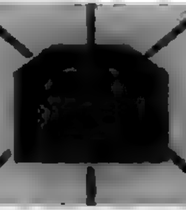
While some telephone companies' nonregulated activities "do not now involve the regulated network plant, we want to ensure for the future that nonregulated activities bear their fair burden of a company's investment," FCC staff attorney Jane Jackson said. "A lot of companies are buying equipment now for future unregulated use."

The accounting method is "designed to be a standard approach that involves the maximum amount of direct assignment of costs" to either the nonregulated or regulated side of a carrier's business, Jackson said.

Telephone companies will have to estimate in advance what percentage of a given piece of equipment will ultimately be used for regulated and nonregulated business, Jackson noted. "If equipment is to be used, say, 20% for nonregulated services during the first year, you assign 20% of operating costs plus investment costs."

Companies' estimates of future revenue also become a basis for dividing costs among regulated and nonregulated services, according to Jackson. "If the nonregulated activity doesn't pan out, they take their lumps," she noted.

Tracking usage property item by property item will not be easy, Jackson admitted, "since intelligent switches are multifunctional and it's hard to say which does which." The new system will incorporate a corrective mechanism for inaccurate usage or revenue estimates that will involve rebates to customers where appropriate, Jackson said.



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Vitalink announces bridge for 802 line

By Peggy Watt

MOUNTAIN VIEW, Calif. — Vitalink Communications Corp. recently announced a low-end bridge product for its network-to-network 802 WAN line.

The Translan IV is intended as an entry-level bridge for connecting only two networks or hosts and has only one synchronous port and a V.35 interface, according to Paul Schaller, vice-president of marketing and sales for Vitalink.

"We've had requests from people who want an entry-level product, who are getting into their first work group location outside their computer center but who want a gateway into their local-area network," Schaller said.

Vitalink's Translan line of bridge products provides communications between devices on geographically separated Ethernet 802.3 LANs. The bridges support either terrestrial or satellite connections at transmission speeds ranging from 9.6K to 2.043M bit/sec.

All Translan products handle transmissions at the link level. This enables them to transparently support a wide range of high-level networking protocols, including Digital Equipment Corp.'s Decnet, Xerox Network Systems from Xerox Corp. and Transmission Control Protocol/Internet Protocol.

"There's definitely a use for a low-end bridge as a backbone over T1," said Mark Freund, vice-president at Interconnect Network Consulting Group in Pasadena, Calif. "Many corporations have a lot of T1 lines. If you're running T1 speeds and can bridge over existing backbones, that's a lot less expensive than leasing another line," Freund said.

Unlike the Translan II and III, which have multiple ports, the Translan IV is not able to be upgraded. "We suspect as customers grow their networks they'll replace the Translan IV with a Translan III and move the IV to another location for a while," Schaller said. The Translan IV can be connected with the Translan II or III.

Gateway joins 3+, SNADS

From page 73

based applications," said K. Garry Rasmussen, the company's chief administrative officer.

Linkage has been working on Merrill Lynch's communications system for two years.

The integrator chose 3Com as the LAN vendor because the 3+ network "has many necessary features like global naming service and an integrated store-and-forward mail system," explained Linkage President Robert Jull.

Global naming enables users to address other users and resources on geographically distributed networks and servers.

SOFTWARE & SERVICES

Ask data base tool helps reduce errors in management

By Rosemary Hamilton

LOS ALTOS, Calif. — Ask Computer Systems, Inc. recently added to its suite of manufacturing management products with a module that serves as a separate data base for engineering revisions.

The purpose of a separate data base, called Manman/Engineer, is twofold, according to Ask Computer Systems spokesmen. It allows for bill-of-materials revisions to be made outside of Ask Computer Systems' Manman data base, thus reducing errors that often occur when multiple users are accessing one data base and changing data.

Unlike the current Ask Computer Systems software, Manman/Engineer has been designed to accept data from other vendors' computer-aided design (CAD) systems, a feature that more closely integrates the design and manufacturing process.

"Now we're more consistent with our engineering changes," said Robert Bechler, material planning manager at Sequent Computer Systems, Inc., a Manman/Engineer beta site.

According to Eric Roberts, an Ask Computer Systems product marketing manager, Manman/Engineer can be considered as a "sandbox data base," because users can play with data without impacting a company's official manufacturing data. Users can make copies of official bills of materials and then store and manipulate the data while in Manman/Engineer. Once changes have been approved, a bill of materials can be sent back to the materials requirements planning package, Manman/Mfg, as an offical revision.

The same process can be applied to data from other vendors' CAD systems. So far, successful file transfer has been made with both Mentor Graphics Corp. and Apollo Computer, Inc. CAD systems, according to Ask Computer Systems' Roberts.

Manman/Engineer runs on the Digital Equipment Corp. line of VAX minicomputers. Prices for the Manman/Engineer start at $16,000 for a DEC Microvax license and $23,000 for the high end of the VAX line.

Firm offers DASD Advisor

Boole & Babbage product incorporates expert system

By Charles Babcock

SUNNYVALE, Calif. — Boole & Babbage, Inc. is offering a mainframe direct-access storage device (DASD) management system, called DASD Advisor, that is said to incorporate an expert system.

DASD Advisor is an optional addition to Boole & Babbage's established DASD performance tool, DASD Response Manager.

The Advisor uses information gathered by the Response Manager to identify disk storage performance problems, analyze their causes and recommend corrective action in English-like reports, according to Dennis White, Boole & Babbage's director of marketing.

It analyzes performance data with the intent of identifying bottlenecks at the channel, control unit, head-of-string and device levels of the I/O subsystem. It then interprets the data to explain performance problems and recommend adjustments to improve them, White said.

For example, the Advisor consists of three analysis modes. System Balance Analysis mode presents a view of the I/O subsystem from the top down, examining the relative utilization of such devices as channels and control units.

The Workload Analysis option examines the problem volumes in the I/O subsystem that are tied to particular work loads.

Each module is activated from menus that present labeled options.

DASD Advisor will be available in May or June at a price between $20,000 and $30,000.

Boole & Babbage used an expert system shell from Aion Corp. in Palo Alto, Calif., to develop the Advisor. Its knowledge base has a set of intelligent editors and windowing interface and an editor that allows developers to custom-design a user interface for the finished expert system, White said.

Founded in 1967, the Sunnyvale, Calif., firm was an early entrant in the performance management field. It plans to issue a series of expert system-based Advisor tools that extend the capabilities of current Boole & Babbage tools in the IBM MVS, IMS, CICS and VM environments.

SOFTWARE NOTES

AT&T, Gould to sell Austec tools

Austec, Inc. has signed a licensing agreement with **AT&T** and **Gould, Inc.** under which those firms will sell Austec's line of networked Cobol software development tools, including Acenet, Acecobol, Acemenu and Acegen. Acenet is said to work like a virtual operating system, able to run on different hardware but showing the same operating system to Cobol applications, Austec spokesmen said.

■

Cortex Corp. in Waltham, Mass., has signed an agreement to put its applica-

See NOTES page 76

Global Software adds IBM DB2 tool

By Charles Babcock

DUXBURY, Mass. — Global Software, Inc. has announced a tool that uses an existing data dictionary to provide dictionary facilities to IBM's DB2.

The tool, called Silas, is an ISPF Dialogue Manager application that contains screens for the logical maintenance of data bases, tablespaces, tables, indexes and views in the Datamanager data dictionary, a product of MSP, Inc.

Silas permits an existing inventory of data element definitions in the dictionary to be browsed and selected as columns for DB2 tables, said Duncan G. Connall, president.

In addition, Silas is said to provide

See GLOBAL page 76

INSIDE

Candle announces a multiple-region CICS reporting package/**76**

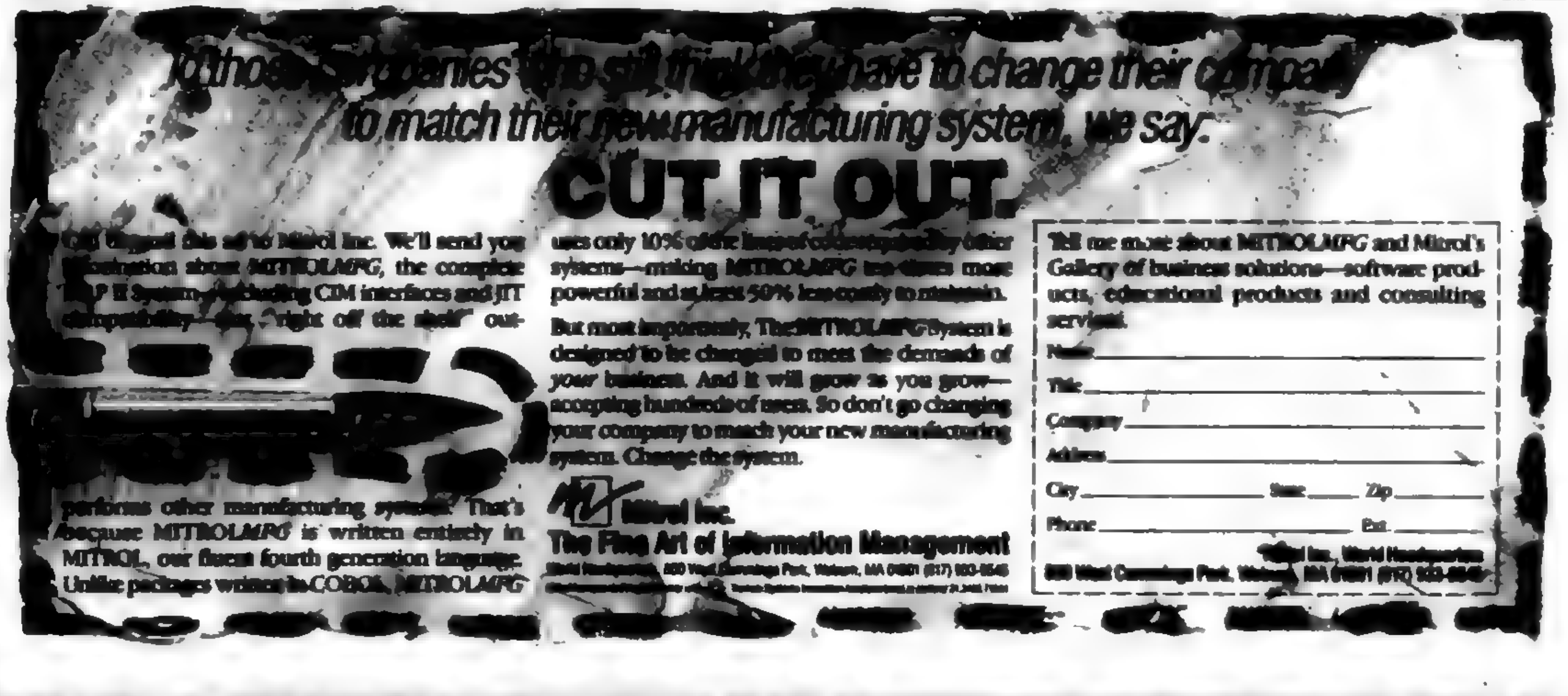
NEW THIS WEEK

- Dynasoft offers integrated software system for IBM mainframes
- For more on this and other new products, see pp. 89-100.

INSTANT ANALYSIS

"Prototyping can create an illusion of progress. If you show users a spaghetti-and-meatball chart, a flow chart of balloons and boxes, it doesn't look like an information system and they think you haven't started yet."

— James Davey, senior research associate, Digital Consulting, Inc.



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Global Software adds DB2 tool

From page 75

for the generation of Create, Alter, Drop, Grant, Revoke, Label On and Comment On statements in DB2 and documents them in the data dictionary.

Equivalent statements may be generated for SQL/DS, the relational data base management system used under IBM's VM and DOS/VSE operating systems.

The Datamanager data dictionary provides cross referencing and structure generation capabilities via Silas, Global spokesmen said.

Definition and maintenance

By using Silas screens, DB2 data bases can be defined and maintained, Connall claimed.

Silas is available at a price ranging from $8,000 to $30,500, running under TSO or VM/CMS.

Silas is available as either a standalone product or as an option that has the capability to run with Global's Hugo/ISPF product.

MSA offers integrator

ATLANTA — An application that is said to provide the ability to integrate a set of financial applications and act as a "traffic cop" in their interchange of data has been announced by Management Science America, Inc (MSA).

Called the Financial Controller, it uses MSA's fourth-generation Information Expert system to provide an integration environment for applications. The applications may be MSA financial packages, in-house applications or third-party systems, said Larry Smart, MSA senior vice-president.

Financial Controller is in beta-test at Bankers Trust Co. in New York and will be available in the first quarter of this year, MSA spokesmen said. It will cost new customers $25,000; existing MSA financial applications users will receive the product free. The software makes it easier to integrate new applications with existing ones, spokesmen said.

Notes: Codasyl seeks members

From page 75

tion development tools on the **NCR Corp.** Tower, ITX 9000 and VRX/E 9800 minicomputers.

Known as Corvision and the Application Factory, they were originally developed for the Digital Equipment Corp. VAX. They have the ability to automate generating applications from a special diagram to production Cobol.

■

Additional members are being sought for a **Codasyl** committee. The committee's proposed function is to recommend a screen management standard to be adopted for third- and fourth-generation languages.

The standard will specify a simple interface for applications and an Independent Screen Description Language that describes interaction with both applications and devices, such as terminals, workstations and personal computers.

Interested parties are invited to contact Dan Frantz at Digital Equipment Corp., ZK02-3/R56, 110 Spit Brook Road, Nashua, N.H. 03062, or call (603) 881-2272.

■

IBM World Trade Corp. and **Automated Language Processing Systems, Inc.** (ALP Systems) in Provo, Utah, have signed an agreement under which ALP Systems will provide a computer-aided foreign language translation system.

The first translation system, which is due next summer, translates English to Japanese; later systems will translate English into Chinese and Korean, ALP spokesmen said. The systems run on IBM 5550 terminals under VM/CMS.

■

The **American National Standards Institute** (ANSI) has published an updated edition of ASCII standard codes. ANSI X3.4-1986 revises the 1977 edition of the 7-bit coded character set.

Some names of ASCII characters have been changed to reduce ambiguity.

For example, "Opening" and "closing" have been replaced with "left" and "right" when referring to parentheses, brackets and braces, for example.

Candle Corp. announces CICS reporting package

By Eddy Goldberg

LOS ANGELES — Candle Corp. is expected to make available the Background Reporting Facility for IBM CICS/MVS environments in the second quarter of this year. The product will enable users to report on the performance of transactions across multiple CICS regions, as well as across different machines.

Candle also recently announced the immediate release of its Omegamon/VM software, XA/SF Version 300, for monitoring the performance of IBM's VM/XA/SF operating system.

Now in beta test, the Background Reporting Facility is the first CICS monitoring product to allow reporting across multiple regions, according to Theodore J. Marr, marketing vice-president at Candle.

The Background Reporting Facility, which will work with all IBM-supported CICS releases, collects performance activity that is used to form a data base on system activity. The data is stored in an external address space.

A utility is included to convert the background reporting data to IBM's CICS Monitoring Facility (CMF), allowing users to run existing CMF reports and feed the performance data bases, Candle spokesmen said.

The Background Reporting Facility, an Omegamon/CICS add-on product, will cost $6,000 for the MVS version and $2,000 for the DOS version, which is scheduled for summer 1987.

New features include a facility for performance comparisons to identify long-term peaks and averages in resource utilization during an Omegamon/VM session. It also includes a feature to analyze how users affect a specific mini-disk, which can be used for I/O load balancing.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

Planners juggle tech and talk

The growing number of capacity planners in U.S. data processing operations face a dual set of challenges, and about 2,000 of those managers tried to address their needs at a recent conference.

First, the planners are confronted by technical issues; in essence, the need for tools to measure performance and predict growth. Capacity planners at CMG '86, the international meeting of the Computer Measurement Group, Inc., seemed confident, however, that vendors are trying to address those technical issues, even if the attendees were disappointed by the lack of progress in the development of some tools, such as an all-purpose capacity planning expert system.

The second challenge, which is tougher to deal with, is the management issue. This is an area where every capacity planner in every corporation faces different problems because the role of this new breed of manager can vary widely.

It was strange listening to the comments of the different capacity planners as they described their groups' activities. It became increasingly clear there is no typical capacity planning group. The planners' roles range from iron-fisted control of hardware and software acquisitions to statistics gathering for special projects that never get off the ground.

It also became apparent that too many capacity planners are unsure of their own status in their companies.

See PLANNERS page 80

Connolly is Computerworld's *senior editor, systems & peripherals.*

Wang, HP flex muscles

Minis edging out IBM in mainframe locations

By Stanley Gibson

LA JOLLA, Calif. — Flexing their muscles in departmental computing, Wang Laboratories, Inc.'s Wang VS and Hewlett-Packard Co.'s HP 3000 minicomputer lines are making inroads on IBM's System/36 and 38 in IBM mainframe shops, a recent study shows.

The study, released by Computer Intelligence Corp., shows that 78% of System/36 sales and 86% of System/38 sales are to small business sites. But only 7% of System/36 and 7% of System/38 sales are to IBM mainframe sites.

In contrast, 62% of HP 3000 sales and 59% of Wang VS sales are to small business sites, while 16% of HP 3000 and 23% of Wang VS sales are to IBM mainframe sites.

Overall, the study shows installations of the HP 3000, the System/38 and the Wang VS increasing at similarly modest rates, the discontinued IBM System/34 population declining sharply and installations of the System/36 increasing rapidly.

The report also finds that IBM systems have considerably more direct-access storage device (DASD) capacity than the HP or Wang systems. Heavier use of data base management systems by the IBM users was offered as a possible explanation of the difference in average DASD capacity. The report's authors speculated, however, that new DBMS offerings from HP and Wang would likely narrow the gap.

In addition, the average DASD capacity for the System/38 stayed approximately the same from 1985 to 1986. Lower cost per megabyte DASD drives, however, might bring increased capacity to those systems in the coming year, the report's

See WANG page 80

NEW THIS WEEK

- Synercom Technology introduces its Distributed VS Station for mapping information management
- For more on this and other new products, see pp. 89-100.

INSTANT ANALYSIS

"By pooling the interests and expertise of three major players with a number of compatibilities and/or cross-licensed products, it protects the investment of Honeywell users better than HIS could have on its own, and even holds some prospects for growth."

— International Data Corp.'s "Computer Industry Report" on Honeywell, Inc.'s divestment of Honeywell Information Systems

Floating Point to supply DEC with M64 processors

By James Connolly

BEAVERTON, Ore. — Floating Point Systems, Inc. last week announced it will be supplying its M64 attached processors to Digital Equipment Corp. for packaging with DEC VAX systems and for sale to customers in the scientific and engineering fields.

In a separate announcement, Floating Point released annual financial results showing a loss of $14.2 million for the year ending Oct. 31, 1986, on revenue on $88.5 million, down from $126.5 million in revenue in 1985 (see story page 81).

Floating Point officials said the DEC agreement is an extension of an existing joint marketing agreement, under which Floating Point targets DEC installations for its products. Those officials declined to

See FLOATING page 80

Board connects 386, VMEbus

By Stanley Gibson

LOS GATOS, Calif. — Force Computers, Inc. recently announced the CPU-386, a board that brings the Intel Corp. 80386 chip to computers using the VMEbus.

The manufacturer claims that the CPU-386 is the first such board for the general market.

"We see it as an ideal marriage," said Wayne Fischer, director of marketing of Force Computers, referring to the chip and bus combination.

Although the board cannot run software written for Microsoft Corp. MS-DOS or Unix operating systems at present, it will be able to in the third quarter of this year, according to Fischer. This month, the system will be able to run programs written for the VRTX operating system from Ready Systems, formerly known as Hunter & Ready, Inc., Fischer said. "This first step

See BOARD page 80

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Planners juggle tech and talk

From page 79

Too many were unable to define their companies' commitments to capacity planning. It is a relatively new field and one that may be of little interest to companies that can afford to add computing power at leisure. However, those companies are becoming more rare.

The burden of building a successful capacity planning operation rests not only with the company, which has to recognize its measurement and planning needs, but also with the capacity planners who need to make themselves valuable. To make themselves assets rather than liabilities, those planners must help their companies and user departments manage their growth and resources.

It is disconcerting to hear managers talk only in numbers — in CPU benchmarks or disk packs — that their superiors or users often may not understand.

Finally, planners must listen to their users, not just concerning the applications or processors the users want but also regarding what the users hope to accomplish. Understanding the business plan is a key to success for capacity planners and MIS in general. Most capacity planners recognize this. However, the remaining handful sound remarkably like the old-line DP managers who hid behind glass walls while denying the need for user input and microcomputers. With luck, that more stubborn breed is the rare exception.

Wang, HP flex muscles

From page 79

authors indicated.

Another Computer Intelligence survey confirms a widely perceived trend that Digital Equipment Corp. is gaining an increased share of the market for commercial and general-purpose processors.

The arrival of new, more powerful DEC VAXs and increased use of clustering should help DEC break out of the scientific mold more and more, the report concludes. "More power means the ability to handle a wider array of system and application software — good news for vendors in the fast-growing DEC VAX market."

Floating Point to supply DEC

From page 79

specify the dollar value and length of the contract. However, they said DEC will introduce products based on the VAX-M64 combination. The introduction is expected sometime this month.

"The new products combine the strength of the two companies. DEC provides the industry's finest general-purpose engineering and scientific platform, as well as superb distributed and networked systems, while we offer the industry's most widely accepted compute-intensive processors," said George P. O'Leary, president of Floating Point.

Board connects 386, VMEbus

From page 79

is offering hardware. The second step is operating system and software," he said.

Once the operating system software is in place, the board will be able to execute the thousands of programs written for the Intel 8086, 8088 and 80286 chips at a faster rate. However, the full benefit of the 80386 chip can only be obtained from programs written especially for it, Fischer said.

"Now, there are a lot of cases where the application software doesn't run fast enough. The board offers considerable performance improvement for slightly greater cost," Fischer said. The board should gain acceptance in the military market, where the VMEbus is widely used, he added.

The CPU-386 is the first CPU board designed by Force Computers that is not based on the Motorola, Inc. 68000 family. Available in the middle of this month, the product will sell for $5,775.

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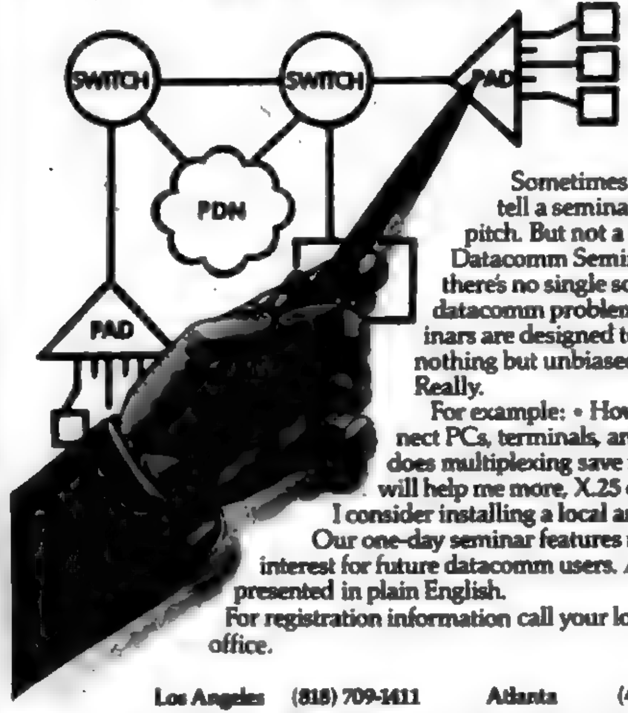

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COMPUTER INDUSTRY

OUTSIDE LINES
Bob Djurdjevic

3090s now face tougher ride

All those early-1986 doomsday preachers who talked of IBM's problems with 3090s because of their alleged lack of "functional differentiation" from the 3080 series will have to think again.

In fact, the 3090 program is off to a great start. According to July 1986 data from Computer Intelligence Corp., the 3090s' "if sold" shipment value in the U.S. was already exceeding that of all other IBM processors put together by a margin of 38% to 62%. As a result, IBM has been able to regain the large systems market share from the plug-compatible machines (PCM), which the company lost in 1985.

The significance of IBM's success with the 3090 during the first half of the year can best be judged by comparing it with another successful IBM product, the 4381.

As of July 1986, the 4381s accounted for about 49% of IBM's U.S. units installed. Meanwhile, the 3090s' share was only 7.6%. Measured in terms of market value, however, the 4381s contributed only 16% of IBM's total large systems installed base, while the 3090s accounted for more than 38%.

The two mainframe PCM vendors, Amdahl Corp. and National Advanced Systems Corp. (NAS), underwent a hiatus in shipments during the first half of 1986, owing to a change in product cycles. IBM, on the other hand, pro-

See 3090s page 82

Djurdjevic is a computer industry analyst and president of Annex Research, a Phoenix-based computer research and consulting firm.

Loss expected at Wang

Fourth-quarter charges will also put Unisys in the red

By Alan Alper

LOWELL, Mass. — Subpar demand for its office automation products and mounting deficits at its Intecom, Inc. communications subsidiary will cause Wang Laboratories, Inc. to report a significant loss for its second fiscal quarter ended Dec. 31, 1986, sources close to the company said last week.

Another major vendor, Unisys Corp., which is the partnership of the former Burroughs Corp. and Sperry Corp., said last week that it will report a substantial loss in its fourth quarter, which ended Dec. 31, 1986.

The firm estimated it will take an after-tax charge of $250 million to $275 million due to layoffs, divestments, consolidation of operations and asset write-downs. Unisys earned $52.9 million in the third quarter — its first as the combined company.

Sources close to the company said Wang could report a loss of about $50 million for the second quarter of fiscal 1987. That result would follow a loss of $30 million in the first quarter, which was also said to be due to sluggish demand and poor performance by Intecom.

Second-quarter profit

In the second quarter of fiscal 1986, Wang reported a profit of $21.7 million.

The continuing financial difficulties at Wang fueled internal speculation last week that Harry Chou, vice-chairman and chief financial officer, is on the verge of resigning.

A Wang spokesman vigorously denied that Chou, an 18-year Wang veteran and confidant of company Founder and Chairman An Wang, had offered his resignation. He noted that rumors regarding Chou's departure were spawned after the executive left the firm last week to examine a vacation house.

Floating Point posts $14.5M loss

By Clinton Wilder

BEAVERTON, Ore. — Troubled scientific systems vendor Floating Point Systems, Inc. recently announced a slew of bad financial news, including a loss of $14.3 million, or $1.67 per share, for the fiscal year ended Oct. 31.

In fiscal 1985, Floating Point reported a profit of roughly the same amount — $14.4 million, or $1.75 per share. Fiscal 1986 revenue declined 30% to $88.6 million.

In addition, Floating Point said it was forced to reduce its previously reported revenue for the first three quarters by $6.2 million because of a change in revenue recognition.

In the past, the company recognized revenue when its products were shipped to customers, even though the customers had the right of return. Floating Point restated its results to recognize revenue at the time of customer acceptance.

Most of the year's red ink came in the fourth quarter, when the firm lost $12 million, or $1.39 per share, on revenue of $20 million.

Floating Point took a one-time charge of $4.1 million in the quarter to account for its loss from investing in financially struggling Lattice Semiconductor Corp. in Portland, Ore.

Reduction, underutilization

During the fiscal year, Floating Point also took charges of $8 million for inventory write-downs and $3 million for a 30% work force reduction and associated underutilization of factory capacity.

Lattice employees recently worked without pay for two months when the firm failed to complete an expected $10 million round of financing.

Lattice restored 50% of its payroll in early December after receiving funds from an undisclosed source.

INSIDE

Software AG announces 54% profit drop for quarter/82

Pansophic's buyout of SPSS gets canceled/82

INSTANT ANALYSIS

"Down the road, IBM will undoubtedly become a market force in microcomputer software. The growing reliance on departmental processing, networking and mainframe linkage will play right into Big Blue's hand."

— Gary P. Sneby, managing director, Piper, Jaffray & Hopwood, Inc.

Six IBM execs retire early

Vice-presidents take advantage of incentives

By Clinton Wilder

ARMONK, N.Y. — Two IBM senior vice-presidents and four vice-presidents announced their retirements during the company's recent three-month period to sign up for early retirement incentives.

Senior Vice-Presidents Dean P. Phypers and George B. Beitzel will retire. However, both men will retain their seats on IBM's board of directors.

Senior Vice-President and Group Executive Clarence B. Rogers Jr. was named to a position that consolidates his current post as head of the corporate services staff with Phypers' job, which entails heading the corporate operations staff.

Rogers will be responsible for 11 corporate staffs. These staffs include development, information systems and administration, manufacturing, marketing and service.

No replacement named yet

IBM has not yet named a replacement for Beitzel. Beitzel is senior vice-president of corporate business units.

The four retiring vice-presidents are Charles P. Biggar, who is president of the national service division; James F. Manning, assistant to Rolm Corp. President Dennis D. Paboojian; Ronald F. Casella, assistant group executive for software and business services, Information Systems Group; and P. Martin Foley, vice-president of information systems and administration.

J. Carl Masi named IDC CEO

By Clinton Wilder

FRAMINGHAM, Mass. — J. Carl Masi's nine-month search for a chief executive's position in the computer industry came to an end recently when he was named chairman and chief executive officer of the market research firm International Data Corp. (IDC), effective Jan. 1.

Masi, 45, a 12-year veteran of Wang Laboratories, Inc., resigned as Wang's sales and marketing executive vice-president last year.

Like former Wang President John Cunningham, Masi said he left Wang because of a desire to hold the top position in a computer firm.

Masi said his move from a $2 billion systems vendor to a privately held research services firm, whose annual revenue he estimated at $30 million, is not as unusual as it might appear.

"It's not the kind of move I thought I would have made nine months ago," Masi said. "But I looked at a number of different companies and traditional suppliers, and I just didn't find the opportunity that I have at IDC."

Masi compared the function of research services with the ultimate purpose of computer technology.

"IDC does not make a product that you can kick or plug into the wall," he said.

"But the real purpose is the same — providing the right information in the right form at the right time so users can make better business decisions," Masi added.

IDC is a subsidiary of International Data Group, which also owns CW Communications, Inc., publisher of *Computerworld* and other computer publications.

3090s now face tougher ride

From page 81

ceeded full steam ahead with the 3090s, trying to get as big a jump on the PCMs as possible.

How big a jump was it? In terms of the "if sold" shipment value list, IBM increased its market share to 92.3%; its market value share increased to 95.1%. The PCMs' share of the large systems market, on the other hand, declined to 5.4% for Amdahl and 2.3% for NAS. Their respective market value shares were 3.3% and 1.6%.

It would appear, therefore, that the scene is set for another big IBM surge in the large systems market. Not so, however.

In the second half of 1986, IBM had to start *selling* the 3090s, rather than just taking orders. As pointed out after the original Sierra announcement, the first 500 to 1,000 large IBM systems were pretty well spoken for on the day of announcement. That's how well the Fortune 500-type companies listen when IBM speaks.

Unfortunately for IBM, however, most of the world is not made up of such giant industrial enterprises. The second-tier companies, in terms of size, tend to spend their money a little more prudently, which means tougher sledding for IBM.

Coupled with the increased availability of the PCM vendors' products, such a scenario will make 1987 an exciting year from the users' standpoint.

Software AG's profits fall 54%

RESTON, Va. — Software AG Systems, Inc. recently announced that its profits tumbled by 54% on a slim 4% rise in revenue for the second quarter ended Nov. 30, 1986.

The developer of mainframe data base management systems reported net income of $986,000, or 17 cents per share, compared with $2.1 million, or 36 cents per share, in the year-earlier quarter.

Software AG's six-month net income of $2.1 million is 58% below the comparable period a year earlier. President and Chief Executive Officer Stuart J. Miller said the firm is expected to report a profit decline in the fiscal year ending May 31.

INDUSTRY NOTES

Pansophic-SPSS buyout canceled

Pansophic Systems, Inc. in Oak Brook, Ill., has broken off negotiations to acquire SPSS, Inc., the Chicago-based statistical analysis package producer. **David J. Eskra**, chief executive officer, issued no explanation of why the planned $32 million acquisition [CW, Nov. 10, 1986], announced at the end of October, failed to come off.

■

Uccel Corp. in Dallas has completed the acquisition of three companies for a total of $51 million. They are SKK, Inc. in Chicago, developer of the mainframe security software package ACF2, for $27 million; Cambridge Systems Group, Inc., in Santa Clara, Calif., which markets ACF2 and two related system-management products, for $21 million; and California Software, Inc. in Los Angeles, maker of Netman, an automated equipment ordering system, for $3 million.

Uccel spokesmen said the two larger acquisitions were made with bank borrowings and that the Dallas financial and systems software house still holds $100 million in cash and securities.

■

George W. Tamke, a 17-year IBM veteran, has been named president of **Cullinet Software, Inc.** Although Cullinet Vice-Chairman and Chief Executive Officer David Chapman had formally held the title of president, the office essentially had been vacant since the departure of Robert Goldman, who left to head Artificial Intelligence Corp.

Tamke's background in IBM mid-range systems is a sign of Westwood, Mass.-based Cullinet's direction away from the pure mainframe environment into software for minicomputers and departmental processors.

Tamke comes from IBM's Information Systems and Products Group, where he was assistant group executive for systems development and manufacturing. He will be responsible for Cullinet's sales and services divisions and will report to Chapman.

■

Intecom, Inc., the digital private branch exchange subsidiary of Wang Laboratories, Inc., recently laid off 180 employees. "The new merger with Wang enables us to utilize the parent company's capabilities and resources, thereby eliminating redundancies," Intecom President John Thibault said.

■

Apollo Computer, Inc. will make a more aggressive push into the personal computer computer-aided design market by selling its low-end engineering workstation, the Series 3000, through microcomputer dealers. Apollo which is working with authorized Autodesk, Inc. and Versacad Corp. dealers, is targeting users at companies with fewer than 1,000 employees.

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MANAGEMENT

TAKING CHARGE
Alan E. Brill

Prevented maintenance

For years, articles and entire books have been written decrying the tremendous volume of resources devoted to the maintenance of applications software. The authors argue that the world would be a better place if only we could devote more of our energy to building new and better systems.

We are assured that through proper planning, we can move from an emergency (crisis) maintenance environment to a critical (but not panic) environment. Perhaps we can even get to a point at which maintenance is routine and untroubled or adopt the engineering concept of preventive maintenance.

I'm not going to claim that all of this is not good and desirable. I'm not going to argue that through good management, we can reach a point at which we think in preventive maintenance terms. I just think that if we look at preventive maintenance as our goal, we are being incredibly short-sighted.

Preventive maintenance is still actual work requiring the expenditure of actual resources. A better kind of maintenance — one requiring no expenditure of resources — would be maintenance that you were never called upon to perform, or, to coin a phrase, "prevented maintenance."

Consider an example:

Two companies in the same industry build payroll systems. Both work well. Late on the evening of Dec. 31, the managements of both companies sign their first collective bargaining agree-

See PREVENTED page 84

Brill is director of Computer Security Services for the New York City Department of Investigation.

GM opens electronic system

Payment program to be used at divisions, banks

By David A. Ludlum

In one of the more innovative thrusts of its development of electronic data interchange, General Motors Corp. plans to complete the launching of electronic payment for eight divisions through eight major banks this month.

Seven banks were on-line with electronic payment systems last month as planned, but one has "slipped into January," according to Benson Woo, GM's director of worldwide banking and U.S. cash management.

He declined to identify the bank. The eight banks are The Chase Manhattan Bank NA, Chemical Bank, Citibank NA, Pittsburgh National Bank, Manufacturers National Bank of Detroit, National Bank of Detroit, First National Bank of Chicago and Bank of America National Trust & Savings Association.

GM, aiming to become the first U.S. company to make electronic payments to all regular suppliers, is introducing the concept in stages after completing tests and a pilot project. "It is a controlled launch to make sure that everything works," Woo said.

The company's Electronic Data Systems Corp. subsidiary built a prototype system on a personal computer last year, finished a year-long pilot project with the First National Bank of Chicago in September and began operating a production IBM mainframe system in October, Woo said.

With the eight divisions on-line, GM expects to make electronic payments to about 300 suppliers. "We want to limit the number of suppliers to make sure everything works properly," Woo said.

The company may bring on the rest of the divisions and 20,000 regular suppliers this year. "Our intention is to go for all of them," Woo explained. "The timetables can be adjusted if necessary in order to make everyone feel comfortable. If it slips past 1987, that's not going to be a problem for us."

The payment system takes what Woo calls a "belt-and-suspenders" approach to

See GM page 88

INSIDE

Calendar: Selected conferences, exhibitions, seminars/86

INSTANT ANALYSIS

"Everything to a CEO is staff."

— John P. Imlay Jr., chairman, Management Science America, Inc.

Employees share in CIM start-up

By Rosemary Hamilton

Managing staff through the changes that computer-integrated manufacturing (CIM) brings can benefit from some familiar concepts, particularly the involvement of employees in the process, according to manufacturing executives.

"You've got to go out and ask for their help," said Raymond Grohoski, manager of engineering at the Bodine Corp. in Bridgeport, Conn. "You've got to make them feel important, because they really are important."

The methods proposed to break down the barriers and move people toward CIM vary widely, depending on the manufacturer. One manufacturer suggests psychological testing to ensure staffers are assigned the jobs that best suit their personalities. Other executives, however, say such procedures are unnecessary and basic good management is the key.

"To get employees to accept changes, you have to involve them," said William Rankin, manager of computer-aided manufacturing services at Deere & Co. "They share in the problems, so you have to let the individuals share in the solutions. They're the ones that are going to have to live with that."

Involvement at this Moline, Ill., plant primarily consists of quality circles and problem-solving work groups that are assembled with a mix of salaried and wage employees, Rankin said.

To ensure the success of such work groups, it is important to break down the barrier dividing the engineering and manufacturing departments, which have traditionally been at odds with each other. As Patrick Toole, an IBM vice-president and group executive, said during a speech at the Autofact '86 trade show: "The cultural

See WORKERS page 88

MANAGERS ON THE MOVE

Security Pacific Information Systems, Inc. (SPIS) in Denver will shift its focus from selling to other firms to supporting its parent company as recently appointed president and chief executive **Joseph E. McClure** takes over.

McClure was senior vice-president for computer services at SPIS, which he joined in 1984, the year Los Angeles bank holding company Security Pacific Corp. bought it from Baldwin-United Corp. McClure previously worked for Petro-Lewis Corp. and IBM.

He succeeds Michael Mitchell, who resigned to pursue outside business interests, McClure said. Security Pacific Corp. Vice-Chairman William Ford is chairman of SPIS.

In the past two years SPIS has concentrated on selling products and services to outside companies. Now it will focus more on Security Pacific subsidiaries, McClure said. It is negotiating the purchase of a system developed by Bank America Corp. and owned by Chrysler Financial Corp. that would link the 350 branch offices of Security Pacific Finance System Co.

Joseph E. McClure

SPIS products and services for outside customers include deposit and lending systems for savings and loan associations, a turnkey integrated system for small community banks, software for insurers and time-sharing.

SPIS will generate about $20 million in revenue next year, McClure said. A separate, larger subsidiary, Security Pacific Automation Co., supports Security Pacific banking activities.

■

Arthur S. Gloster II, formerly director of the Computing Services Center at Wayne State University in Detroit, has been appointed vice-president of information systems at **California Polytechnic State University** in San Luis Obispo, Calif.

■

The **Contel Government Systems** division of Contel Corp. in Fairfax, Va., has appointed **A. Steven Wolf** director of management information systems. He was an assistant vice-president of information services at M/A-COM, Inc. The division also appointed former program manager **David Tubesing** director of technical services for its Department of Defense Programs.

■

Joseph F. Traub, chairman of the Department of Computer Science at Columbia University, has been appointed president of the **Consortium for Scientific Computing**.

Traub, who has received a simultaneous appointment as professor of computer science at **Princeton University** in Princeton, N.J., succeeds **Dennis Jennings**, who served as interim president and has returned to University College of Dublin.

Traub's duties include planning, directing and managing activities of the $125 million John von Neumann Center for Scientific Computing.

Prevented maintenance

From page 83

ments with unions representing their workers. The agreements call for a pay increase of 4.683% on the first $15,000 of salary and a 3.277% increase on that portion above $15,000 but not more than $20,450.

At Company X, the DP and payroll departments go into an almost unimaginable panic. All days off and holidays are canceled. Drums of black coffee are rolled in to sober up the staff after New Year's Eve festivities. The objective is to change the pay records of each of the 4,750 people affected.

A quick meeting indicates that no one understands the payroll system. It was written by a person no longer with the company and, sadly, no longer among the living. Not only is there no documentation for the payroll system, but for key modules, there isn't even any current source code. Bottom line: there is no way they can make the salary changes in time by changing the programs.

As a result, the amount of salary change has to be manually calculated for each employee, a salary change transaction must be prepared and the files must be updated. Meanwhile, a crash project is undertaken to get the payroll system fixed up.

Meanwhile, at Company Z, the programmer-analyst with responsibility comes in on New Year's Day, as do the payroll supervisor and an internal auditor. Together, they put into the system a single password-protected group-update transaction that quickly recalculates everyone's salary, updates the record and provides a report to the payroll department and accounting and an audit trail report to the internal auditors.

The difference between the two companies is obvious. When Company Z built its system, it recognized that across-the-board raises were a possibility; Company X didn't.

Consider three additional cases:

- There's another bug hidden in Company X's payroll system. When it was built, the highest weekly pay was $600 per week. The analyst defined the file field of weekly pay to have three digits to the left of the decimal point. Next week, unbeknownst to DP, a new attorney is being hired. His salary will be $53,000. There's going to be another panic.
- To "save computer time," a mail-order processing system was built with the sales tax rates hard-coded into the programs for each state and city in the U.S. Any time a rate changes — generally, there is at least one change each week — the programmers modify the source code on the various programs, compile them, fix the bugs that appear, recompile them, unit-test them, relink them and test the system. Management can't understand why the turnover rate for maintenance programmers stands at 147% per year.
- To permit faster development of a desired new application program, a company eliminates quality assurance reviews and walk-throughs and performs as little testing as it can get away with. The system goes live, and within two weeks no fewer than 125 unsuspected bugs crop up, 51 of them major ones requiring immediate repair. The department goes into a maintenance frenzy from which it will not emerge for a long time.

In all three cases, the maintenance activities were preventable. In the first, the possibility of salary growth should have been obvious. In the second, the need to provide an efficient user-based rate-change mechanism should have been equally obvious. In the last case, for ignoring quality assurance, the company got what it deserved.

These examples and the earlier one help us focus our definition of prevented maintenance:

Prevented maintenance is (1) maintenance never needed because prudent problem analysis recognized the need for flexibility and the flexibility was provided for in the design or (2) maintenance that is not needed because quality assurance and testing techniques are used to assure that bugs that would cause panic maintenance are detected and corrected.

More succinctly, prevented maintenance is maintenance that you don't have to do because the system was designed not to need it. Thus, the keys to success in prevented maintenance are prudence and preplanning.

The major problem is the need to forecast system change. While there is no way to predict the system's future, there is a simple technique that will lead to reliable predictions. All you have to do is ask those who have some knowledge of the future requirements and environment:

Ask the users. Ask about current plans and business plans. Ask for their views on future changes in your industry as a whole. Ask about expected or possible changes in laws or regulations that might affect your system.

Ask the technical staff. Determine whether planned or predicted changes in hardware, packages or systems software are likely to impact your new application.

Ask yourself. Are you, for example, avoiding the temptation to hard-code variables rather than placing them in tables? If you have created tables, have you planned a controlled way for the tables to be maintained by the user? Have you actively evaluated the need for flexibility at every point in the system?

It isn't possible to eliminate all maintenance or even all emergency maintenance. But you can take action during systems development to avoid big investments in maintenance that is preventable.

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Software**	July 8	May 29	Siggraph
PC's	August 12	July 3	PC Expo
Communications	September 2	July 31	TCA & Info '87
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CALENDAR

JANUARY 18-24

Pacific Telecommunications Council Ninth Annual Conference. Honolulu, Jan. 18-21 — Contact: PTC '87, Room 308, 1110 University Ave., Honolulu, Hawaii 96826.

Systems Engineering Workshop. Tampa Bay, Fla., Jan. 19-22 — Contact: M. Bryce & Associates, Inc., 777 Alderman Road, Palm Harbor, Fla. 33563.

Comlease Winter. New Orleans, Jan. 19-23 — Contact: The Information Exchange, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

Buscon-West. Los Angeles, Jan. 20-21 — Contact: The Bus/Board Users Show & Conference, No. 116, 17100 Norwalk Blvd., Cerritos, Calif. 90701.

Companywide Disaster Recovery Planning. Los Angeles, Jan. 20-22 — Contact: Devlin Associates, Inc., 430 Exton Commons, Exton, Pa. 19341. Also being held March 24-26 in Philadelphia.

Uniforum. Washington, D.C., Jan. 20-23 — Contact: Suite 205, 2400 E. Devon Ave., Des Plaines, Ill. 60018.

Dbase III and Dbase III Plus. New York, Jan. 20-23 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held Feb. 9-12 in San Francisco and March 9-12 in Chicago.

Educational Seminar on T-1 Facilities and Networking. Dallas, Jan. 21-22 — Contact: Timeplex, Inc., 400 Chestnut Ridge Road, Woodcliff Lake, N.J. 07675.

Also being held Feb. 18-19 in Irvine, Calif. and March 18-19 in New Orleans.

Winter 1987 Technical Conference of the Usenix Association. Washington, D.C., Jan. 21-23 — Contact: P.O. Box 385, Sunset Beach, Calif. 90742.

The Open Network Architecture Concept. Washington, D.C., Jan. 22-23 — Contact: Telecom Publishing Group, Suite 444, 1101 King St., Alexandria, Va. 22314.

JANUARY 25-31

Entity Modeling: Techniques and Application. Chicago, Jan. 26-30 — Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Integrating Purchasing, Receiving and Accounts Payable Systems. Philadelphia, Jan. 26-30 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Mapper Installation, Coordination and Support. Dallas, Jan. 26-30 — Contact: Compumetrics Training Institute, P.O. Box 58383, Houston, Texas 77258.

NCITD Informational Forum. New Orleans, Jan. 27 — Contact: Eugene A. Hemley, Executive Director, National Council on International Trade Documentation, Suite 1200, 350 Broadway, New York, N.Y. 10013.

Annual Conference on Improving Productivity in EDP System Development. Phoenix, Jan. 27-30 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

Computer Graphics New York '87. New York, Jan. 28-30 — Contact: Exhibition Marketing & Management, Inc., Suite 690, 8300 Greensboro Drive, McLean, Va. 22102.

Keeping U.S. Manufacturing Globally Competitive. San Diego, Jan. 28-30 — Contact: Robotic Industries Association, P.O. Box 3724, 900 Victors Way, Ann Arbor, Mich. 48106.

The Conference on Desktop Communications. San Francisco, Jan. 28-31 — Contact: The Seybold Group, Inc., 20695 Western Ave., Torrance, Calif. 90501.

Being More Profitable and Competitive with PC CAD/D. Sarasota, Fla., Jan. 30 — Contact: Maura Belliveau, Graphic Systems, Inc., 180 Franklin St., Cambridge, Mass. 02139.

FEBRUARY 1-7

1987 ABA Bank Telecommunications & Data Processing Workshop. San Diego, Feb. 1-4 — Contact: American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Instructional Computing Conference VII. Orlando, Fla., Feb. 2-5 — Contact: Florida Department of Education, Educational Technology Section, Knott Building, Tallahassee, Fla. 32399.

Third International Conference on Data Engineering. Los Angeles, Feb. 2-6 — Contact: The Computer Society of the Institute of Electrical and Electronics Engineers, Inc., 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Automated Clean Room Processes. San Jose, Calif., Feb. 3-4 — Contact: Robotics International of Society of Manufacturing Engineers, One SME Drive, P.O. Box 930, Dearborn, Mich. 48121.

The Third International Conference on Data Engineering. Los Angeles, Feb. 3-5 — Contact: Professor Gio Wiederhold, Stanford University, Computer Science Department, Marguerite Jacks Hall, Palo Alto, Calif. 94305.

Digital Image Processing. Washington, D.C., Feb. 3-6 — Contact: Yolande Amundson, Manager, Education Services, P.O. Box 3614, 5800 Hannum Ave., Culver City, Calif. 90231.

Also being held Feb. 24-27 in Palo Alto, Calif., March 17-20 in Boston and March 24-27 in Washington, D.C.

Machine Vision and Image Recognition. Washington, D.C., Feb. 3-6 — Contact: Marilyn Martin, Education Services, P.O. Box 3614, 5800 Hannum Ave., Culver City, Calif. 90231.

Also being held Feb 10-13 in San Diego, March 10-13 in Anaheim, Calif. Will also be held from April 7-10 in Palo Alto, Calif., and April 21-24 in Washington, D.C.

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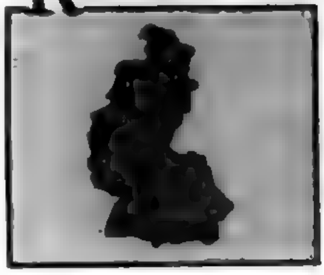

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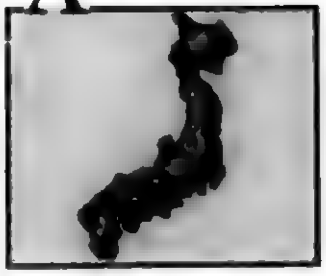

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GM payment system opened

From page 83

security, encrypting data and authenticating messages to determine if they have been altered.

GM expects to reduce costs with electronic payments by eliminating paperwork. Woo would not say how much cost reduction is expected.

But the company is also implementing electronic data interchange (EDI) to reap the benefits offered through integration of previously isolated data. As much of 70% of data in one auto maker's computer is used by another, and re-entering data manually creates aggravation and the possibility of error, according to Michael Gerus of the Auto Industry Action Group, which is aimed at improving competitiveness.

GM and other industry officials emphasize that electronic payments are just one aspect of the more far-reaching implementation of EDI, the electronic exchange among companies of business documents such as shipment notices and material releases. For example, EDI is expected to help the auto makers implement just-in-time inventory, a major step toward improving productivity.

"We recognize the movement of related information has become as important as movement of funds themselves. The story here is one of electronic data interchange, not just electronic payments," Gerus said.

GM's project is also expected to educate banks regarding routine electronic payments. "The people at GM have been very cautious about planning for acceptance by the banking community. A lot of banks are looking at this as an opportunity to bring in new customers," Gerus added.

Workers share in start-up

From page 83

barriers between engineering and manufacturing are like England. You have the House of Lords and the House of Commons who get together every once in a while to praise the queen, but don't talk about much that's meaningful."

This barrier is central to the problem of CIM management. The purpose of CIM is integration, not only of computer systems, but of the various departments of the organization.

Deere & Co.'s Rankin said manufacturing engineers who design production methods have become part of the product design group to help narrow the traditional gap between the two departments. "We have a manager of engineering overseeing both sides for a particular project," Rankin remarked.

Teamwork

The concept of teamwork like the work groups at Deere & Co. consistently crops up in interviews with manufacturing managers. At the Cone Drive division of Excello Corp., for instance, MIS director Paul Brauninger recalled an incident involving a personal computer with a color monitor.

When this PC was installed on the factory floor, the workers, who had been using monochrome monitors, were so taken with the color monitor that they all wanted one, Brauninger said.

Since the monochrome systems were sufficient, the idea of purchasing new color monitors was ruled out. So Brauninger had the one color system taken off the factory floor.

According to this MIS director, it was better to have none than have one worker using a PC that other workers perceived as special, or better, than their equipment.

At the IBM display production facility, located in Research Triangle Park, N.C., Plant Manager of Communications Systems Gene Addesso said education is key to a sucessful CIM implementation.

When the facility began its automation program in 1984, meetings were held with employees to discuss competitive pressures from offshore producers, he said. The idea, Addesso said, was that employees will accept change more quickly if they fully understand why it must take place.

To boost morale, the facility declared a company holiday and sponsored a party that cost $200,000, Addesso said. "We wanted to show the importance we place on employees," he added.

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NEW PRODUCTS

Package offers dynamic linking for IBM users

Dynasoft Corp. in Rosemont, Ill., has announced the Dynasoft Integrated Software System for IBM mainframe computers using MVS/TSO and VM/CMS.

The integrated software package is said to dynamically link the spreadsheet, word processing, graphic and data base interface business functions.

According to Dynasoft, the software features include full overlay windows. This feature allows the user of the software package to simultaneously view and manipulate data in the spreadsheet, graphic display and word processing document.

Document changes

Overlay windowing lets the user see changes in the graph or word processing documents as information in the underlying spreadsheet is altered, the vendor explained.

A company spokesman said the integrated software package allows graphs to be used as a tool for understanding the dynamics of different types of information that are being processed during the analysis phase.

Other features include pop-up menus that prompt the user for commands and the fact that users need learn only one set of command syntax to operate all four systems.

All processing is done in one environment, the vendor said.

The Dynasoft Integrated Software System is priced between $17,500 and $49,000, depending on the size of the machine.

For Dynasoft users who already use Dynaplan, an upgrade pricing plan is available.

HP unveils processing aid

Emulator/analyzer aimed at micro development

Hewlett-Packard Co. in Palo Alto, Calif., has introduced an emulator/analyzer combination for the Motorola, Inc. 32-bit MC68020 microprocessor for the HP 64000-UX microprocessor development environment.

This emulator/analyzer combination is said to provide real-time emulation at 20 MHz with no-wait states while code is executed out of the emulation or target memory.

According to the vendor, the HP 64000-UX microprocessor development solution is said to provide an environment for the design, testing and integration of hardware and software and includes an HP 64416A/B emulation subsystem with either 256K bytes or 512K bytes of emulation memory.

An HP 64411A analysis bus generator board and the HP 64404A/64405A integrated-analysis board are also provided.

Emulation and analysis features include real-time execution up to 20 MHz with no-wait states out of user or emulation memory; up to 512K bytes of emulation memory; dual-ported emulation memory; emulation memory mappable in 256-byte blocks; and emulation memory mappable over full 4G-byte address space of the MC68020.

Other attributes include full-function code support in memory access; real-time analysis of bus-cycle activity; disassembly of MC68020 and MC68881 instruction set; display of MC68881 floating-point coprocessor registers; trace buffer 2,048 states deep; and 32-bit ranging on address and data.

A complete HP emulation and analysis subsystem that fits into the HP 64000-UX microprocessor-development environment with 512K bytes of emulation memory costs $27,985.

INSIDE

Software & Services/90
Microcomputers/94
Communications/97
Systems & Peripherals/98
Price Reductions/100

Synercom software, DEC computers combine to form DVS workstation

As part of its recently announced distributed architecture, Synercom Technology, Inc. in Sugar Land, Texas, has introduced its Distributed VS Station (DVS) for mapping information management.

The DVS combines Synercom's workstation support software with Digital Equipment Corp.'s Vaxstation computer family to create a workstation with an on-board VMS-based Microvax II computer.

According to a company spokesman, the DVS features resident processing power that works with Synercom software to perform computer-intensive processes at the workstation, instead of relying on the resources of a host system.

The distribution of the processing load allows a virtually unlimited number of workstations to be connected as part of a distributed data base network.

User-interface software features include icons, pop-up menus and multiple graphic windows. The DVS is said to provide multiwindowing and multitasking, allowing multiple processes to run at the workstation concurrently.

The DVS runs in a Decnet environment. It is available as a turnkey system including software and hardware with prices starting at $38,300.

CDC enhances EDI services for business communications

Control Data Corp., based in Minneapolis, has expanded its electronic data interchange (EDI) services to offer new microcomputer capabilities and enhanced communications products.

The new services, Redi-Micro, Redi-Comm and Redi-3780, are part of the Redinet electronic data interchange system offered by Control Data's Business Information Services group. The products are used to electronically prepare, transmit and receive business communications, such as purchase orders and invoices.

Redi-Micro is a menu-driven program that generates and interprets material releases, purchase orders, invoices and replies. It includes communications software to transmit information via the Redinet telecommunications network.

Redi-Comm transmits and receives information asynchronously. Redi-3780 offers users bisynchronous communications. The vendor said both communications products are activated by a single command, and monitor and correct transmitted information. Both can also produce audit reports on the transmissions.

Redinet products are offered separately or can be grouped with other Redinet services. Redi-Micro, Redi-Comm and Redi-3780 operate on IBM Personal Computers, PC ATs, XTs and compatibles. Redi-3780 requires an additional AST, Inc. interface board for bisynchronous communications.

Redi-Micro costs $700 and includes a copy of either Redi-Comm or Redi-3780 software. In addition, Redi-Comm and Redi-3780 can be purchased separately for $200 and can be used with any industry standard transaction processing system.

Redinet was introduced in 1984 as a nationwide data network for the industrial marketplace. All products use the ANSI X.12 protocol for defining common information transactions. Redinet supports other standard EDI formats commonly in use.

Honeywell adds three support modules to office network system

Honeywell, Inc. in Billerica, Mass., has added three modules to its Office Network Exchange Plus (One Plus) integrated departmental system.

The modules include Onegraph Business Graphics; Onedocument Workstation Facility, for the creation of compound documents containing both graphics and text; and Onespell Plus, which are business and medical spelling verifiers and correctors.

One Plus supports communications among a variety of Honeywell and non-Honeywell systems, including multimedia document creation and intersystem data base access. One Plus modules run on Honeywell's DPS 6 Plus virtual systems and the DPS 6 family of small computers.

The Onegraph Business Graphics package provides users with business graphics capabilities. End users may enter new data or use data originating in other applications. Programmers can build graphic capabilities into applications. Features include American National Standards Institute's Computer Graphics Interface and Onecalc spreadsheet inputs.

Onegraph consists of five separately priced components. Onegraph Executive, providing the underlying support for the other components, is priced from $220 to $395. Onegraph Interactive Facility, said to allow access to Onegraph capabilities through either menus or commands, is priced from $330 to $595. Onegraph Application Development Facility, said to allow C, Fortran and Cobol programmers to use Onegraph within their applications, costs from $825 to $1,495

The Onegraph Workstation Facility allows a personal computer to be used as a workstation. It costs $595. The Onegraph Device Controller Facility allows support of additional graphic output devices. It costs $495

The PC-resident Onedocument Workstation Facility costs $595. Onespell Plus, available in a business lexicon version or a medical and business lexicon version, costs from $550 and $735, respectively.

SOFTWARE & SERVICES

Systems software

Telesoft has announced **Telegen2 1750A**, a software development and execution environment for the Ada programming language.

Hosted on the Digital Equipment Corp. VAX under VMS, the system contains Telesoft's second-generation compiler, object tools including an Ada linker, library manager, library tool set, Ada execution environment and cross-compilation system for embedded MIL-STD-1750A targets. Productivity tools include global optimizer and language tools.

License fees for the Telegen2 1750A product line range from $17,000 to $86,000.

Telesoft, 10639 Roselle St., San Diego, Calif. 92121.

■

Internet Systems Corp. has announced its quality assurance program, **Automated Testing System** (ATS), for its Internet System banking software program.

ATS is said to provide integrated automated quality control. It inputs the bank's test cases, compares the actual with expected results and reuses the test cases to validate a system installation or change. ATS also generates exception reports, which notify users of transactional errors.

ATS, which is a separate add-on subsystem for the Internet System, is priced at $100,000. The basic Internet System is priced at about $1 million, depending on configuration.

Internet, Suite 700, 200 W. Madison St., Chicago, Ill. 60606.

■

Computer Associates International, Inc. has announced **CA-JARS/CMS 6.0**, an enhanced version of its performance management and job accounting system for the IBM VM environment.

New features include minidisk accounting, on-line budget inquiry and user interfaces and automated report generation and file backup.

A report writer, which is said to allow the VM user to generate any report using free-form commands, is also included.

CA-JARS/CMS 6.0 costs $15,000.

Computer Associates International, 711 Stewart Ave., Garden City, N.J. 11530.

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Applications packages

P-K Marketing Associates, Inc. has announced **Customer Information System (CIS)/38**, a customer or marketing data base written in RPG III for the IBM System/38.

CIS/38 is designed to support in-house development of customer, marketing and distribution and sales-related applications. Data base features include support for businesses that have customers with multiple customer numbers, shipping points, sales representatives and divisions. Data elements included are related to accounts receivable, credit and collection, sales and marketing, pricing, invoicing, orders, shipping and freight.

CIS/38 costs $4,500.

P-K Marketing Associates, P.O. Box 144, Suffield, Conn. 06078.

■

Path Systems has announced the **Path Benefits Administrator**, a software program for company benefit administration.

The program is said to calculate insurance premiums for the company and its employees while performing related enrollment administration. The program can be customized to handle any number of plans. Features include on-line Help, mass update, planning or open enrollment periods, standard enrollment reports, contribution summaries, benefit statements, payroll notification and Consolidated Omnibus Budget Reconciliation Act reporting.

The Benefits Administration interfaces with Path system or other programs. It costs $1,900. A stand-alone version costs $2,500.

Path Systems, Suite 103, 4575 Scotts Valley Drive, Scotts Valley, Calif. 95066.

■

McDonnell Douglas Information Systems Group has announced an **Assembly Modeler** three-dimensional design package for its Graphics Design System computer-aided design and engineering product.

The Assembly Modeler is said to allow users to manipulate 3D building components within a two-dimensional environment. Features include automatic interference checking, drawing coordination, perspective images and integration of 2D and 3D data.

Prices start at $3,000.

McDonnell Douglas, 325 McDonnell Blvd., St. Louis, Mo. 63042.

Languages

Computer Cognition has announced **Acucobol**, a C-based, Ryan-MacFarland Corp. Cobol-compatible compiler for Unix and Digital Equipment Corp. VAX/VMS and VAX/Ultrix environments.

The compiler is said to feature 3,500 line/min. compiles, support for 16 open files in Unix and Ultrix environments and a built-in windowing option.

Prices for Acucobol start at $600 for a single-user personal computer system; $1,000 for micro systems; and $3,000 for minicomputer systems.

Runtime interpreters cost $175 each for PCs, $300 for micros and $450 for minis, the vendor said.

Computer Cognition, 6696 Mesa Ridge Road, San Diego, Calif. 92121.

Interactive Software Engineering, Inc. has announced **Eiffel**, a compiler and programming environment.

Eiffel is a language and a set of tools. The language is said to offer classes with multiple inheritance, generic parameters in the Ada style and information hiding. It includes the ability to express assertions and invariants and is statically typed.

Eiffel is available on the Unix operating system. It is priced from $2,995.

Interactive Software Engineering, Suite 7, 270 Storke Road, Goleta, Calif. 93117.

Utilities

SDM International, Inc. has announced a combined IBM Systems Network Architecture/Binary Synchronous Control batch communications software product called **SDM/Link**.

SDM/Link is said to provide CPU-to-CPU data transfer capabilities for IBM 3000, 4300 and 9300 series computer systems. It can be used as a remote job entry workstation for IBM's RSCS, JES2, KES3 and Power/RJE subsystems.

SDM/Link is priced from $5,000 to $12,000.

SDM International, 134 Spring Ave., Fuquay-Varina, N.C. 27526.

■

Amalgamated Software of North America, Inc. has announced **Call/Parm** for the IBM System/36.

The Call/Parm facility is an addition to the vendor's RPGIII compiler. It is said to give RPG programs the ability to call other RPG programs dynamically, allowing parameter passing between programs and return of control back to the calling program.

According to the vendor, it has no program size restrictions. Calls can be nested to any depth, and RPG source can refer to common files by the same name.

The RPGIII compiler with the Call/Parm facility is priced at $1,000.

Amalgamated Software, P.O. Box 6610, Malibu, Calif. 90264.

■

Syco System Communications, Inc. has added **Automatic Backup** to its After Hours Software product line.

Automatic Backup is a VMS/MicroVMS menu-driven backup service for Digital Equipment Corp.'s VAX computer family. It is said to allow full, incremental and partial disk copies, which, once defined, can automatically be repeated either daily, weekly, biweekly, quad-weekly or quarterly.

Other features include the ability to run in the background, security and the ability to back up onto tapes, disks or laser disks.

Prices range from $700 for an RX50 MicroVMS license to $1,250 for a TK50 VMS license.

Syco System Communications, Box 838, 165 Mechanic St., Leominster, Mass. 01453.

■

GT Software, Inc. has announced **Release 1.6** of its Help screen/menu processor for CICS called **Assist/GT** in addition to **Preval/GT**.

Preval/GT is said to validate screen input data external to a user's calling programs as part of the BMS screen display. No programming is required to perform range checks, table lookups, field cross-checking or to handle decimal alignment, negative numbers and percentages.

Assist/GT Release 1.6 includes the ability to move screen data from one location to another, suspend a transaction while invoking another transaction and display an initial window that can then select another window, a full-screen Help display or an online manual. Also included are 52 program function keys.

Assist/GT costs $5,500 for VSE and $6,900 for MVS. Preval/GT costs $11,000 for VSE and $13,800 for MVS.

GT Software, 4411 E. Jones Bridge Road, Norcross, Ga. 30092.

J & L Software, Inc. has announced **Mimesis** software, a customizable interface said to emulate the input of various operating systems.

Mimesis software comes with a sample Digital Equipment Corp. VMS- or Microsoft Corp. MS-DOS-style shell and the Mimesis compiler, the tool used to create and modify users' interfaces. Mimesis can also be used to limit the command set for a designated number of users, according to the vendor.

Users can create any number of interfaces for one environment or for an entire company. Mimesis is supported on the Unix operating system and can run on most systems supporting the C language.

Prices range from $2,000 to $10,000 per CPU.

J & L Software, 1337 Heidi Drive, Plano, Texas 75023.

Data base management systems

Infodata Systems, Inc. has announced the release of **Version 86.1** of **Inquire/Text**, its text data base management system.

Inquire/Text is said to combine a data base foundation with the ability to process structured and unstructured data in a single system. Version 86.1 includes faster response time, reduced CPU time, fewer I/Os and reduced memory utilization, particularly in large data base multiuser environments.

Other features include enhanced diagnostic facilities and improvements to buffer sharing and routing.

Inquire/Text is priced from $49,500.

Infodata, Five Tobey Village Office Park, Pittsford, N.Y. 14534.

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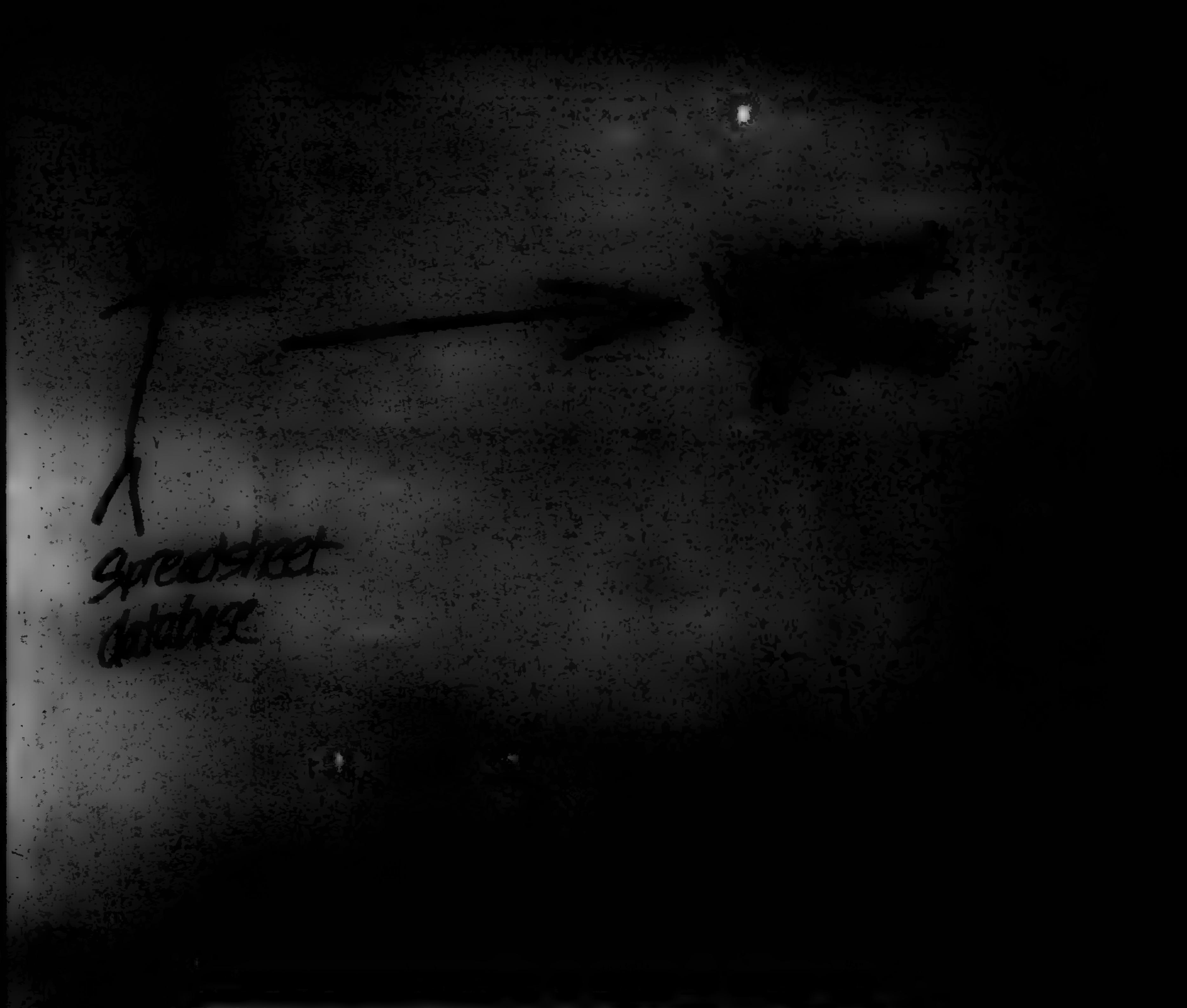

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MICROS

Systems

Edicon, a Kodak company, has announced the **Edicon System**, a photoimage management system said to integrate photographic images with text and graphics in a computerized data base.

The system captures color images and allows them to be displayed and arranged on a high-resolution monitor.

Once captured, images are electronically stored along with associated text and graphics for later display or transmission to other video monitors on the system, the vendor said.

The system combines a video camera, IBM Personal Computer, color video monitor and proprietary hardware and software.

Systems are priced from $35,000.

Edicon, 907 Culver Road, Rochester, N.Y. 14609.

Software applications packages

The **Dynaware Division** of **Sun Grade, Inc.** has announced **Dynaperspective**, a three-dimensional, solids modeling graphics software package designed for IBM Personal Computer XTs, ATs and compatibles.

According to the vendor, Dynaperspective combines line, shape and form as well as color and shade to create renderings in two- and three-dimensional formats.

Features of the product include solid surface modeling and the ability to present three-dimensional renderings with full-surface color and light-source shading.

Other features include a library of frequently used symbols and pull-down menus.

Dynaperspective is priced at $1,850.

Dynaware, Suite 316, Bellefield Bldg., 1309 114th S.E., Bellevue, Wash. 98004.

Computer Product Introduction Corp. has announced **Cash Drawer**, a software product for IBM Personal Computers and compatibles.

Cash Drawer is a point-of-sale accounting package said to handle the needs of a retail business, including sales, rentals and services such as time/billing or repairs.

Reports are programmed in and there is a custom-report generator. The software offers four levels of password security and provides an interface with light-bar menus and context-sensitive Help, according to the vendor.

Cash Drawer costs $1,295.

Computer Product Introductions, 2127 Bellevue Way S.E., Bellevue, Wash. 98004.

●

International Micro Systems has announced the **Focus on Business series** of 16 software systems said to run on local-area networks.

The series includes a range of accounting software plus specialized packages for doctors, dentists, manufacturers, wholesalers and churches and other nonprofit organizations.

Features are said to include a network log that allows the software to keep track of its own usage and record locking that allows more than one person to use a data file concurrently.

Each application is said to run in either single-user mode or a multiuser environment.

Each Focus on Business accounting system is priced at $650, the vendor said. Vertical systems are priced at up to $1,995.

International Micro Systems, 6445 Metcalf, Shawnee Mission, Kan. 66202.

Software utilities

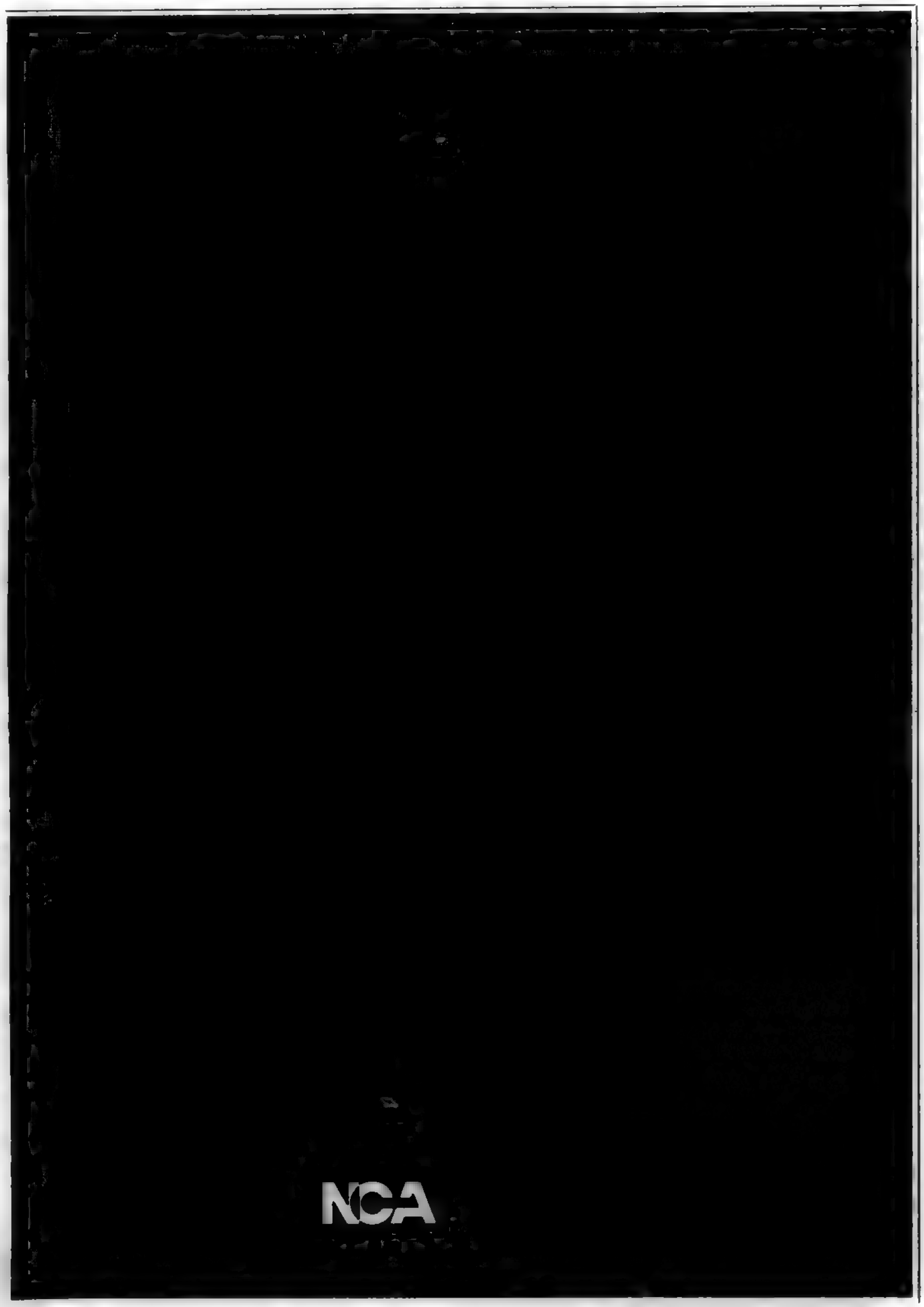
Digital Learning Systems, Inc. has announced **Keynotes**, a memory-resident support program said to provide access to reference materials.

Keynotes combines the features of a documentation package, information-retrieval program and built-in Help system for IBM Personal Computers. The program includes a key word/key phrase search feature, a built-in text editor, a Basic programmer's guide, a tutorial on spreadsheet macros, a list of international dial codes and time zones and a chart of common abbreviations.

Users can store more than 100 pages of tailored information such as document formats, access codes, macros and user instrutions.

Keynotes is priced at $100.

Digital Learning Systems, 4 Century Drive, Parsippany, N.J. 07054.



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NEW PRODUCTS/MICROCOMPUTERS

Communications

Arnet Corp. has announced **Smartport**, a communications board for multiuser IBM Personal Computer AT- or Intel Corp. 80386-based systems.

Smartport includes an on-board processor to drive terminals, printers and other devices connected to its four or eight serial RS-232 ports. It works with Unix, Xenix and other multiuser operating systems.

According to the vendor, the board contains 64K bytes of dual-ported random-access memory.

Smartport costs $895 with four serial ports and $1,295 with eight serial ports.

IBM PC-DOS and Xenix drivers cost $25 and $50, respectively.

Arnet, 476 Woodyrest Ave., Nashville, Tenn. 37210.

Anderson Jacobson, Inc. has introduced the **AJ 1212-STH** 1,200 bit/sec. and the **AJ 2412-STH** 2,400 bit/sec. Hayes Microcomputer Products, Inc. AT-compatible modems.

The modems feature autodialer, nonvolatile memory, voice-data switching, an on-line inactivity timer and a choice of MI/MIC or A/A1 operation. They were designed for synchronous or asynchronous communication over standard dial-up telephone lines.

The AJ 2412-STH meets CCITT V.22 bis, V.21 and V.22 protocols and Bell Laboratories' 103 and 212A standards; the AJ 1212-STH meets all but CCITT V.22 bis.

The AJ 1212-STH and AJ 2412-STH cost $295 and $395, respectively.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.

Hayes Microcomputer Products, Inc. has enhanced its **Smartcomm II** software for the IBM Personal Computer Network.

The communications software is now said to support the IBM Token-Ring Network.

This version is said to give users on the PC Network and the Token-Ring Network the ability to share modems and asynchronous communications ports.

It extends the Smartcomm II functions to all personal computers on either type of network, the vendor said.

Smartcom II for the IBM PC network and Token-Ring Network contains five User's Guides, one System Guide and one program disk. It costs $599.

Hayes Microcomputer Products, P.O. Box 105203, Atlanta, Ga. 30348.

Printers/Plotters/Peripherals

Citizen America Corp. has announced **Overture 110**, a laser printer, and **Tribute 224**, a dot matrix line printer.

Overture 110 features 10 pag/min. printing, 512K-byte memory for graphics and front-download capability. It comes with both parallel and serial interfaces as well as multiemulations of Epson America, Inc.'s PF-286 , Diablo Systems, Inc.'s 635 and IBM's Proprinter.

Tribute 224 is a 200 char./sec. 24-wire printer. it produces graphics with 360 dot/in. resolution and a 24K-byte input buffer memory. It has parallel and serial interfaces, automatic paper loading and bidirectional printing.

Overture 110 costs $2,395, and Tribute 224 costs $949.

Citizen America, Suite 300, 2425 Colorado Ave., Santa Monica, Calif. 90404.

■

Magnovox has introduced the **8CM873** multimode color display monitor.

According to the vendor, the display can automatically switch scan frequencies to display a variety of graphics formats. It works with signals requiring horizontal scan rates in a range of 15 KHz to 34 KHz. It can configure itself to operate at the correct scan rate and can accept either digital or analog signals. The product features an image resolution of up to 926 dots by 580 lines and audio input capability.

The multimode color display is priced at $900.

Magnovox, P.O. Box 14810, Interstate 40 and Straw Plains Pike, Knoxville, Tenn. 37914.

■

C. Itoh has announced the **Prowriter C-815 Supra**, a 24-pin printer.

The printer is said to reach speeds of 162 char./sec. in letter-quality mode. It emulates the IBM Proprinter XL, the Toshiba Corp. P351 and the Qume Corp. Sprint 11. It features a 42K-byte buffer, bidirectional graphics and built-in character fonts, including Courier 10, Prestige 12 and Supersubscript. A pull-type tractor feed is standard. All functions are said to be front panel-selectable.

The C-815 costs $1,995.

C. Itoh, Suite 220, 19750 S. Vermont Ave., Torrence, Calif. 90502.

■

Digital Communications Associates, Inc. has announced **Version 1.5** of its **Smart Alec** terminal emulation board.

Smart Alec is an IBM Personal Computer to IBM System/34, 36 and 38 communciations link. It provides PC users the features of a 5251 Model 11, 5291 or 5292 Model 1 while keeping the PC processing capabilities.

The upgraded software allows the user to remap a keyboard to be identical to the vendor's Irma E78 emulator when running IBM's 3270 pass-through software. It is also compatible with software for the IBM Enhanced 5256 system printers.

Smart Alec costs $895.

Digital Communications Associates, 1000 Alderman Drive, Alpharetta, Ga. 30201.

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NEW PRODUCTS/MICROCOMPUTERS

Auxiliary equipment

Xerox Corp. has announced **PC Type Right**, an electronic dictionary for use with IBM Personal Computers and compatible systems.

PC Type Right is said to check spelling as text is typed. It includes a 100,000-word dictionary as well as a 1,200-word personal dictionary. Errors are signaled by a beep tone. The unit is installed between the computer keyboard and the computer.

PC Type Right costs $199.95.

Xerox, Xerox Square 006, Rochester, N.Y. 14644.

■

Kurta Corp. has announced the **Kurta GIS** cordless graphic input system for the Apple Computer, Inc. Apple IIGS computer.

The Kurta GIS includes either a cordless pen or cordless puck and a tablet and can be used as either a mouse or a graphics table, the vendor said. Users can switch between mouse and tablet mode while working on applications. Up to four Kurta GISs can be connected to a single Apple IIGS.

The Kurta GIS costs $495.

Kurta, 4610 S. 35th St., Phoenix, Ariz. 85040.

COMMUNICATIONS

Multiplexers/Modems

Ungermann-Bass, Inc. has introduced the **Network Interface Unit 140** (NIU-140).

The NIU-140, when teamed with a pair of the company's high-speed remote bridges and a T1 line, provides an alternative to multiple lower speed leased lines, multiplexers and modems, according to a company spokesman. The NIU-140 also supports point-to-point connections between two synchronous devices located on the same Net/One network.

The device is said to support common industry synchronous protocols from IBM, Digital Equipment Corp., Unisys Corp., which is the partnership of the former Sperry Corp. and Burroughs Corp., and Honeywell, Inc.

The NIU-140 costs $2,595 for baseband models and $2,995 for broadband models.

Ungermann-Bass, 3900 Freedom Circle, Santa Clara, Calif. 95052.

■

Touchbase Systems, Inc. has announced the **Worldlink 1200 Portable modem.**

The battery-powered Hayes Microcomputer Products, Inc.-compatible device is said to provide a direct interface for acoustic cup operation at both 300 and 1,200 bit/sec.

Features include autodial, autoanswer and pulse and tone dialing. It provides for dual communications standards supporting Bell Laboratories 103/212A standards as well as the internationally recognized CCITT V.21 and V.22. The standards are switch- and software-selectable.

The Worldlink 1200 costs $199.

Touchbase Systems, 16 Green Acre Lane, Northport, N.Y. 11768.

Analytics Communications Systems has announced a dual-port multiprotocol communications card, the **MP-Comm**, for the IBM Personal Computer family and compatibles.

MP-Comm is said to provide asynchronous communications with Software Synergy, Inc.'s Respond All Asynchronous and 3270/3770 operations with Respond Synchronous 3270 and operates with Autodin Mode I. The card has two DB-15 port terminations and supports full-duplex operation to 19.2K bit/sec.

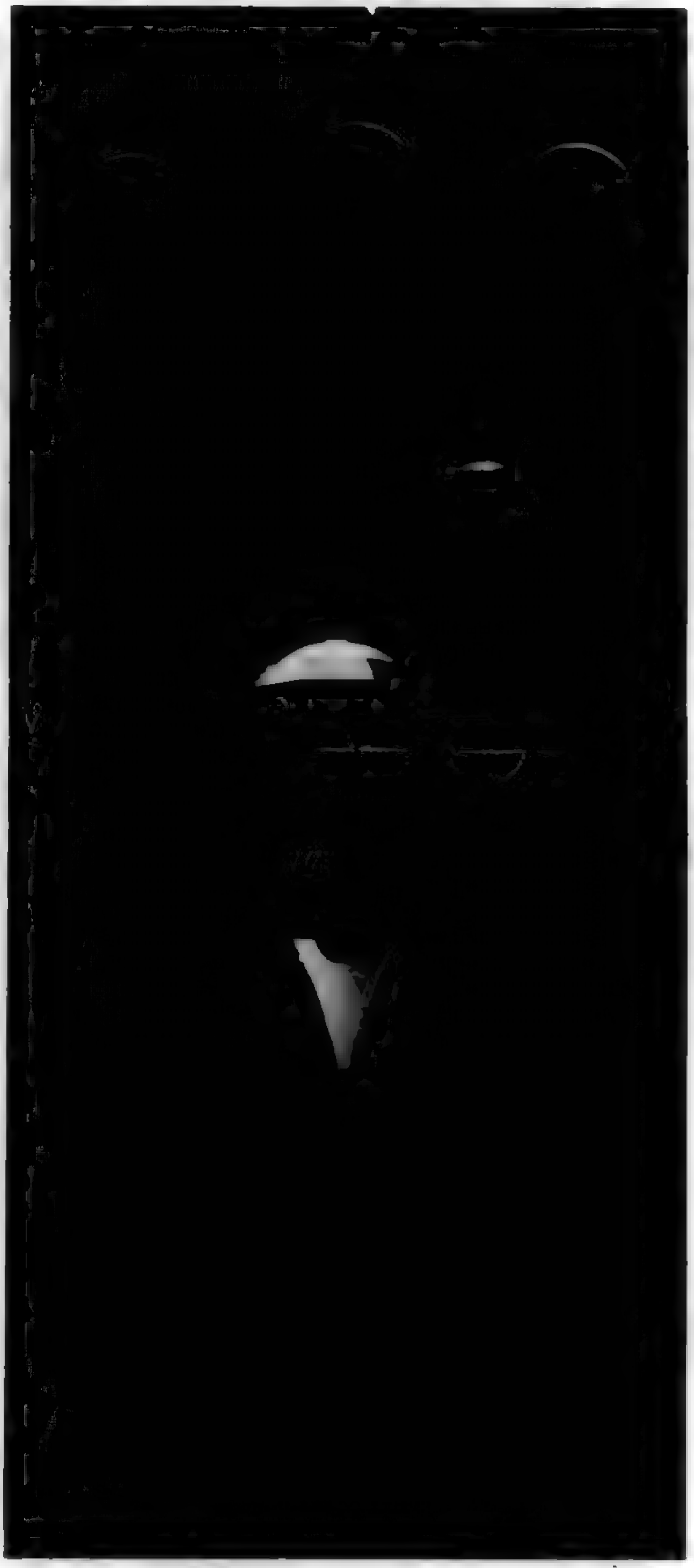
MP-Comm costs $1,995 with Autodin Mode I. The addition of Respond All Asynchronous costs $2,195. The addition of Respond Synchronous 3270 costs $2,495. With both asynchronous and synchronous, MP-Comm costs $2,595.

Analytics Communications Systems, 1820 Michael Faraday Drive, Reston, Va. 22090.

LeCroy Corp. has announced the **Series 5900 Fiber Optic Modem**, designed for operation with IEEE 802.4 media access-control machines.

The Model 5900 Fiber Optic Amplifier/modem and its companion product, the Model 5901 Fiber Optic Transceiver, are said to allow the user to implement network topologies such as passive star, active star and actively tapped bus as well as hybrid

Continued on page 98



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PEAT MARWICK

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Continued from page 97

topologies combining elements of all the previous types.

The Series 5900 products are plug-compatible with Manufacturing Automation Protocol network controllers. The basic signaling rate of the model 5900 is 10M bit/sec. It is available in the VME form factor.

Model 5900 AV costs $1,800; Model 5900 BV costs $1,200; and Model 5901 costs $800.

LeCroy, 700 S. Main St., Spring Valley, N.Y. 10977.

■

Electro Standards Laboratory, Inc. has introduced the **Model 4000-RM** asynchronous multipoint rack-mounted line driver.

The unit is said to provide full-duplex transmission over customer-owned four-wire circuits. Up to 16 units can operate over one line. The Model 4000-RM is transparent to code, parity and transmission speed. The product will operate at data rates up to 19.2K bit/sec. over one mile of 24-gauge twisted-pair cable.

The two-channel device is priced at $270.

Electro Standards Laboratory, P.O. Box 9144, Providence, R.I. 02940.

■

Anderson Jacobson, Inc. has announced the **9641-1D** leased-line modem for a universal card cage and compatible stand-alone enclosure.

The 9.6K bit/sec. modem provides unattended automatic dial backup. It offers full-duplex asynchronous or synchronous operation in point-to-point or multipoint applications with up to 15 drops on a single line.

The product is interchangeable between a central-site card cage and a remote-site stand-alone enclosure.

The AJ 9641-1D modem card and modem in the stand-alone enclosure cost $1,995 and $2,145, respectively.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.'

■

Microcom, Inc. has introduced the **Intelligent Network Controller** (INC) for its High-Density Modem System (HDMS).

The HDMS is a rack-mounted, 32-modem system. The INC is said to provide systems managers with access to capabilities for management and control of the modem system as well as access to diagnostic information. An operator at a central terminal or operator console is said to be able to monitor status, review statistical data regarding line utilization and modem usage, run diagnostic tests on the modem modules and generate printed system status reports.

The Intelligent Network Controller is priced from $1,499.

Microcom, 1400 Providence Highway, Norwood, Mass. 02062.

Auxiliary equipment

Alfa Gat Ltd. has announced **Mul-T-Dial**, a personal computer dialer said to dial, redial, scan a telephone queue list and speak.

Mul-T-Dial consists of a short card and random-access memory software. It enables the user to instruct the system to dial to a group of numbers, one by one, while occupied with any other task in the computer.

The dialer checks both sides of the line for free or engaged signals and reports the status of each call. It notifies the user before a number is connected.

Mul-T-Dial costs $350.

Alfa Gat, P.O. Box 23142, Dizengoff Center, Tel Aviv 61231, Israel.

■

Dynapac, a Dynatech Co., has announced **Multi-Crypt X.25**, a logical channel encryption device for X.25 packet-switched networks.

The Multi-Crypt X.25 is said to use the data encryption standard algorithm. It enables multiple terminals and hosts to send encrypted data through public and private data networks. It provides two asynchronous CCITT X.25-compatible ports plus an asynchronous terminal port and can handle 64 or 128 simultaneous calls.

The Multi-Crypt X.25 costs $3,900.

Dynatech Packet Technology, 6464 General Green Way, Alexandria, Va. 22312.

■

Proteon, Inc. has announced the **P1380** interface board.

The board is said to plug into two IBM Personal Computer AT slots, allowing access to Proteon's Pronet-80 80M bit/sec. token-ring local-area network. It allows ATs to communicate on the same network with workstations and computers from vendors such as Digital Equipment Corp., Sun Microsystems, Inc. and Intel Corp., the vendor said.

The P1380 AT interface is priced at $4,900.

Proteon, Two Technology Drive, Westboro, Mass. 01581.

Voice/data communications

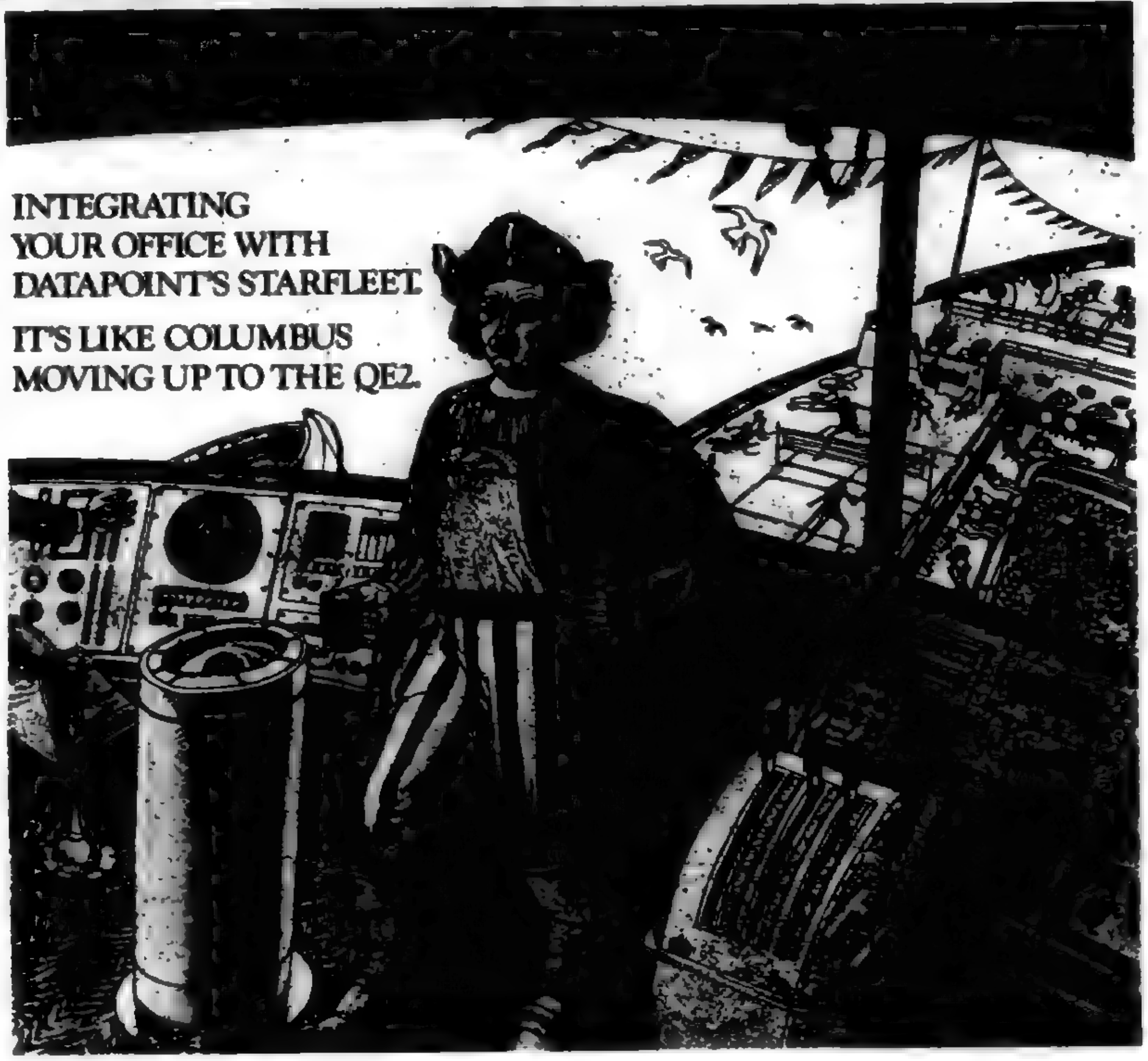
Dialogic Corp. has announced **Dialog/41**, a four-channel voice I/O system said to incorporate call analysis.

The Dialog/41 includes all the features of the vendor's Dialog/40 four-channel voice digitizing and telephone interface system. It allows an application to detect, after a call has been made, if the line is busy, if it has been answered or if an intercept has occurred.

The call-progress analysis occurs automatically after the dialing is complete.

The Dialog/41 system costs $1,395.

Dialogic, 60 Baldwin Road, Parsippany, N.J. 07054.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SYSTEMS & PERIPHERALS

Processors

ICL North America has announced the **DS** series of Unix-based departmental computers for one to 128 users.

The DS Model 3 includes a Motorola, Inc. 68010-based processor that supports up to 16 users, including IBM Personal Computers and compatibles and graphics terminals.

The DS Model 4 supports up to 32 users; the DS Model 5 supports up to 48 users; the DS Model 6 supports up to 64 users and the DS Model 7 supports up to 128 users. All models in the DS series conform to X/Open standards for AT&T's Unix System V.

The entry-level DS3 costs $13,500. DS4 costs $22,800 and the DS5, 6 and 7 range from $95,000 to $250,000.

ICL North America, P.O. Box 10276, 777 Long Ridge Road, Stamford, Conn. 06904.

■

Umecorp has announced the **Knowledge Engine** (KE) and **Expert Controller** (EC) dedicated artificial-intelligence computer systems.

The host independent systems are said to be CMOS parallel-processing computers that deliver distributed real-time expert system control capability to factory automation. The systems use backward and forward chaining, negative logic and deferred judgment logic.

Both systems can provide users with up to 15,000-rule capacity. More than 200 KE systems may be combined using RS-485 multidrop to produce an integrated distributed network of expert systems of more than 3 million rules.

The KE and EC computer systems are priced from $4,000 to $10,000.

Umecorp, 275 Magnolia Ave., Larkspur, Calif. 94939.

■

Hewlett-Packard Co. has announced a **financial incentives program** that allows customers to upgrade HP 1000 real-time computers within the HP 1000/HP Precision Architecture family of technical computers.

The program allows users to return the HP 1000 E, F or A series for credit toward the purchase of a more powerful HP 1000 or HP 9000 Model 840. They will also receive credit for the memory in the returned system and for software upgrades accompanying the return of a computer.

The HP 1000 A-Series computers are priced from $5,000 to $35,000. The HP 9000 Model 840 is priced at $113,000.

Hewlett-Packard, 3000 Hanover St., Palo Alto, Calif. 94304.

■

Integrated Business Computers has announced the **Ensign 386:100**, a multiuser system said to run software available for Intel Corp. 80386 systems.

Ensign 386:100 is said to support up to 100 users. An entry-level system including one slave 68101 CPU with 1M-byte I/O buffer, 16 serial-I/O ports, 1M-byte main memory, a 1.6M-byte floppy and a 25M-byte hard disk costs $8,695.

A fully expanded system includes four slave 68010 CPUs with more than 1M-byte I/O buffer, 100 serial I/O ports, 24M bytes of main memory, a 1.6M-byte floppy, a 60M-byte tape drive and three 280M-byte hard disk drives. It costs $72,895.

Integrated Business Computers, 21621 Nordhoff St., Chatsworth, Calif. 92311.

■

General Micro Systems, Inc. has announced the **GMSVO8** module said to meet VME and VMX 32-bit bus requirements.

The module provides up to 768K bytes of dual-ported nonvolatile memory in the form of either erasable programmable read-only memories (EPROM) or battery-backed CMOS static random-access memories (RAM). It can also provide up to 1.5M bytes of ROM/PROM or EPROM memory. Two different types of memory can be mixed on the board.

The GMSVO8 with 768K bytes of CMOS static dual ported RAM with battery back-up is priced at $2,895.

General Micro Systems, 4740 Brooks St., Montclair, Calif. 91763.

■

Digital Equipment Corp. has introduced the **Decmate III Plus**, a hard-disk version of the Decmate III floppy-based word processing system.

The system is said to offer the complete word processing features of the Decmate III. It can operate as a stand-alone workstation, a terminal or host system or be used for document transfer. It provides VT100 or VT200 series terminal emulation access either to a local-area network terminal server or a VAX host.

The Decmate III Plus system costs $4,695 including a 20M-byte hard disk drive, single floppy drive, monitor, keyboard, Master Menu software and DEC's word processing software.

Digital Equipment, Maynard, Mass. 01754.

■

Ranyan Corp. has introduced the **Model 68SU** Motorola, Inc. 68020-based supermicrocomputer designed to serve as a slave processor on Digital Equipment Corp. VAX computers.

The two-board slave units use a 68020 32/32 bit CPU and a 68881 floating-point coprocessor. The

Continued on page 100

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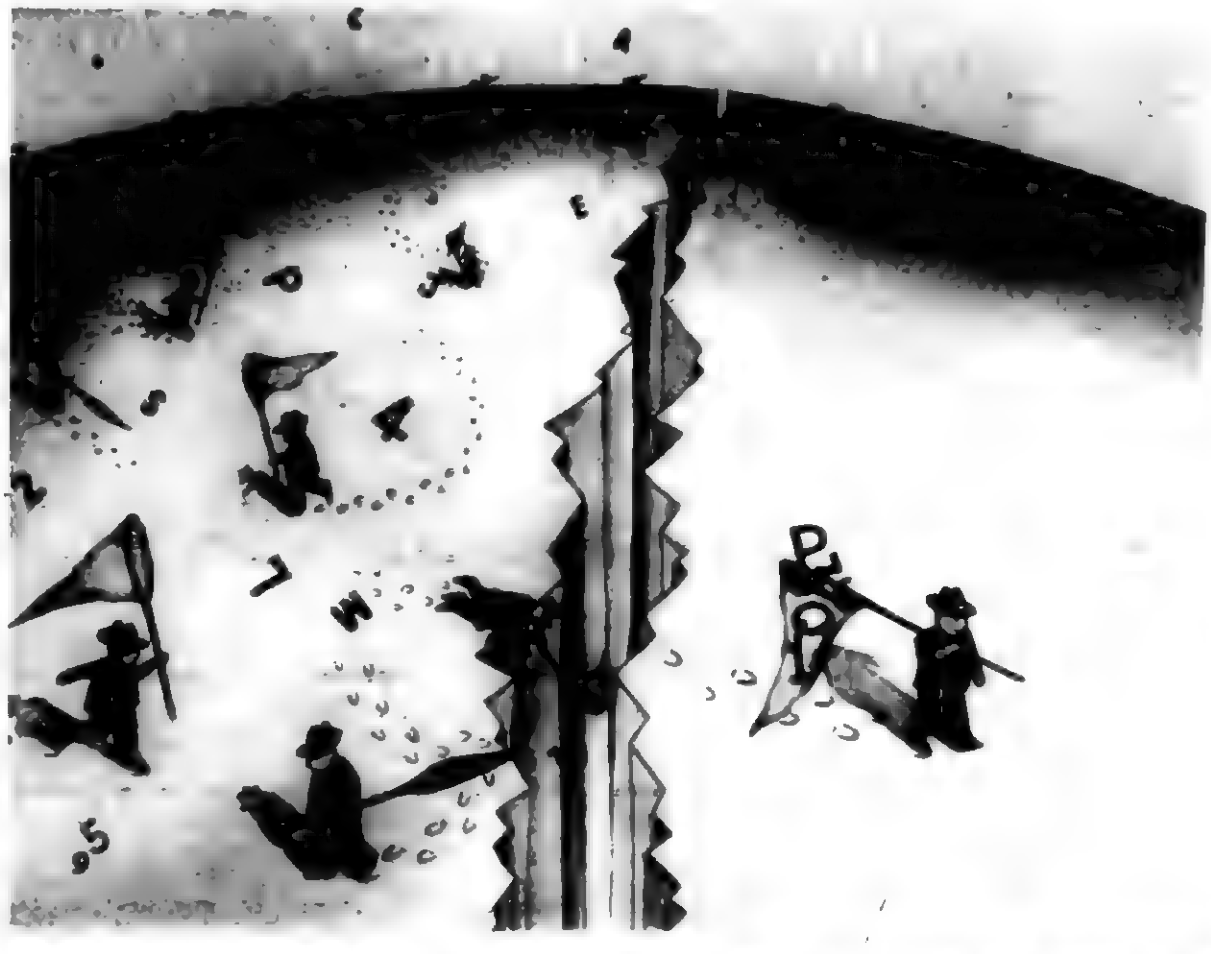

NEW PRODUCTS/SYSTEMS & PERIPHERALS

Continued from page 99

68020 is packaged with 8K bytes or 32K bytes of erasable programmable read-only memory and 32K bytes of static randomeaccess memory (RAM) on a single hex-sized circuit board. A second quad-sized board contains the 68881 and up to 2M bytes of dynamic RAM.

The Ranyan Model 68SU slave processor is priced at $5,850 per two board set.

Ranyon, 15239 Springdale St., Huntington Beach, Calif. 92649.

Data storage

Dilog Corp. has introduced the **DQ696**, which is a controller designed to interface up to two disk drives to Digital Equipment Corp. Microvax, Micro PDP-11 and LSI-11 computers using the enhanced small disk interface (ESDI).

The DQ696 is contained on a single dual-height circuit board. It includes support of the ESDI parameter passing commands and flaw-maps used in drive formatting.

According to the vendor, the DQ696 controller also handles ESDI data transfer rates up to 21.9M bit/sec.

Other attributes include support for 16-, 18- and 22-bit Q-bus addressing in both block and nonblock modes.

The controller is capable of storing all drive characteristics on the drives themselves.

Up to 16 commands can be queued for one or two drives.

The DQ696 controller is priced at $1,450.

Dilog, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

Cipher Data Products, Inc. has introduced the **S310-Plus** disk controller and the **S320-Plus** disk/tape controller.

Both data channel high-speed controllers were designed for use on Data General Corp. and plug-compatible systems.

They provide up to 3M-bit/sec. disk transfer rates and 1M-bit/sec. tape transfer rates on a single board concurrently. Other features include 7-sector buffers and read-ahead attributes.

The S320-Plus combines both disk and tape functions and supports up to four SMD disk drives.

The S320-Plus is priced at $4,200, while the S310-Plus controller is priced at $3,400.

Cipher Data Products, P.O. Box 85170, 10101 Old Grove Road, San Diego, Calif. 92138.

Real Time Enterprises, Inc. has announced the **RTE Optical Disk File Management System.**

The system is said to provide online optical disk storage and retrieval capability for Apollo Computer, Inc. Domain computers. It combines an Optimem 1000 optical drive, a host adapter board, the RTE Optical Disk File Manager software and a set of utilities into a 1G-byte storage system accessible from Apollo nodes equipped with a Multibus.

The system costs $17,300.

Real Time Enterprises, Building E, 3000 Winton Road S., Rochester, N.Y. 14623.

■

Ciprice Inc. has introduced the **Rimfire 3400** enhanced small device interface (ESDI) intelligent caching disk controller for VME-based systems.

The controller is said to optimize system performance through intelligent control. It is capable of burst transfer rates from controller to bus of 20M bit/sec. and sustained transfer rates of 6M bit/sec. It also features a 512K-byte configurable cache memory and on-board firmware. It can support four ESDI disk drives.

The Rimfire 3400 is priced at $1,995.

Ciprico, 2955 Xenium Lane, Plymouth, Minn. 55441.

Printers/Plotters

Interface Systems, Inc. has announced an **IBM System 34, 36 and 38 plug-compatible version** of its Laser 8 desktop page printer.

The printer is said to enable users to produce eight page/min. of letter-quality output by selecting from dual input bins. It emulates the IBM 5219 daisywheel printer and supports IBM's Displaywrite. It prints on bond paper or transparency sheets in 80 or 132 columns. Resolution is 300 by 300 dot/in.

Other features include four type fonts and a two-line, 32 character LCD read-out that displays the printer's operating status.

The Laser 8 is priced at $4,950.

Interface Systems, 5855 Interface Drive, Ann Arbor, Mich. 48103.

PRICE REDUCTIONS

EMC Corp. has reduced the prices of its **memory upgrades** for Wang Laboratories, Inc. VS systems.

The reduction applies to EMC's 0.5M-, 1M-, 2M- and 4M-byte upgrades for the Wang VS 85, VS 90 and VS 100 computers.

One megabyte of EMC VS-compatible memory is priced at $4,500.

The price of EMC's Cache Bonus for the VS 90, consisting of 32K bits of cache memory and a 2M-byte main memory upgrade, has also been reduced to $15,000.

EMC, 12 Mercer Road, Natick, Mass. 01760.

■

Epson America, Inc. has announced a price reduction for its **EX-1000** nine-pin dot matrix printer.

The wide-carriage printer offers a draft speed of 300 char./sec. and an eight-button font selection panel.

It is now priced at $899.

Epson America, 2780 Lomita Blvd., Torrance, Calif. 90505.

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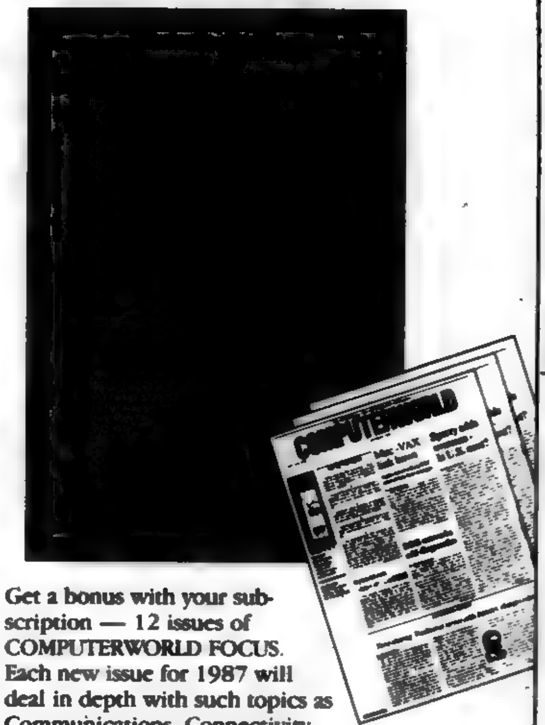

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Sealed proposals will be received by the CDPA, 301 N. Lamar St., 301 Building, Suite 508, Jackson, MS 39201 for the following equipment and services:

Request for Proposal No. 1185, due Thursday, January 22, 1987 at 3:30 p.m. for the acquisition of an IBM System/36-based software package to manage the National Direct Student Loan program for NORTHWEST MISSISSIPPI JUNIOR COLLEGE. Charge $10.00.

Request for Proposal No. 1186, due Tuesday, January 13, 1987 at 3:30 p.m. for the acquisition of an ASCII-to-3270 protocol converter and communications controller for the OFFICE OF THE SECRETARY OF STATE. Charge $10.00.

Request for Proposal No. 1187, due Wednesday, January 14, 1987 at 3:30 p.m. for the acquisition of software consulting services necessary to enhance the CICS-based Uniform Commercial Code information system for the OFFICE OF THE SECRETARY OF STATE. Charge $10.00.

Request for Proposal No. 1188, due Tuesday, January 27, 1987 at 3:30 p.m. for the acquisition of a distributed processing minicomputer capable of performing SNA communications, office automation, local processing and data entry for the DEPARTMENT OF NATURAL RESOURCES. Charge $10.00.

Request for Proposal No. 1189, due Monday, January 19, 1987 at 3:30 p.m. for the acquisition of a line printer which will be connected to a Honeywell DPS 6/94 at the MISSISSIPPI RESEARCH AND DEVELOPMENT CENTER. Charge $10.00.

Request for Proposal No. 1191, due Tuesday, January 13, 1987 at 3:30 p.m. for the acquisition of an operating system upgrade to MVS/XA for JACKSON STATE UNIVERSITY. Charge $10.00.

Detailed specifications may be obtained free of charge from the CDPA office or at the specified cost by submitting a written request accompanied by the appropriate payment. NOTE: Valid forms of payment are corporate check on a Mississippi bank, certified check or POSTAL money order. NO CASH OR OUT-OF-STATE CHECKS. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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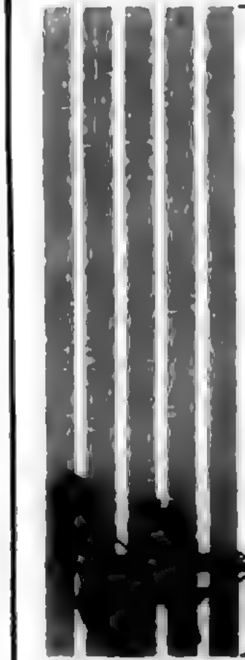

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PROGRAMMER/ANALYST: Resp for maintenance & dvlpment of customer administration processing system. Resp for design, dvlping & enhancing current system using COBOL, DL/1, IMS/DC, MVS/JCL, PL/1, BTS as Test Tool, MFS for Screen Design, [illegible]PERT and DATAXPERT for data [illegible], TSO/SPF as editor, PANVALET as Library system on IBM 3080 mainframe. Applications include financial, business & stock control. Must have 1 yr exp in job or 2 yrs exp as Programmer using COBOL, DL/1, IMS/DC, MVS/JCL, TSO/SPF & IBM mainframe. 40 hrs/wk, $30,600/yr. Resume to H. [illegible], Job Service, 11 South Ave, Rochester, NY 14604. JO # NY0202131.

ROBERT HALF OF ORLANDO
DB2 Administrator

Prestigious client requires professional who desires career growth and excellent compensation package. Successful candidate will possess a four year degree with extensive experience in product supervision of database management systems. Strong knowledge of data base theory and design, various DBMS and large IBM Mainframes a must. "Hands-on" DB2 and SQL are mandatory. All submissions held in confidence and fees are paid by client companies. For consideration of this unique opportunity, forward resume to:

Darlene McCormack
Robert Half of Orlando
P.O. Box [illegible]
[illegible]
(305) [illegible]

PROGRAMMER: Code, test, enhance & maint computer applications as they relate to business & financial systems. 3 yrs or 3 yrs rel programming exp. H.S. grad. Must know: COBOL, DL/1, IMS, DB/DC, MFS, VSAM, OS/VSI, OS/MVS & DOS/VS. Hardware is IBM mainframe. $31,000/yr. 40 hrs/wk. Send resume to S. Huvane (#101), AGS Informations Svcs., Inc. 1139 Spruce Drive, Mountainside, NJ 07092.

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If you enjoy challenges, have 2+ years experience as a P/A, S/P, S/A, Project Leader, DBA, MIS Director and are seeking a permanent position in a stable environment, we have opportunities for you. Expertise required in any of the following areas:

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ACP/TPF	METHOD 1
FOCUS	DPS 6, 7, 8's

Call or send resume to: Dick [illegible]
ALFRED/FUNDERBURK
3701 LaTrobe Drive, Suite 130
Charlotte, NC 28211
(704) 365-3700

SYSTEMS ANALYST: Design & develop on-line Regional Gen'l Ledger Acctg system using MACRO-32 & "C", utilizing VAX hardware. Respons for functional spec design, coding & integrated testing. 2 yrs exp or 2 yrs rel exp as Programmer/Analyst. Bach - Computer Sci. Must know: C, UNIX, VMS, MACRO-11, MACRO-32, COBOL, PL/1, BAL, PDP 11/70, & VAX. $35,000/yr. 40 hrs/wk. AGS Information Services, Inc. 1139 Spruce Drive, Mountainside, NJ 07092. Send resume to S. Huvane (Indicate #100).

INFORMATION SYSTEMS ANALYST

Development of computer programs (software) in Spanish/English. BS in Computer Science. 40 hrs/week, $300/wk. Contact Job Service of Florida, 105 E. Broward Blvd., Ft. Lauderdale, FL 33301. Job Order No. FL5201846.

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Computerworld

COORDINATOR OF THE INFORMATION CENTER & INSTITUTIONAL RESEARCH

DECEMBER, 1986

The University of Wisconsin-Platteville is seeking an individual to serve as the Coordinator of the Information Center and Institutional Research. Responsibilities include the design of informational reports and systems utilizing the University's on-line data base, the preparation and dissemination of all University Computing information, including a newsletter, and consulting in areas of institutional research, statistical analysis and graphics. The position is an Academic Staff appointment and is in direct support of the mission statement of University Computing. The environment for information dissemination and institutional research, utilizing various computer configurations, including a DEC Vax 11/780, two (2) DEC Vax 8300's, one IBM 4361, several Microvax's and many microcomputers connected through a LAN, requires an individual who is innovative, a self-starter and who welcomes a challenge.

Minimum qualifications include a Bachelor's degree in Information or Computer Science or Mathematics, or related fields, and at least one year of experience in an institution of higher education utilizing information or research systems. Effective oral and written communications are essential. Salary for the position is in the mid to upper twenty's.

For consideration for this position, please submit a current resume, salary requirements and names and addresses of three references to Search and Screen Committee, c/o James E. Johnson, Director of University Computing, University of Wisconsin - Platteville, 1 University Plaza, Platteville, WI 53818. Deadline for submission of documents is January 15, 1987. Position will be filled as soon thereafter as possible.

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OF BUFFALO, INC.
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(716) 842-6801
Personnel Agency

Systems Analyst - 40 hrs/wk; 7:30 am - 4:30 pm; $27K. Job reqs MS in Computer Science & 1 yr exp system engineer. Job also reqs 1) exp must incl 1 yr exp using HP 9000 Series computer & 2) 1 college course in each of the following: a) advanced strength of materials, b) systems simulation, c) systems programming, & d) database management. Job duties: using real-time computing techniques w/applications to data acquisition & control, research, design & dev CAE/CAT software prgs. Software will be used for design verification & diagnostic test generation of the electronic function & material characteristics in newly designed parts. Design system utilities to enhance current system & assist staff to improve coding speed. Using data communication techniques, dev terminal emulator for download/upload test data to connect local test stand to mainframe computer. Employ computer graphics to present test results. Instruct & support users in use of newly developed test stand & software prgs. Job duties req use of HP 9000 Series 300. Qualified apps should send resumes & verification of reqs to 7310 Woodward Ave, Rm 415, Detroit, MI 48202. Ref #77768. Employer paid ad.

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Baltimore
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Waltham, MA 02154
(617) 647-1110

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(615) 756-0521

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Chicago, IL 60606
(312) 648-1084

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Cincinnati, OH 45242
(513) 489-6481

Cleveland
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Independence, OH 44131
(216) 524-6444

Columbus
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Columbus, OH 43202
(614) 268-8883

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(214) 580-9000

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Miamisburg, OH 45342
(513) 865-5230

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Englewood, CO 80111
(303) 770-8833

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Southfield, MI 48075
(313) 746-6090

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Erie, PA 16505
(814) 453-4561

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Ft. Lauderdale, FL 33309
(305) 772-6662

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202 West Berry
Ft. Wayne, IN 46802
(219) 426-5101

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Grand Rapids, MI 49506
(616) 956-0131

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Greenville, SC 29615
(803) 297-4790

Harrisburg
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(717) 763-1699

Houston
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Houston, TX 77006
(713) 528-5064

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(317) 843-5260

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JFK Boulevard
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First American offers excellent salary and benefits package, including relocation. For immediate consideration, send resume and salary history to:

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McM CORPORATION
P.O. Box 10234
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PROGRAM MANAGER of the Northeast Artificial Intelligence Consortium (NAIC), a multi-university consortium for research in artificial intelligence. Reports directly to Consortium Director and the Executive Committee. Responsible for day-to-day programmatic management of overall consortium and interaction with sponsors. Coordinate preparation of research proposals and reports. Organize industrial affiliates program and attract external research support for consortium members. Initiate and coordinate educational programs including short courses, meetings and seminars. The ideal candidate would have a degree in Computer Science or Computer Engineering, some background in artificial intelligence, and experience in research administration and corporate relations. Consortium member universities are SUNY at Buffalo, Clarkson University, University of Massachusetts, Rensselaer Polytechnic Institute, Rochester Institute of Technology, University of Rochester, and Syracuse University. The Program Manager will be an employee of Syracuse University, which is the Lead institute for the consortium, and will be covered by a comprehensive university benefit package. Applications will be accepted until January 21, 1987. Appointment will be made as soon as a suitable applicant is chosen. Send application with three letters of reference to: Dr. Volker Weiss, Director NAIC, Syracuse University, c/o Human Resources, Skytop Office Building, Syracuse, NY 13244. An AA/EO Employer

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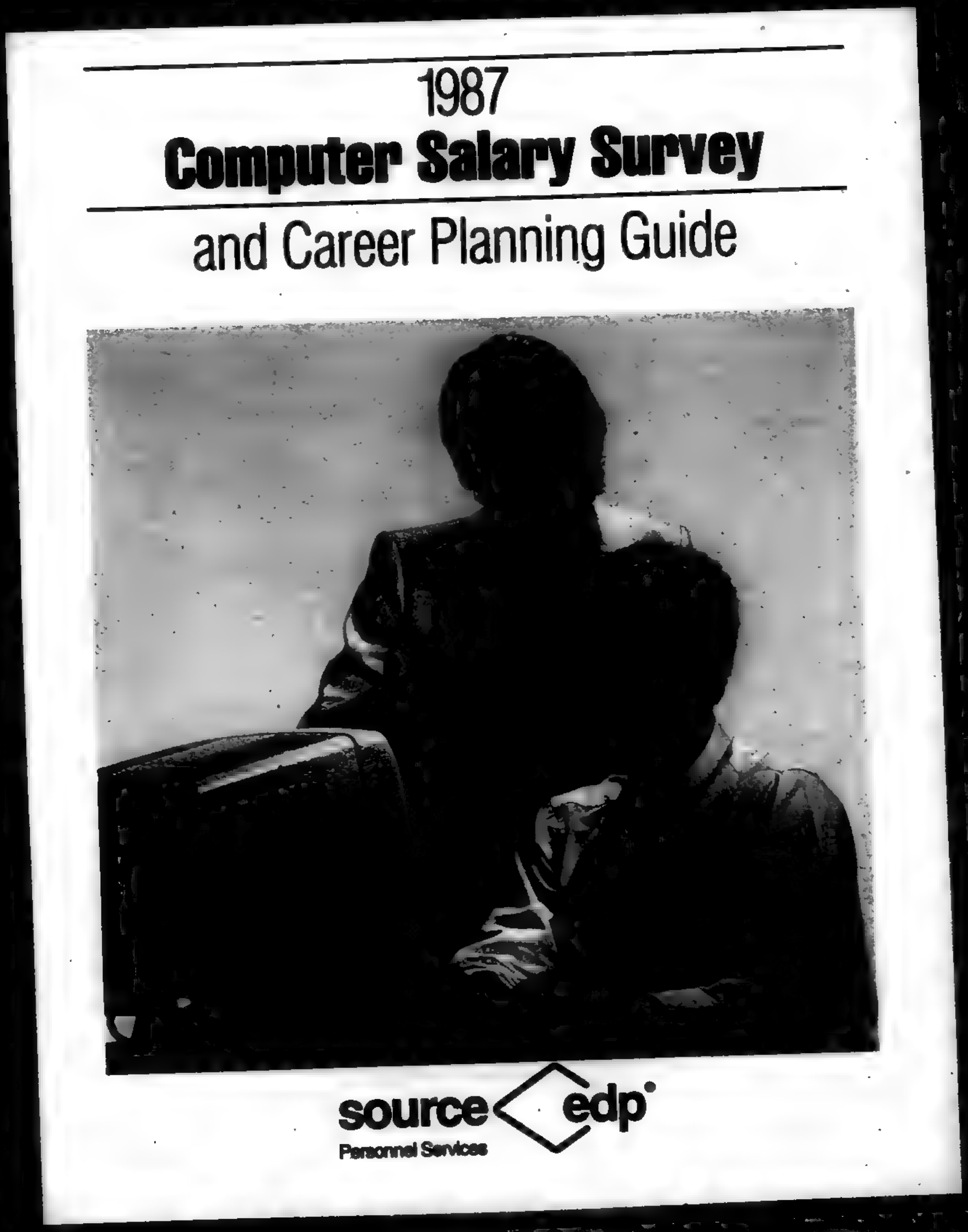

1987
Computer Salary Survey
and Career Planning Guide

source edp
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New 1987 Survey explores the latest trends in computer salaries, technology and career opportunities

You know how quickly technology can change. But, do you know how much salaries change...or how much difference there is in compensation levels for computer professionals who perform comparable functions...or how much salaries vary by industry or geographic location? In 1987, for example, some computer professionals are able to earn as much as 233% more than their peers!

Comprehensive review of salaries, trends and demand

The new ***1987 Computer Salary Survey and Career Planning Guide*** is based on information from thousands of computer professionals and firms that hire them across North America. Salaries for sixty-three position titles are reviewed including those in programming, systems analysis, software engineering, Edp auditing, office automation, operations, computer sales, marketing, technical support, management and much more. You'll learn if your compensation is keeping pace with your peers—and what you can expect to earn as you advance in your career.

Charts, exhibits and graphs to assess your progress

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Free to computer professionals

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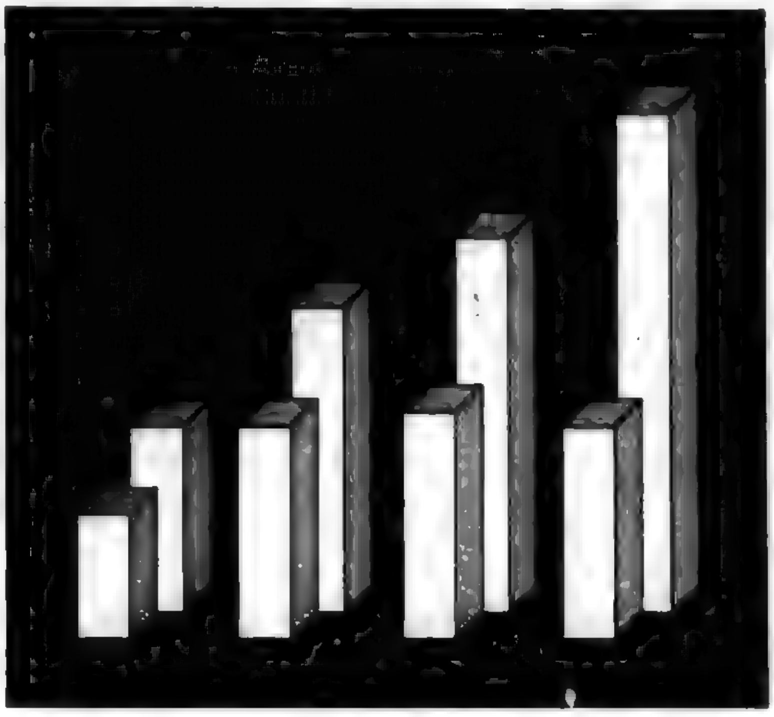

(Sample salary ranges for computer professionals who perform comparable job functions)

The new 1987 Survey shows the enormous range of salaries that one can expect to find within certain disciplines in the computer industry. Sharp variations—as much as 233% within the same area of specialization—can be found! The graph above vividly shows compensation differences for people performing the same basic functions. While some salary differences may be due to unique factors such as geographic location, many others just might be within your control. Our Survey can help you gain that control and make sure you're maximizing your potential.

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Downtown	213/688-0041
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San Fernando Valley	818/905-1500
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1987

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Albert Frank	76
Bendata	45
Bi Moyle	60
BMC Software	15
Bridge Communications	84
Broderbund Software	36
Cambridge Systems	99
CGI Systems Inc.	Cover3
Chubb Institute	25
Codex	33
Communications Networks '87	40-41
Computer Corp of America	5
The Computer Museum	87
CW Circulation	95
CW Focus	85
CW Nasa	114-115
CW Testimonial	90,96
CWMS Asia	88
CWMS Germany	86
Data Access Corp.	100
Data Design Associates	77
Data Point	98
Data South	88
Datasphere Inc.	32
Dataware, Inc.	39
D&B Computing	48-49
DBMS	80
Digital Service Corp. Ltd.	29
Epson America	56-57
Group Operations	47
Hewlett Packard	64-65
IBM	24-25,62-63
The Interface Group	37,46
Intermec	60
JD Edwards	38
JDS Microprocessing	74
Joseph & Cogan & Associates	42
Keyword Technology	54
KnW Systems	16
Lotus Development Corp.	92-93
Macworld Expo	44-45
Micom/Interlan	34,80
MicroTerm	28
Mike Murach & Associates	9
Mitrol	76
Motorola	22-23
MSA	Cover4
Multi-Tech Systems, Inc.	67
National University	35
NCA Corp.	94
Oracle Corp.	11,71
Peat Marwick	97
Racal	63
Radio Shack	82
Realia Inc.	14
Relational Technology	78
Robert Half	32
SAS Institute	70,79
Scientific Computer	50
Search Link	12
Seybold	73
Simware	31
Software Technology	42
Software Products	83
Sorbus Service	2
SPSS Inc.	26
Syncsort	Cover2
Tangram Systems	66
Telenet	58-59
Teltone	91
3M File Management	18-19
Tymnet	20
Unilease Computer Corp.	62
VM Software	7
Xerox	39

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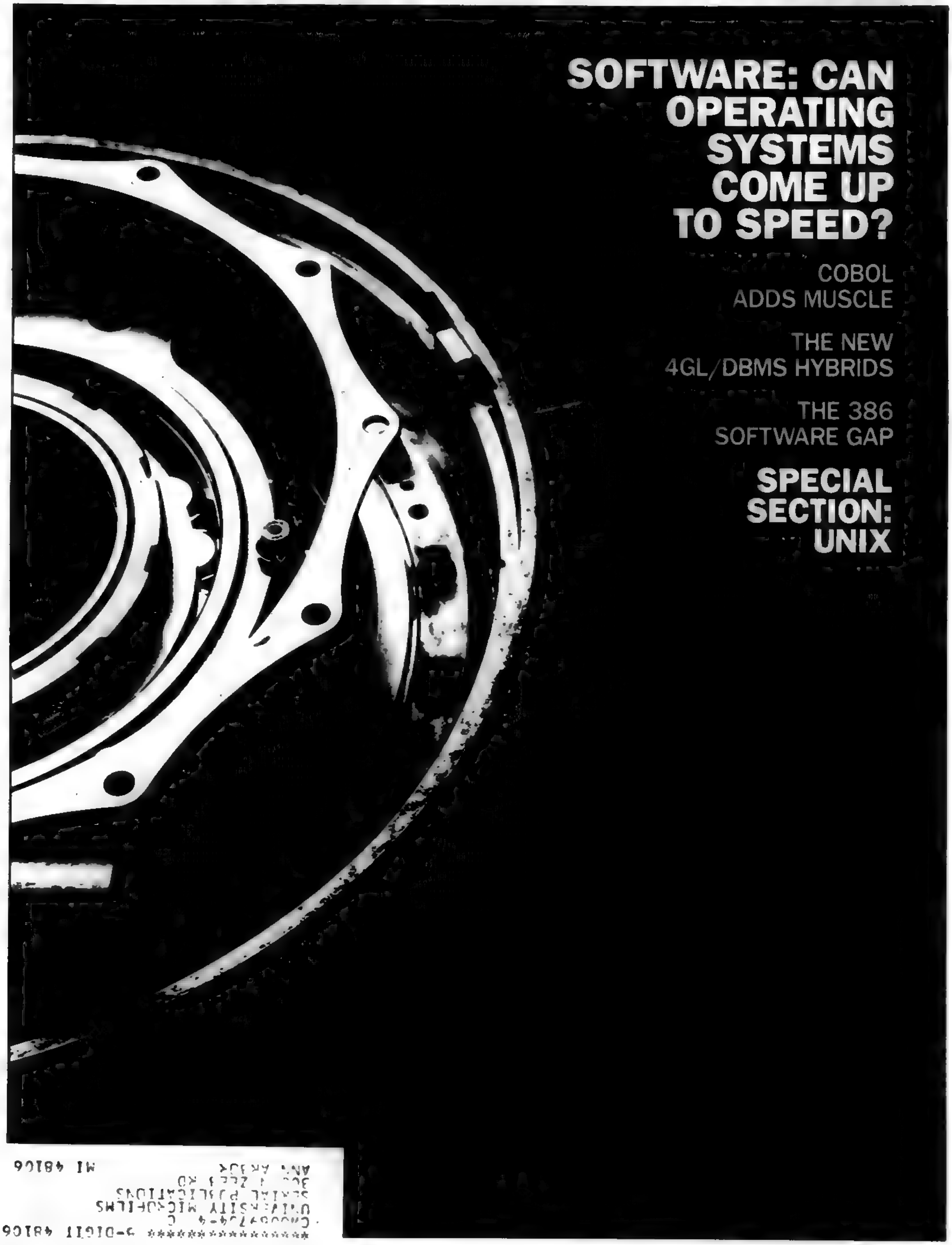

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CONTENTS

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ABOUT THIS ISSUE

Hardware advances are offering users faster, more powerful capabilities, but software is lagging behind. MIS's decision is tough. How can you make the most effective use out of the capacity of existing software while planning for future advances? No matter what your current computing needs are, you need to know what's out there on the software front. Only the best informed professional will be able to make the appropriate software choices to maximize his hardware and keep his organization one step ahead.

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Page 10

FEATURES

Micros Fuel Up For 386 Takeoff 10
Thomas Roberts
Operating system software is playing catch-up with the powerful Intel Corp. 80386 hardware arriving on the scene. Read what this means to users and what vendors are offering to bridge the gap.

Cobol Shapes Up 13
Stan Kolodziej
Detractors have been predicting the demise of Cobol. But, lately, the language has been getting back in shape and flexing its muscles on several market fronts. See what has added new vigor to this old warrior.

Magnificent Monsters, Fabulous Hybrids 15
Michael Tucker
In this age of concern about multiuser connectivity, certain corporations are expecting MIS to graft Unix onto their installed bases of IBM machines. Find out what hybrid tools some organizations are using to get the job done.

DBMS And 4GLs: Splitting The Difference 18
Rebecca Hurst
Because data base management systems and fourth-generation languages can serve overlapping functions, looking for the right product to suit your needs can be frustrating. Here is a guide to help you decide between separate DBMS and 4GL products or offerings that combine features of both.

Secrets Of Survival For Alternate Systems 31
Michael Tucker
Alternatives to IBM, Unix and proprietary operating systems have managed to maintain their share of both users and market position. Read how systems like Pick and Theos have survived and may even be the path by which MIS gains control of the personal computer environment.

Page 25

SPECIAL SECTION: UNIX

Blending MS-DOS And Unix 21
Philip J. Gill
Uniting MS-DOS and Unix into a single operating environment may be the way to harness the power of the new 32-bit machines. Find out what the pros and cons of such a union might be for you and your organization.

The Move To Fault Tolerance 25
Anne Lovett
Is there a need for fault-tolerant Unix? The author analyzes how the market has reacted and the kinds of products that are available for different kinds of applications.

Multiprocessing Unix Meets Users' Needs 29
Rebecca Hurst
Multiprocessor Unix machines usually work as fault-tolerant systems or parallel computers. This article explores the experience of a lottery business, an animal toxic control center and two computing research labs that use multiprocessing to make their businesses work more effectively.

Page 7

DEPARTMENTS

Editorial 5
Letters 5
Insider 6
Manager's Corner 6
Q&A 7
News Analysis 8
Products 33
Calendar 36

ON AT&T'S "HIGHWAY 3B" THERE ARE NO LIMITS ON WHERE YOU CAN GO WITH COMPUTERS.

Like it or not, the multi-system environment is here to stay. Mainframes will be mainframes. PCs will continue to proliferate like mosquitoes. And user needs will change every day.

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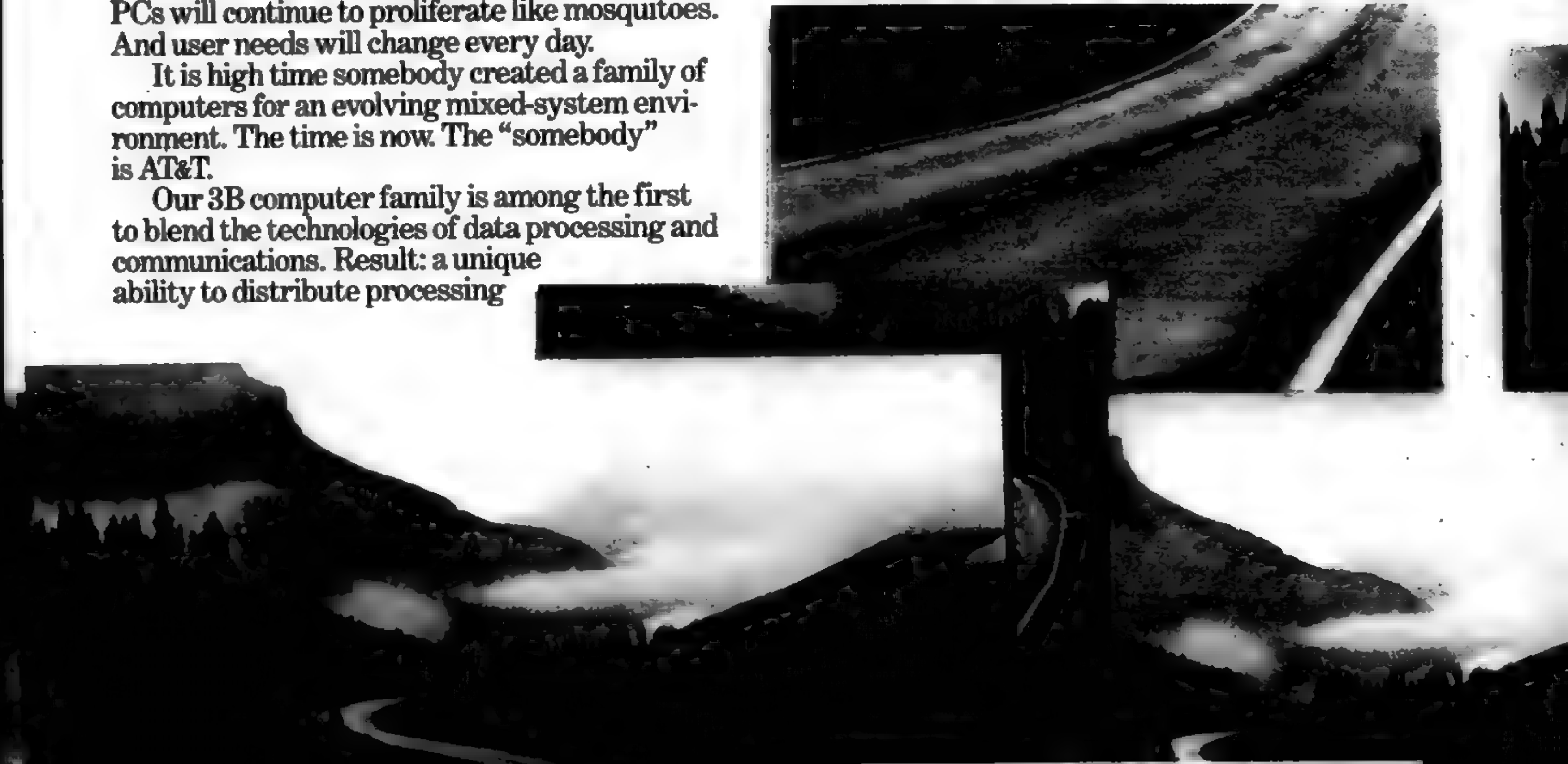

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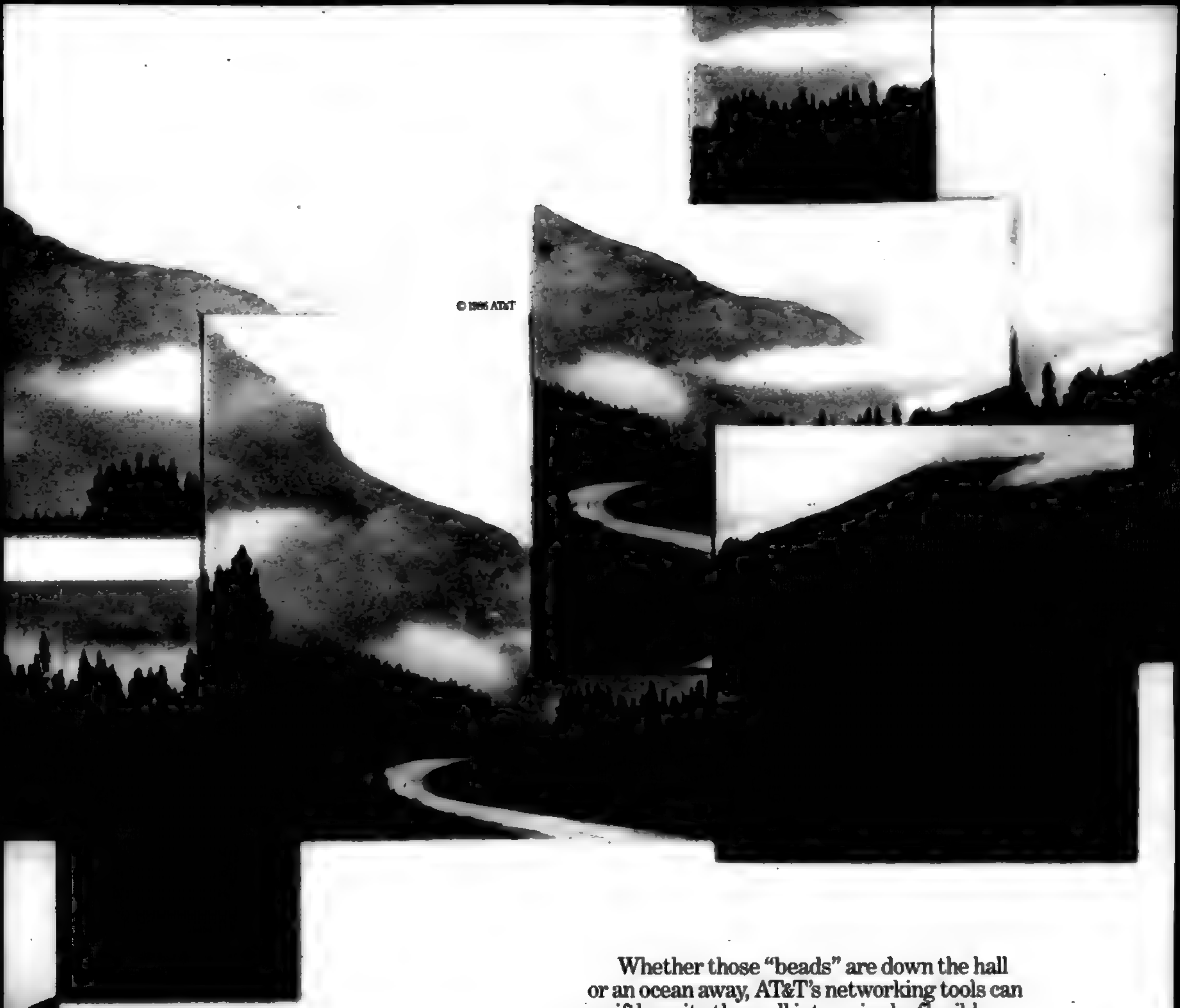

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systems—without forcing users to give up the applications they know and trust.

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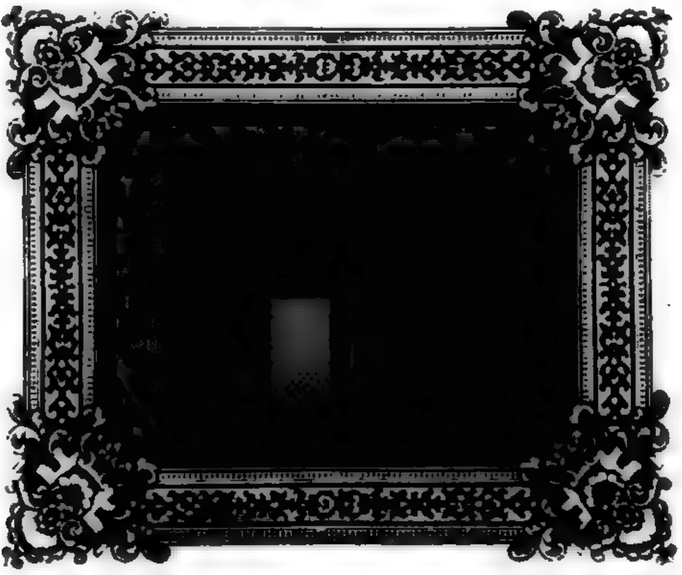

Once you add the final touches to your screen design, the mask editor automatically preserves your work of art in a separate screen library. At the same time, a WORKING-STORAGE definition is created for your mask. It's that simple.

Visual COBOL gives you the screen management capabilities you need. It can make the difference between ordinary software, and software that sells. Just as important, Visual COBOL increases your productivity by saving you valuable time in both the design and coding stages of program development. What's more, screen modifications can be done without recompiling the program, so maintenance is easy.

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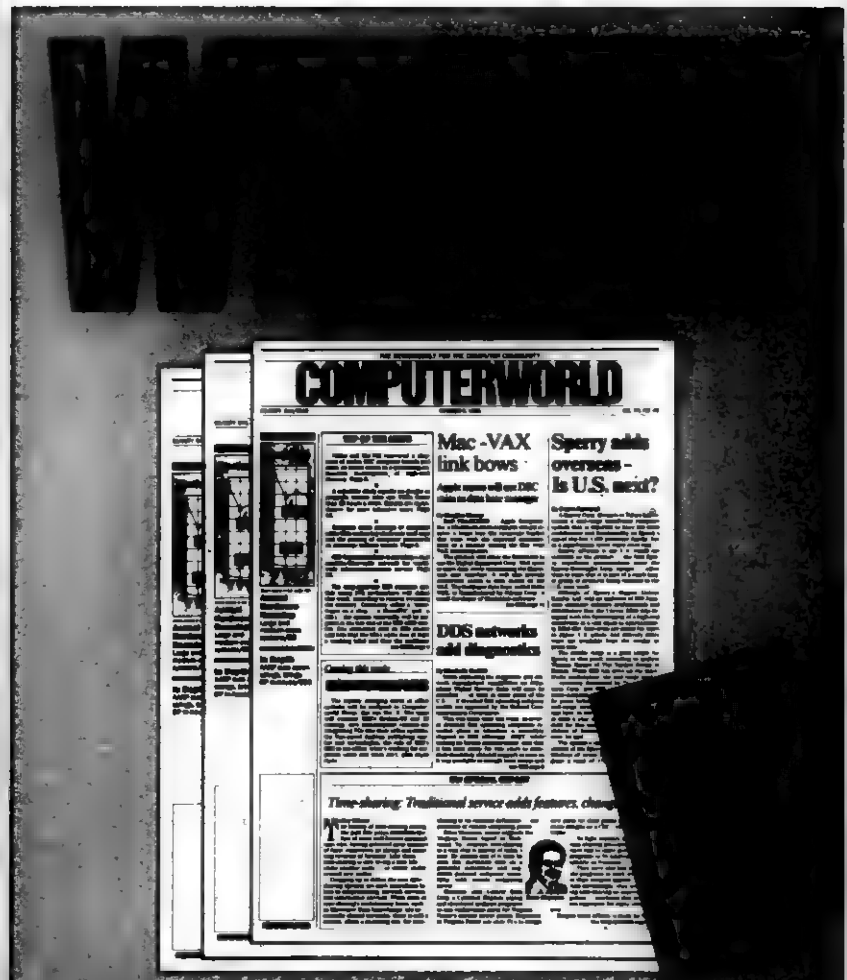
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SOFTWARE VIEWPOINT

EDITORIAL

The Sad State Of Operating Systems

Software has always lagged behind hardware advances but now it appears to be in a worse state than ever before. This can be seen in what is often termed "the sad state of operating systems."

Some advances have occurred in functionality and integration among operating systems and a few silver linings are appearing on the cloudy horizon, but for the most part, operating systems are not helping hardware fulfill its potential.

Operating systems today consist of systems that have come out of the data center days or that were once programmer tools known for their unfriendly interfaces. The Microsoft Corp. MS-DOS operating system is far from being a new operating system anymore because advances in hardware have outstripped it of lots of its power. MS-DOS is also now hampered by being a single-user system in today's multiuser world. In terms of new operating systems, we are still waiting for MS-DOS 5.0 to debut, but that eventuality seems to be pushed back further and further.

Yet the operating system picture is not all dark. Existing operating systems have evolved, merged and increased in sophistication and do, in fact, offer MIS managers increased options. Although many consider operating systems an invisible part of any system, it is worthwhile for MIS to take the time to study the changes going on in these engines that propel their systems. Many operating systems offer functionalities that can be used to improve the advantage of existing equipment. It would pay most MIS managers to become more aware of their advantages and disadvantages.

Many of these options and changes are outlined in this issue. Cobol is gaining new muscle, and senior editor Stan Kolodziej delves into this resurgence in "Cobol Shapes Up." The pros and cons of merging different operating systems is explored by features editor Michael Tucker in his story "Magnificent Monsters, Fabulous Hybrids." And the latest events in the Unix world are featured in our Special Section stories, which include a look at Unix and MS-DOS merge products that combine flexibility and user-friendliness. We also analyze the problems with the new Intel Corp. 80386 machines, problems rooted in their less capable operating systems.

MIS's role has been to balance technological realities with the demands from management and clients for more functionality. Until operating systems come fully up to speed, MIS will continue to juggle those elements in the near future.

Ann Dooley

LETTERS

Remember To Calculate Current Technology Cost

I am writing in response to Jim Young's article, "DP Managers Must Forecast the Future," in the August 20, 1986 issue of *Computerworld Focus.*

His article provides superior and philosophical reading for *any* manager who can appreciate the role of forecasting in decision making. However, one point needs a little more elaboration in practical terms. Young wrote: "Forecasting may guide a choice between alternatives or even encourage a strategic postponement of immediate action." I agree. But this may suggest to procrastinate without a complete cost/benefit study!

I think that the article would have been a little more detailed if it underlined that a DP manager must calculate the cost of available, expandable and upgradeable technology immediately, calculate the cost of postponement, evaluate the difference and decide what will be best for the company in the short and long term.

Incidently, here is some news that might interest Young and his Unix friends: A few friends and professional peers in Pakistan who are either using Unix (only a handful) or are otherwise interested in developing their understanding of it (like myself) meet informally every alternate day. We are formally launching a Unix Group in Pakistan on Jan. 3, 1987 at a Holiday Inn here. Any ideas and suggestions?

Usman A. Ghani
Sindhi Muslim Housing Society
Pakistan

Simple Solutions For Business Users On Mac

I am responding to the article in your Nov. 12, 1986 issue titled "Apple Plugs Into IBM's Market" and to a host of other articles addressing the end-user computing audience.

I have spent the majority of my 20 years of work experience addressing the user market, tuning in on its needs. The message that comes through strong and clear is: "Give me a solution to my problem, but don't make it more complex than the original area of concern."

Among the potpourri of so-called end-user products and services that flood the marketplace, one stands out, in my opinion, as having clearly met that expectation — namely, the Apple Computer, Inc. Macintosh Plus and its software. Yet this product continues to fight an uphill battle for recognition and acceptance as a business tool.

Your article quoted a gentleman as saying, "You can learn it in 10 minutes, but in 10 years you won't get any better." Isn't that precisely our goal? From an end-user's point of view, when I buy a PC to solve a problem today, I want it to be up and running as soon as possible. I don't want to spend the next 10 years learning all it can do for me. The Mac allows me to get to the root of the problem quickly and its solution, without needing to be a systems analyst. In short, the Macintosh is a transparent solution to end-user computing problems better than anything else on the market today.

Addressing the issue of incompatibility with the IBM world, I think the issue lies more with the application packages than with the hardware.

Although this reply may sound like a Macintosh ad, it is the result of a long run of frustration reading about solutions to end-user problems that end up causing more problems than benefits. When a product or service finally arrives on the market that does not appear to follow the pack, I think it deserves proper attention.

A. Charles Spina,
President,
Knowledge Resources
Information Counseling &
Research Services
Succasunna, N.J.

Graduate Urges Gearing Studies To 'Real World'

In its issues, *Computerworld Focus* appeals to its readers for thoughts, suggestions and ideas for future editions of the publication. I would like to recommend that *CW Focus* take a serious look at current educational trends.

I am about to graduate from a university in Virginia and feel that I know less than I did when I started. I received a broad-based education but it stopped short of much-needed practical experience and hands-on training. The classified ads are full of demands for people who have completed at least two years of experience in [computer] languages that I have barely heard of, much less know anything about. I feel that more could be done by educational facilities to better prepare graduates for the demands of the real world. I would enjoy learning more about how industry, as well as colleges and universities around the country, feel about this situation.

Kevin P. Kilpatrick
Fairfax, Va.

dB

BY RICH TENNANT

...AND FOR DISK INTENSIVE WORK LIKE AI, A 386 CAN'T BE BEAT. LOOK, YOU JUST CAN'T GO WRONG WITH A 386 OPERATING SYSTEM.
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WHAT ABOUT SOFTWARE?
IT'S GOT SPEED! IT'S GOT MEMORY! IT'S GOT VERSATILITY!

Attention Readers

Computerworld Focus will be published 12 times in 1987. We welcome letters to the editor and publish those we judge to be of interest to our readers. Letters may be edited for brevity.

Letters should be addressed to the Editor, Computerworld Focus, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171

CW subscribers will continue to receive *Focus* with their subscriptions.

SOFTWARE VIEWPOINT

The Market Heyday Of Operating Systems Is Nearly Over

INSIDER

Timothy J. Caffrey

For the past several years, operating systems have stepped from technical obscurity into the industry spotlight. However, this broadly defined collection of system utilities has had its day in the sun.

The evidence of the prominence these systems have held is abundant. For example, at the height of its power, Unix commanded the focus of at least one industry research house (Yates Ventures, Inc.) and stood as the central theme of AT&T's computer marketing strategy. Microsoft Corp.'s MS-DOS, perhaps the most successful off-the-shelf operating system, has been credited with opening up the IBM Personal Computer market to the now-ubiquitous clone. And, at the other end of the systems scale, a large part of IBM's marketing energies have been focused on the development and promulgation of a statement of direction for its mainframe operating systems.

Psychological, technical and financial investments in operating systems have been significant. Major planning decisions rest on the view of operating systems as central determinants of market direction. Systems planners, for example, have readily adopted standard operating systems for corporate computing.

Market strategists have spent valuable resources understanding the impact and direction of the Unix or MS-DOS.

Risk of missing the mark

Such market plans, however, involve considerable risk of missing the mark. The days of the operating system as a central market force are fast coming to a close. The shift from operating system to operating environment is more than a semantic subtlety.

The reasons for the coming decline of the operating system are firmly rooted in the myths that fueled its rise to prominence. The idea that a standard operating system exists was the first myth to crumble. Unix, in particular, promised an escape from the quasi-monopoly pricing of large systems and independence from proprietary operating systems. However, the market reality failed to deliver on either of these promises.

Another factor in the decline of the operating system is that it plays only a minor role in cross-systems networking and connectivity. While standardization on operating systems was seen as a cornerstone of connectivity, communications standards such as IBM's Document Content Architecture, Document Interchange Architecture, SQL and others have emerged as the real components of successful networking strategies.

Psychological weaknesses

Ultimately, however, the decline of the operating system will be attributed to psychological rather than technical weaknesses. Operating systems have little inherent appeal to the upcoming generation of market makers. As computing strategies are dictated increasingly by nontechnical buyers and users, these systems will step back into obscurity.

These changes do not mean that operating systems are going away. What is really happening is that our operating system definition is becoming outmoded. New, small-systems architectures, particularly those based on the Intel Corp. 80386, will incorporate the use of both hardware and firmware as the delivery vehicles for operating system functions.

At the same time, the size of the operating system portfolio is expanding to encompass communications, interface, graphics and a host of other now-separate systems utilities. The emergence of an applications platform will have a long-term impact on vendor strategies, market and product definitions and configuration options. Strategic thinking should be adjusted accordingly.

Caffrey is vice-president of Office Automation Services at International Data Corp. in Framingham, Mass.

A Guide To Mastering Your Operating System's Potential

MANAGER'S CORNER

Jim Young

MIS's choice of operating systems is many times a fallout of another decision like application software or hardware selection. While we cannot necessarily change how we acquire operating systems, at least we should do a better job of using the tools that we end up with.

Even when certain MIS managers inherit good operating systems, they either take the systems for granted and do not learn their full functions or these managers fail to see the need for features they only recognize vaguely.

It is easy to identify a manager of this ilk. He is the one who must ask outside experts if the system is out of capacity. He is the person who has machine performance problems and can't figure out how to solve them. And he is certainly the type to throw unnecessary hardware and software at a problem.

It is not very difficult to learn about your operating system. Vendors are usually willing to assist in schooling; documentation, while often complex, is usually compact; and other owners of that particular operating system usually don't mind sharing what they have learned.

One particularly helpful feature of many operating systems is the ability for them to measure activity. They can measure and record numerous types of specialized information, including data on the system's own performance, completion of jobs, hardware errors and the like. The use of these measuring systems is not without cost. While many systems record the data, you might have to build or acquire output programs to gain meaningful reports. Moreover, both machine resources and human resources are spent running and reviewing the reports.

Benefits make costs worth bearing

On the other hand, the benefits of understanding and using the operating systems' measuring features almost always make these costs worth bearing. With statistics on machine performance, you can spot bottlenecks and eliminate problems, track useage, project future hardware needs, increase machine throughput and much more. Job reporting lets you monitor and control production, improve machine scheduling, determine who is using the system and how much resources they use, monitor performance and productivity and so on.

With a benchmark understanding of how your system is running today, you can better gauge future performance changes. You can determine how systems can be designed and programmed to perform optimally. And, best of all, measurement is an introduction to other operating system features for tuning performance.

For instance, a report on task throughput could lead you to an operating system routine in which on-line transaction servicing can be prioritized.

Hence, the use of these measurements can make the difference between being ignorant of your operating system and out of control of your computer's performance or being in command of the engine that makes your computer work and being able to make it perform like a well-maintained race car.

The lesson is clear. To be a master of your operating system's potential, you merely need to follow these steps:

- Learn what information your operating system is capturing and what it could be capturing.
- Evaluate this information at least once so that you understand it.
- Analyze this information on a reasonable, periodic basis, and use this data to direct your technical decisions.
- Most important, don't wait for problems to force you or someone else to start this learning process. If you begin today, you may be able to avoid those problems in the first place.

Young is principal and director of consulting for Arthur Young & Co. in Worcester, Mass. He has worked in the industry for 15 years.

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CIRCLE READER SERVICE NUMBER 214

SOFTWARE VIEWPOINT

Unix Users Group Leader Predicts Shift To Posix

Robert Ackerman is the president and chief executive officer of Unisoft Corp., which assisted AT&T in developing its Unix System V verification suite. But in his role as executive vice-president of /usr/group, a Unix users group, Ackerman is an outspoken proponent of Posix, a 'vendor-independent, multiuser operating system definition that he says will replace AT&T's Unix System V as the industry standard.

Ackerman recently spoke with Computerworld Focus *senior writer Rebecca Hurst about AT&T's shifting influence on Unix and the push to make Posix a universal standard.*

Q&A

What is AT&T's current position regarding Unix?

There are two ways to look at AT&T's position. Historically, AT&T has built the Unix market. Originally, the other participants in the Unix industry were small start-up companies, so AT&T was by far the dominant, well-resourced player. This has resulted in a transition during the last two years from a marketplace that was heavily fragmented to one that is consolidated around AT&T and Unix System V.

Moving forward, AT&T will continue to be a major participant in the Unix industry, but it is no longer the only multibillion-dollar supplier in the Unix industry. In the X/Open Group [a consortium of U.S. and European vendors that license Unix] alone, there are 10 multibillion-dollar organizations developing Unix product strategies. AT&T will continue to be important, but only as one of a number of leaders in the industry.

What impact are these multibillion-dollar companies having on Unix?

There is a perceived need on the part of the multibillion-dollar manufacturers for a Unix standard independent of AT&T for obvious competitive reasons. They're concerned about having to license the technology from AT&T and then competing against AT&T with that same technology. AT&T has chosen to reserve "Unix" as its proprietary name for its operating system standard, though other vendors can license System V. The problem comes when federal agencies or even large corporate users specify Unix System V in their requests for proposals because only one vendor can supply Unix System V — AT&T.

At the same time, government agencies that specify Unix System V open themselves up to the challenge from vendors that they are sole sourcing. This practice goes against all procurement policies for the U.S. federal government. So, there is pressure on the government to ask for a Unix operating system without saying Unix.

The pressures placed on users, together with those on vendors, have given impetus to growing acceptance of Posix, the Institute of Electrical and Electronics Engineers' (IEEE) portable operating system based on Unix.

Robert Ackerman

> We're simply coming up with an independent definition of Unix that can be supported by all the manufacturers as they best see fit.

What exactly is Posix and when can we expect it to be acted on?

The Unix standard process has been going on for some time, but it's always been known as the IEEE standards activity. Only recently has the name Posix been attached to that activity.

Posix actually had its beginnings in /usr/group as a Unix standard that was primarily based on Unix System III. In the next stage of its evolution, the work on that standard was handed over to the IEEE P1003 committee, where it was further specified, expanded and defined. The IEEE version is very close to Unix System V.

Today, Posix is a trial-use standard. That means a draft standard has been created, and it is being circulated within the IEEE community for comments, including, "Does this address what we're trying to accomplish?" and "Are there inconsistencies here?" This process goes on for several months, so sometime between August and December 1987, one could expect IEEE to vote Posix in as a full-use standard.

Are Posix and Unix System V fully compatible?

To say that they're fully compatible would not be true. The Posix specification is a subset of Unix System V functionality.

What's important is that this subset is compatible with System V to a large extent.

We're trying to identify the minor inconsistencies between the two and resolve them so that Posix and System V are 100% compatible or at least not mutually exclusive.

The reason this is so important is that the last thing we want to do is fragment the market. We're trying to bring in an independent industry standard that is fully compatible with System V, around which the market has standardized. We have to have a very smooth transition. We don't want a jigsaw effect in which suddenly System V is out and Posix is in.

How soon will we see Posix-based products on the market?

We might see statements from the vendor community that it intends to support Posix as currently specified and will adhere to the final specification of Posix, but it would be very difficult for anyone to support Posix until it is a fully adopted standard. I am seeing a great deal of interest and activity within the vendor community including major manufacturers.

What effect will Posix have on people who use or who are considering Unix-based computer systems?

The message we would want to get to users in particular is, "Don't worry. We're not throwing a new standard at you." We're simply coming up with an independent definition of Unix that can be supported by all the manufacturers as they best see fit.

For example, vendors might take their proprietary operating systems and modify them to adhere to Posix. Other people may independently develop Posix from scratch. The focus for a user has to continue to be buying solutions, not technology, but make sure that the proposed solution is based on industry standards. Today, Unix System V is an industry standard. In two years, System V will be just one of the ways that Posix, the industry standard, will be supported.

CORRECTIONS

Kelly Clerkin of Canton, Mass.-based Corporate Software, Inc. should have been listed as coauthor, not contributor, to the article titled "Checking Out Publishing Software" [*CW Focus*, Nov. 12, 1986, page 31].

The quotations ascribed to Phyllis Mlady in the article titled "MIS Cuts Back On Micros" [*CW Focus*, Nov. 12, 1986, page 15] were incorrectly attributed to her. The statements were made by another respondent.

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CIRCLE READER SERVICE NUMBER 213

NEWS ANALYSIS

PCs Revive Mainframe Software Mart

The mainframe software market may be in for a micro-induced revolution.

In its November 1986 issue, *Computerworld Focus* reported that the remote development of mainframe software on microcomputers was beginning to catch on in MIS departments, chiefly due to a host of products that allow mainframe applications to be created on IBM Personal Computers and PC 370s. Now, the same products are being exploited by independent software vendors. By radically reducing the cost of development, this could mean a rapid proliferation of mainframe software offerings.

While remote development of software for larger machines on workstations has been a fixture in the technical and engineering markets for some years, MIS and its suppliers have steered away from the technology. The feeling among MIS generally was that it had enough problems as it was without introducing PCs as an added uncertainty. The mainframe software vendors simply followed suit.

However, the rising costs of software development and the ever-growing applications backlog of most MIS departments has made remote software development more attractive.

For once, the MIS profession has been leading the way into a new technology. Even before most mainframe software suppliers had begun to investigate remote development, MIS professionals had discovered and begun to exploit a new generation of PC/mainframe development products. The first of these have been packages — such as $4,495 MicroCICS from Los Angeles-based Unicorn Systems Co. — that allow applications for IBM's mainframe transaction system, CICS, to be put together on the IBM PC 370. Within the last few months, vendors have also brought out products that allow CICS development on IBM Personal Computer XT- and AT-class machines. These include RealCICS, at $2,000 from Chicago-based Realia, Inc., and the CICS/PC from Triangle Software Co. of San Jose, Calif.

One user of Unicorn's MicroCICS product is Oklahoma Natural Gas Co., headquarted in Tulsa, Okla. Winsford Spears, the utility's manager for systems development, says that he went with remote development for classic reasons: conservation of mainframe resources, productivity and cost.

Independent vendors join in

But, the real news about remote development may be with independent software vendors. They, too, are exploiting the PC connection.

For example, Health Systems International, Inc., a New Haven, Conn.-based independent software vendor selling into hospital MIS operations, is also a Unicorn user. The majority of its work is for Unix systems, but it does have some IBM mainframe customers. "We used to buy time on a mainframe and do our development there," says W. Richard Stevens, Health Systems' vice-president of computer services, "but, after a while, we couldn't cost-justify that. On the other hand, we couldn't justify buying a mainframe and bringing it in-house." So, instead, the company purchased a PC AT/370 and the Unicorn system.

"We do all our development work on the AT," Stevens notes. "Then, when everybody is happy with it, we buy some time on a mainframe, port the application over, do the final compile and otherwise make certain that it really will run on a mainframe. Then, we make tapes and mail it to our clients."

The result is a model for the way mainframe software could be developed on a shoestring budget. In theory, with these sort of tools, individual programmers working alone could produce applications for mainframes with *almost* the same ease that they currently turn out Microsoft Corp. MS-DOS applications.

In practice, of course, the marketing and technological realities of mainframes make it unlikely that the next mainframe blockbuster is going to come out of somebody's garage.

But, by making mainframe software development cheaper for the entrepreneur outside the garage, these products could significantly change the economics of MIS. Since the introduction of the PC, mainframes and their MIS users have been crippled by the fact that their numbers were relatively small when compared with micros, although the cost of producing mainframe software is relatively high.

Traditionally, independent software vendors have been lured away from mainframes to the PC market, in which the user base was so much larger and the cost of admission was so much smaller. By reducing the price of that admission ticket, PC/mainframe development systems could vastly increase the number of people writing for mainframes and also vastly increase the amount of software available to mainframe users. PC-development systems may soon yield a mainframe renaissance.

MS-DOS Or Unix Publishing Systems

Just as business professionals have a range of publishing requirements, there are a variety of systems to meet those needs. Moreover, the subtle variations among publishing systems can make the purchase process confusing at best. One primary decision users have to make is whether a Microsoft Corp. MS-DOS-based publishing system or Unix-based one will meet their needs best.

Because computer-aided publishing is a relatively recent development, the types of products available have polarized at the low and high ends of the market.

At the low end, applications are developed for the Apple Computer, Inc. Macintosh or MS-DOS-based IBM Personal Computers or compatibles. Two highly regarded packages for these PCs are Aldus Corp.'s Pagemaker and Xerox Corp.'s Xerox Desktop Publisher, Ventura Edition.

Hardware, communications limits

However, publishing systems based on these computers face hardware and communications limitations, according to Joan-Carol Brigham, an analyst at International Data Corp. in Framingham, Mass. "They are typically limited to 640K bytes of memory, 30M bytes of disk space and a 16-bit CPU," she explains. Also, linking separate PCs to a local-area network file server is not as easy as using a multiuser, Unix-based system, notes Tony Bove, editor of "Desktop Publishing," a monthly report on the electronic publishing industry.

At the high end, applications are

See PUBLISH page 9

Vendors Peddle 386 Operating Systems

Microsoft Corp.'s MS-DOS has been the software talk of the town lately, now that Intel Corp. 80386 microprocessor-based computers are putting pressure on Microsoft to get its operating system act in gear.

Microsoft has cooly responded to the pressure by saying that the public will probably not see applications written for its protected-mode operating system (sometimes referred to as MS-DOS 5.0, sometimes as Advanced DOS) until the end of this year. That leaves a time gap, and a big one, between the 386 hardware now coming on the market and its next-generation operating system from the industry's highest profile software company.

A gap to some, a window of opportunity to others. Into the breach have come a number of software vendors peddling alternative operating systems for the 386 machines, hoping to grab a quick share of the 386 market before Microsoft and IBM.

The Software Link, Inc., headquartered in Atlanta, is gaining some publicity (if not users) with its PC-MOS/386 multiuser, multitasking operating system. The firm says MOS/386 is compatible with Microsoft's current operating system versions and it takes advantage of the 386's 32-bit protected-mode feature. Software Link also claims its operating system can support up to 25 users.

Pick Systems, the Irvine, Calif., firm that has been nipping for years at the flanks of the IBM mainframe software market, has jumped into the fray, porting its Pick operating system to the 386 processor and touting operating system compatibility from micros to mainframes. Claiming the Pick operating system market reached $1.3 billion in 1986, the company is hoping that its 386 Pick version will provide good leverage in winning over a contingent of clients this year — users who can't wait for IBM to give more operating system homogeneity across platforms.

Windows To Play Role As 386 Tool

Forrester Research, Inc., a Cambridge, Mass., market research firm, claims that Microsoft Corp.'s Windows will play a larger role as a migration tool and graphics interface to the Intel Corp. 80386 operating system. Forrester says Windows already includes features that will be in MS-DOS 5.0, including a clipboard for low-level interprocess communications, improved memory management and limited multitasking.

Microsoft has itself stated that applications written to Windows specifications will run under MS-DOS 5.0, and Forrester sees Windows as the bridge between IBM Personal Computers running MS-DOS 3.2 and Intel 80286 or 80386 systems with MS-DOS 5.0.

For Forrester, the 386 processor and MS-DOS 5.0 will finally unclog a static PC software market. It also predicts that the changeover to a new generation of software will reshuffle the software market.

Forrester says software winners and losers will be differentiated by the following criteria:

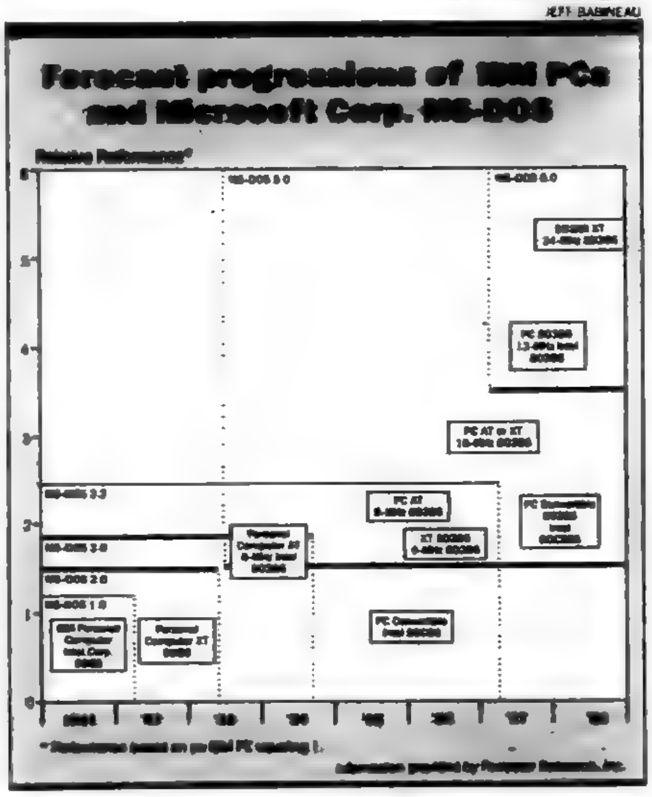
- The ability to manage the development of complex software in the MS-DOS 5.0 environment.
- The creation of software extending beyond what users can do today, such as distributed data bases.
- An ease of use in applications that lures a new group of users from the manager, executive and professional levels to use PCs, with programs developing around smart windows.
- Account control with innovative licensing agreements.

If software vendors can meet at least three of these four issues, Forrester predicts they will be a success in the new PC software arena.

"A good number of these second-generation PC software vendors will come out of the minicomputer/mainframe marketplace," says John McCarthy, an analyst at Forrester. "Companies like Access Technology, Inc. in the spreadsheet area, Oracle Corp. and Informix Software, Inc. in the data base area

See FORRESTER page 9

JEFF BABINEAU



NEWS ANALYSIS

Posix Challenges AT&T's Unix System V

Just when you thought it was safe to call AT&T's Unix System V an industry standard, a challenger is riding in on the waves of user support.

General Motors Corp. and the U.S. government, two large, influential, standards-minded users, have publicly announced their support of Posix, the Institute of Electrical and Electronic Engineers, Inc. (IEEE) portable operating system standard.

Users agree that the attraction of Posix, which closely resembles Unix System V, is its vendor independence. More specifically, it frees everyone from their dependence on Unix's developer and sole licenser, AT&T.

The most visible government support of Posix has come from the National Bureau of Standards (NBS). In August 1986, the bureau proposed in the federal register that Posix be established as a Federal Information Processing Standard (FIPS). Moreover, the standards bureau has been working with IEEE to develop a validation suite that will evaluate a product's compliance with the Posix specifications, says Al Hankinson, the NBS's chief of systems and software technology.

'Posix is attractive to us'

In the private sector, GM has issued a letter to vendors stating that it will support AT&T's Unix System V standard until there is a full-use national standard, reports John Williams, senior manufacturing project engineer at GM. "A standard such as Posix is attractive to us," Williams says. "If we have a national vendor-independent standard, more people will adhere to it."

"The standards process will bring about a consensus as to what users want, and more suppliers will adapt products to address that consensus," NBS's Hankinson concurs. In part, GM's letter was designed to inform vendors of the company's future standardization goals so that vendors can provide products that meet those goals, Williams explains.

Despite the activity by users, Posix is not expected to become a full-use standard until the last quarter of 1987. It will then be another six to nine months before the NBS approves it as a FIPS, Ackerman says. It is also unlikely that vendors will provide commercial implementations of Posix before 1988.

However, the government and business users alike should prepare for Posix, NBS's Hankinson asserts. "Users have to develop a transition stategy that will take them from their Unix-based systems today to one that recognizes Posix," he recommends. This strategy includes plans for procurement. "Posix will be here and will be a major factor."

Ada Moves Into Commercial Mart

From the bowels of the Department of Defense, a programming language is taking some bold steps into the commercial programming world.

Ada is not a new language, dating officially from 1977 when the DOD christened it as its future language of choice.

During the years, Ada has won over its share of believers. The language uses a programming logic structure that makes Ada programs easy to maintain, something of which Cobol shops, with their reams of entangled spaghetti code, have only dreamed.

Ada, in essence, contains an amalgam of the best features of other languages: Cobol's data base handling, Fortran's math, Pascal's programming logic and C's strength in communications. And Ada contains facilities that make it fairly easy to interface it with other languages.

Why the late commercial arrival?

All well and good, but why the late arrival in the commercial area? For one thing, Ada has been tied so closely to the military in the past that it created its own coterie of inside programmers and an aura of inaccessibility to commercial users. It also did not get the outside support and publicity it needed from major software and hardware vendors.

"As a result, there were just not enough Ada support tools being developed," explains Bruce Lynch, president of the Programmer's Shop, located in Hanover, Mass. "Now that these tools are coming out, there will be a two- or three-year gestation period before Ada really makes a splash [commercially]."

Lynch says a good starting point for Ada are those programming shops that have abandoned Cobol to strike out with PL/I or Fortran. "Ada is a stronger language than Cobol and has similar strengths to PL/I," Lynch explains. "Ada can be a good extension to PL/I in large programming groups that need clear, logical programming."

IBM, in its inimitable way, is helping the Ada cause. The company has licensed Telegen2, an Ada development system from San Diego-based Telesoft, to run on IBM's 370, 4300 and 3090 lines under the IBM VM and MVS operating systems.

Ada will also get help in other areas. In the avionics, telecommunications and factory automation markets, the increased use of more powerful, cheaper embedded processors is turning more and more people to Ada.

As the U.S. Army converts an increasing number projects toward Ada, outside contract programmers will take that expertise back into the commercial arena.

FORRESTER from page 8

and Applix, Inc. in office automation have the necessary experience with more complex software development efforts."

IBM's 9370 Line Puts VM In The Spotlight

IBM's recent introduction of its 9370 family of Micro370 computers has suddenly taken the software spotlight from MVS, IBM's premiere operating system, to its VM operating system.

Ironically, VM, which IBM critics claim has been given short shrift by IBM, now appears to be IBM's operating system of choice in its bid to provide mainframe software at the low-end, departmental level.

This presents an interesting scenario. While VM is pushing steadily downward into the departmental level, the Intel Corp. 80386 processor has a virtual memory facility that can accommodate VM development. Some analysts say they believe IBM will take advantage of this feature to tie VM into its own 386 microcomputer, which is expected to arrive on the market later this year.

In this regard, the 9370 family could be a pivotal point in IBM's departmental computing strategy, poised between the 386 and its higher end minis and mainframes — and not just in the business community. Many vendors expect the 9370 to become a big seller in the manufacturing and scientific areas as well.

Mitrol, Inc. of Woburn, Mass., for example, has even put a fourth-generation language-based manufacturing resource planning (MRP II) system on the 9370. Mitrol says its clients will now be able to migrate its MRP II system from IBM mainframes to the 9370s as those systems become available in 1987.

"We think the 9370 family will become big players in the manufacturing environment," explains Dan Franck, senior design engineer at Mitrol. "I wouldn't be surprised if IBM even comes out with a ruggedized 9370 to get it right onto the shop floor. I don't think we're alone in that assessment."

••••••••

News section compiled by Computerworld Focus *staff members Stan Kolodziej, Michael Tucker and Rebecca Hurst.*

Using Interactive Software To Program

Can a packaged application development system make a dent in traditional large systems programming productivity?

"It did for us," explains Steve Grice, systems analyst at Reynolds & Reynolds Co. in Dayton, Ohio. "We had a need to crank out code quickly, and there was no way we were going to do it with Cobol using standard programming methods."

Grice has been using the Application Factory from Cortex Corp. in Waltham, Mass., to develop a raw stock tracking system to keep tabs on paper supplies and another system to track the company's field service people.

For the DEC environment

Cortex says the product is a package carrying programmers through the entire software life cycle from design specifications, prototyping, coding and maintenance stages of large applications on Digital Equipment Corp. VAX systems.

"We were a traditional Decsystem-10 shop, but we reached the stage where we debated whether to go with IBM or stay with DEC," Grice says. "We decided to bring in a VAX-11/785 and VAX 8600 and go with Application Factory."

Grice says it took only 10 weeks for two programmers to put up the inventory system using the Application Factory, a pace he describes as very fast.

Products such as the Application Factory have an advantage over conventional code generators because they let programmers enter the specifications for the applications interactively and on-line. The systems then use the specifications as a basis for automatically generating code in less time than conventional programming methods. In effect, Grice says, the system was designed to teach a computer to program.

Other large development systems packages, many of them based on fourth-generation languages, are gaining popularity with large user installations requiring quick system uptime and a minimum of back-end maintenance.

Companies such as Promod, Inc., with its Promod system, Applied Data Research, Inc. with its Datacom/DB data base and Ideal language and Pro Computer Sciences, Inc. with its Pro-IV system are chasing part of a total U.S. software productivity tool market of $5.8 billion in 1987, as forecast by International Data Corp., a market research firm located in Framingham, Mass.

PUBLISH from page 8

designed for Unix-based workstations or minis. Two such packages include Interleaf, Inc.'s Text Publishing Software and Context Corp.'s Context Document Software. Unix-based systems are generally workstations based on full 32-bit processors, Brigham says. These workstations have a large local disk and up to 4M bytes of memory.

Among users who already have publishing systems, many have made their decisions based on the types of computers they already had at their desks, according to analysts of Seybold Publications, Inc., a Malibu, Calif.-based market research firm. Users of MS-DOS-based publishing software already have access to an IBM PC or compatible, says Peter Dyson, a Seybold analyst.

Similarly, Unix-based publishing software is often used by people who already use Unix workstations for their scientific or engineering applications, says Jonathon Seybold, president of Seybold Publications. However, many Unix-based publishing systems are found in firms in which publishing is the primary activity and the company can cost-justify the system, he adds.

Business professionals can set up a publishing system more cost-effectively if they purchase software that works with their current computers, but, according to Bove and Seybold, managers considering a publishing system should ask the following questions:

■ *How much data do I have to publish at once?*

The smaller the publishing job, the more attractive a PC is, Bove asserts.

Only if PC or Mac tools cannot meet the users needs should they move up to a Unix system, Seybold says.

■ *How many people will be using the system?*

"If there are two to four users, go with PC systems," Bove suggests. "If there are 10 or 20, look at Unix. Anywhere in between is a gray area where you need to ask a lot more questions," he says

■ *What is the system's cost per user?*

Unix systems offer more features, but they are far more expensive and more difficult to cost-justify. For smaller publishing applications, PC-based systems will probably prove the most cost-effective.

Finally, users should consider that the gap between PC and Mac and Unix publishing systems will narrow in 1987 with the introduction of better networking software and publishing applications, analysts agree.

MICROS FUEL UP FOR 386 TAKEOFF

• BY • THOMAS • ROBERTS •

The technical potential of the 80386 microprocessor is, in a word, astounding. In September 1986, Compaq Computer Corp. became the first company to introduce a PC built around the Intel Corp. 80386 microprocessor. At the Comdex/Fall trade show little more than a month later, practically a dozen companies followed suit with 80386-based systems of their own.

But the 386 systems available today are essentially souped-up versions of IBM Personal Computer ATs. These 386 machines are not living up to their potential, nor will this potential be fulfilled for some time to come.

The root of the problem lies in operating systems software. In the IBM Personal Computer and compatible world, advances in hardware are generations ahead of systems software development.

This gap between hardware and software is causing considerable confusion in the PC marketplace. At times, the confusion seems to be fueled by reports centering on the technical virtues of 386 systems without fully explaining when or how those virtues will be realized.

Much of the excited talk surrounding the chip at the heart of 80386 systems may sound like sales hype. It is not. Intel's latest microprocessor represents minicomputer power embodied in a single silicon wafer. The 386 is a full 32-bit CPU, which, by most estimates, will achieve processing speeds of 3 million instructions per second (MIPS) to 4 MIPS. Onboard memory management features will address vast amounts of memory.

Any 386 system has the potential to recognize up to 4G bytes of physical memory and 64 terabytes of virtual memory. The chip provides support for protected multitasking and was designed to run more than one operating system concurrently.

What's more, the 80386 maintains compatibility with earlier microprocessors in the Intel line. The IBM PC and compatible family of personal computers has been powered by Intel processors for the past five years. More than 6.5 million PCs installed worldwide belong to this IBM and compatible family, according to International Data Corp., a Framingham, Mass.-based market research firm. These computers are currently running software programs believed to be worth more than $6 billion in aggregate. Provisions have been made in the 386 design that allow it to run the vast number of programs already written for IBM and compatible equipment.

The market, however, is far from having a Microsoft Corp. MS-DOS operating system that will exploit the capabilities of the 386. In fact, the systems software gap is so great that the industry is still waiting for an MS-DOS built specifically for Intel 80286-based PC ATs and compatibles.

Sure, the PC AT now runs on Microsoft's MS-DOS 3.0, 3.1 or 3.2, and these versions of MS-DOS have allowed well over half a million PC AT users to accomplish a lot. But when it comes to maximizing the potential of the 286 processor in PC AT-style systems, these versions of MS-DOS do very little.

The 80286 chip itself is no laggard. The protected mode of the 286 offers full 16-bit processing,

JOHN OWENS PHOTOS COURTESY U.S. AIR FORCE, 99TH AERIAL REFUELING SQUADRON, AND THE 1ST TACTICAL FIGHTER WING

access to 16M bytes of physical memory and protected multitasking capabilities. Most PC ATs and compatibles have never been run in protected mode, however. Lacking an MS-DOS operating system to exploit the protected mode, most ATs have been running in real mode. In real mode, an 80286 basically acts like a fast 8086 processor, ignoring its own advanced memory and multitasking features.

A new MS-DOS operating system for the protected mode of the 80286 is on the way. But MIS and users have been waiting for this operating system since the first PC ATs were introduced. Moreover, new applications software will need to be written to take advantage of this upgraded MS-DOS.

The first of these applications will probably not appear until six months after the operating system debuts. If a 286 MS-DOS should become available by the middle of this year, that means it will be the end of 1987 before meaningful applications will appear. That is almost three and a half years after the first 286-based PC AT systems were introduced by IBM.

386 hardware: The generation gap

The discrepancy between PC hardware and software development becomes even more pronounced when looking at the 386 generation of systems. It is somewhat simplistic to think of PC hardware in terms of generations, but for the sake of this discussion, it serves an important purpose. If one traces the lineage of the IBM PC family and compatibles, the PCs, PC XTs and compatibles represent the first generation of these computers while the PC AT-style systems represent the second and 80386-based PCs represent the third.

With the availability of 386 PCs, hardware development has effectively jumped two generations ahead of operating systems software development. For example, according to Microsoft's own estimates, a new version of MS-DOS designed specifically for the 80386 will not be ready until sometime in mid-1988. This means that applications built to run under the native mode of a 386-specific MS-DOS may not appear until the end of 1988 at the earliest.

There are several theories about why PC operating systems are so far behind their hardware counterparts. Underlying all of these, however, are some very basic economic factors.

When IBM decided to open its PC architecture, it invited competitive third-party software and hardware vendors to make and sell whatever applications and accessories they could dream up. Of course, much of the PC's success is owed to this decision. But a large part of IBM's current headache in the PC market is also due to the open architecture. PC-compatible and clone manufacturers have achieved great success in the last 12 to 18 months at the expense of IBM's market share and bottom line.

At last count, there were more than 65 companies selling IBM-compatible PCs. This market is becoming more and more crowded every day. Vendors looking for a competitive advantage are bound to do one of two things: cut their prices or push the technological boundaries of the product they are selling. Hence, prices for low-end PCs are rapidly dropping below the $500 mark. Also, 386 PCs showed up as soon as the first chips passed final testing and began rolling off Intel's fabrication lines.

Operating system software for the PC environment is quite a different story, with Microsoft holding a quasi-monopoly. Of course, no one is required to buy or run MS-DOS on a PC. But who would choose to ignore the treasure trove of applications software available for MS-DOS? Not many people, judging by the relatively small success of Microsoft's Xenix and Unix compared with MS-DOS.

Is Microsoft the pirate ship of the PC industry? Quite the contrary. Operating systems development is not a trivial task, and Microsoft is hard at work on a new 386 version. But the fact remains that intense competition in the PC hardware arena has spurred development at a much faster rate than the progress of operating systems software.

However, the world is highly competitive. One would think that an MS-DOS alternative better suited to take advantage of underutilized hardware would start to win some converts. As it stands, there are several alternative systems or utilities that are vying to do just that.

The most obvious of these are the old standbys, Xenix and Unix. Along with the Compaq 386 announcement last September, Microsoft promised that a version of Xenix System V/386 would be available by the first quarter of 1987. AT&T's Unix port for the 386 is also scheduled for certification and delivery in the first quarter of this year. That is more than a year before the industry can expect to see delivery of MS-DOS for the 386.

Unix and Xenix, which is a superset of Unix System V, are both better suited than MS-DOS to take advantage of advanced features on the 386 processor. MS-DOS is essentially trying to grow out of the 8-bit environment in which it was spawned. In comparison, Unix was born and bred in a 32-bit minicomputer environment and has been moved down onto smaller processors. Support for a 32-bit instruction set, a large linear address space and virtual memory are inherent to Unix. This is not the case with MS-DOS. Major additions must still be grafted onto MS-DOS to take advantage of features not found in the more constrained environment of an 8-bit processor.

Progress in Xenix, Unix

The most often-heard complaint about both Xenix and Unix has been the lack of software available for general business applications. But there has been definitive progress here. There are now more than 2,000 general business applications programs running under Unix System V.

Assuming that a good portion of these applications get ported to 386 PCs, does that mean that users will begin jumping from MS-DOS to Unix? It is doubtful. Despite the technical advantages of Unix or Xenix in a 32-bit environment, there are still three strikes against Unix with the majority of PC users:

■ *Technical Sophistication.*

The average PC user is not an avid fan of technology. As a result, Unix is a hard sell for the typical PC user. Most do not care what operating system they are using, let alone the benefits of such arcane things as virtual memory or 32-bit instruction sets.

■ *Ease of Use.*

Beginning to use Unix is probably not a whole lot harder than beginning to use MS-DOS. Many MS-DOS users, however, think that Unix is significantly more difficult. The majority of users comfortable with MS-DOS will, therefore, be reluctant to invest time learning a new Unix operating system.

■ *Price.*

While a copy of MS-DOS costs about $85, a comparable Xenix license commands a price of approximately $500. Applications software in the Xenix and Unix arena is also typically higher priced than MS-DOS applications.

That brings us to the 80386's ability to create virtual environments running different operating systems simultaneously. The chip can run a single 286 or 386 operating system, along with several copies of 8086 operating systems, in what is called the virtual 86 mode. Virtual 86 mode effectively emulates several Intel 8086 computers running at once. That means that several copies of MS-DOS (Release 2.0 or 3.0) can be loaded into these virtual 86 machines, along with copies of existing MS-DOS applications. While the limitations of MS-DOS, such as the 640K-byte memory barrier, cannot be avoided with this scheme, it is a viable way to get protected multitasking capabilities with existing applications.

Several companies are working on software control programs for the virtual environment. Two firms that have won considerable attention for their MS-DOS and Unix integration on the 386 are Phoenix Technologies Ltd. and Locus Computing Corp.

Phoenix is famous for putting a prefabricated thorn in IBM's side by selling its PC-compatible read-only memory BIOS specifications. Now, in conjunction with Interactive Systems, Phoenix has announced the creation of a control program called VP/IX that permits 80386-based systems to run PC-compatible MS-DOS applications as a task under Unix. Interestingly, Phoenix has also signed an agreement with Microsoft to provide a similar VP/IX link between Xenix and MS-DOS. Locus has announced a similar product called Merge 386.

Both of these products maintain the multitasking and multiuser capabilities of Unix and allow file sharing between Unix and MS-DOS. A user may also invoke MS-DOS applications from within Unix and vice versa.

But both VP/IX and Locus's Merge 386 are products that will appeal to a relatively small proportion of users in the overall PC market. High-end PC users running computer-aided design or technical applications will be more apt to move toward Unix if access to old MS-DOS applications is guaranteed. With full-blown Unix available on an Intel-based system, some workstation users may also be tempted to move to a 386 PC if they get the added benefit of running MS-DOS software.

For the majority of single-user 386-based systems, however, the operating system of choice will almost certainly be MS-DOS. And, if that is the case, most of the 386 PCs bought in the next two years will struggle valiantly and wait for operating system software to catch up. ■

Roberts is a research analyst with International Data Corp., a market research firm based in Framingham, Mass. His research and consulting services focus on the effective use of PCs in office automation.

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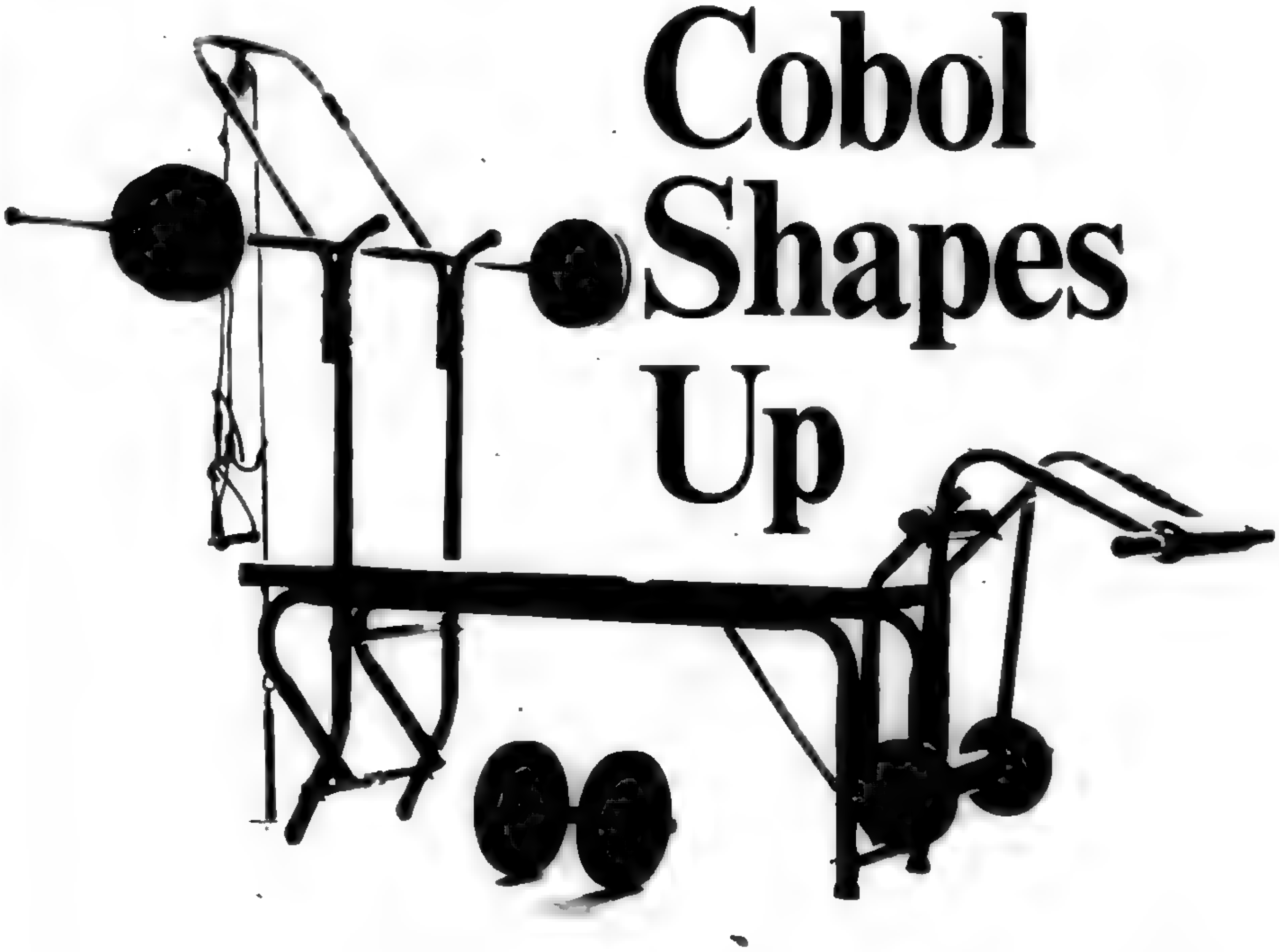

•BY•STAN•KOLODZIEJ•

For some time now, Cobol's detractors have been keen on painting the venerable computer language as an aging warrior ready to be retired.

Much to the chagrin and surprise of many, however, Cobol has been busy pumping iron to get back into shape. Cobol, in fact, is drawing on some major strengths to flex new muscle on several market fronts.

The critical mass of Cobol mainframe applications and the sheer numbers of programmers well versed in the language have swelled during the past 25 years. It has been estimated that more than 75% of existing mainframe applications have been written in Cobol. Supported by its widespread user base, Cobol has proven tenacious in resisting the change to fourth-generation languages, which appear to be the heirs apparent to Cobol and other third-generation languages.

Another factor adding to Cobol's punch comes from a growing supply of third-party software vendors that are busy streamlining all stages of Cobol's application life cycle, even catapulting the language onto the new breed of powerful microcomputers currently appearing on the market.

"I wouldn't call it a renaissance of Cobol," explains Larry Timmins, a research analyst at the Gartner Group, Inc. in Stamford, Conn. "Cobol never died. There are just so many Cobol applications out there that are keeping other languages from moving in, and the people who are making the big programming decisions are still Cobol based."

The increased activity in the Cobol marketplace has centered on two broad thrusts: restructuring the language and existing mainframe Cobol programs; and migrating Cobol's core building blocks to run on smaller processors, creating new Cobol applications away from centralized mainframe environments.

The first movement has its base in the work done by the American National Standards Institute (ANSI). ANSI's Cobol 74 standard was a step forward in making Cobol a more structured programming language over the preceding Cobol 68 standard. Another major leap in restructuring Cobol came recently with ANSI Cobol 85, a standard that offers further advances in Cobol code generation.

Using both Cobol 74 and 85 standards as touchstones, a number of software vendors, such as Peat, Marwick, Mitchell & Co. Catalyst Group with its Structured Retrofit, Language Technology, Inc. with its Recoder and IBM with its Cobol/SF, have in recent years carved out a growing client base by supplying Cobol retrofit packages to larger mainframe installations that are experiencing trouble upgrading older Cobol programs.

"These products basically use various scorecards to rate how structured the existing Cobol code is. Then the firms provide tools to get the programs up to what is deemed an acceptable structured Cobol level," Gartner Group's Timmins explains. "It's an interesting trend because it forms an incentive to get people to get their code up to some sort of structured snuff," he adds.

IBM also helped set the Cobol upgrade wheels in motion in December 1985 when it introduced VS Cobol II, the company's tipping of the hat to ANSI Cobol 85. Though VS Cobol II is an MVS Cobol compiler, it is not, however, fully certified, and IBM stopped short of using all of the programming enhancements laid out in Cobol 85.

Nonetheless, VS Cobol II has become a watershed of sorts for Cobol. It represents IBM's faith in Cobol 85 as an important base for future mainframe programming. It has also given a green light to third-party software developers to use VS Cobol II and Cobol 85 compatibility as perceived selling points in introducing new mainframe and micro Cobol compilers.

"When IBM began marketing VS Cobol II, that's when the new Cobol market started taking off," says Paul O'Grady, executive vice-president of sales for Micro Focus, Inc., a Palo Alto, Calif., developer of Cobol compilers for microcomputers. "It set the trend."

However, the new Cobol market has taken off slower than expected in the existing mainframe world. The same built-in inertia that has helped fend off the incursions of other languages has also proved a barrier to MIS converting en masse to Cobol 85.

"I would say the majority of mainframe sites are drifting over to Cobol 85," Timmins says, "but they certainly aren't hurrying."

In this conservative MIS climate, fourth-generation languages also have not fared well in their mission to convert old Cobol systems. Where fourth-generation languages *have* managed to make some inroads is within a small core of corporations willing to experiment with new system development.

The East Bay Municipal Utility District of Oakland, Calif., for example, developed a new materials management system using the Application Factory, a set of fourth-generation language modules from Cortex Corp. headquartered in Waltham, Mass.

According to Ross Mitchell, a Newtonville, Mass., consultant who is helping the utility develop the new system, East Bay was a solid Cobol shop until 1984. "It looked at bringing the [materials management] applications up in Cobol and figured it would require seven man-years to develop an on-line system," Mitchell says. "Developing the system in the fourth-generation language will take about 15 man-months."

Mitchell estimates the finished core applications will be made up of a total of 500,000 lines of code, an argument against those who malign fourth-generation languages as being unsuitable for large-scale application development.

"The changeover [to the fourth-generation system] has been good," explains Herman Nichols, East Bay's manager of purchasing and a user of the new system.

Cobol programming on micros is not a new phenomenon, but recent advances in microcomputer hardware and software are ready to break it wide open. The big push will come from the onrush of Intel Corp. 80386-based micros expected in 1987. The 32-bit architecture and increased speed of the 386 machines are naturals for programmers.

Another catalyst will be Microsoft Corp.'s 286 DOS operating system, which will take advantage of the protected-mode feature of the Intel 80286 and 80386 processors to overcome the inherent 640K-byte memory limitations of existing MS-DOS operating systems. These developments are promising to boost the micro a quantum leap into the realm of Cobol programming, making true off-loading of mainframe Cobol programming resources finally a reality.

"There are two forces driving the Cobol industry now," explains Micro Focus's O'Grady. "The first is ANSI Standard 85, and the other is the migration of application development from the mainframe to the micro. The latter has major ramifications for mainframe people. We've now reached the stage where you can run [Cobol] application code on micros and expect reasonable response time. The only limiting factor now is MS-DOS and that will soon disappear" with the arrival of 286 DOS, O'Grady adds.

> *'I wouldn't call it a renaissance of Cobol. Cobol never died.'*
>
> **— Larry Timmins**
> **Gartner Group, Inc.**

Vendors, scenting a new market opportunity, are jumping in with micro Cobol application software, most of which duplicates IBM's CICS programming environment. These packages typically use the same screens, commands and sequences familiar to CICS programmers. The reason the Cobol micro vendors are concentrating on CICS applications is simple: According to recent Gartner Group estimates, there are now more than 25,000 CICS user sites worldwide.

IBM, in its way, helped nudge this market along when it introduced Ez-Ed, an ISPF tool for Cobol applications development on IBM Personal Computers.

"It will take another year to establish the market for Cobol on micros," claims Steve Tryon, president of Alameda, Calif.-based MBP Software and Systems Technology, Inc., makers of Visual Cobol, a compiler for IBM PCs. "The 386 machines are going to give virtual address space, and with the extra processing speed and hard disk, full-fledged Cobol on micros will be here."

The verdict is starting to come in from the users of these micro Cobol systems. Becky Stedman, a consultant with J. T. S. Computer Services, Inc., located in Rochester, N.Y., helped some of Xerox Corp.'s Latin American divisions install Visual Cobol on PCs to write accounts receivable and general ledger applications.

"The applications are both developed and run on micros," Stedman explains. "The [Visual Cobol] package has some nice features such as a Shrink command and Mask editor. The applications aren't the fastest, but for our purposes they're fine." (The Mask editor is part of Visual Cobol's screen painting facility. The Shrink command is a utility for reducing the size of Execute files.)

David Howard, manager of Credit Coordination, Systems Group, at the Chase Manhattan Bank in New York, says the bank is using Visual Cobol to produce programs tracking credit authorization for commercial clients. "The whole purpose is to put the data entry out where the data is," Howard explains, "and take some of the load from our IBM 3090."

Howard has nothing but good things to say about Visual Cobol's screen management and debugging facilities, which he claims make program maintenance easier. His only complaint is that the compiling is slow. The bank plans on expanding its use of micro Cobol programming, developing applications to keep track of documents related to the credit transactions.

Wendy's International, Inc. of Dublin, Ohio, is a beta test site for Quicktask, a CICS applications development tool from Columbus, Ohio-based Goal Systems International, Inc.

"We're using it to develop everything from sales to payroll applications," explains Allan Huffman, director of Technical Systems at Wendy's head office. "Quicktask eliminates the need to know 95% of CICS programming knowledge. The system programs more like a batch application. You still have to understand some of the CICS logic, but not much."

Huffman says Quicktask has been great on the development side, pointing out the package's test debugging tools that enable programmers to check each instruction automatically and correct problems on the fly.

Ironically, this gradual off-loading of Cobol applications onto micros might pose yet another stumbling block for those fourth-generation language vendors trying to rebound from dedicated Cobol mainframe shops to the relatively new field of micro and end-user applications development.

"But it's not going to be an either/or situation at the micro level," claims Mike McCandless, telemarketing sales manager at Micro Focus. "Software developers are always looking for better ways of programming for business applications. That could include fourth-generation languages. We're not tied to Cobol."

McCandless claims that fourth-generation language-like tools have already been integrated into his firm's Cobol screen management facility. He adds that a series of Cobol code-generating tools, which simulate those already being used with fourth-generation languages, will soon appear on the market from several vendors. O'Grady adds: "We see Cobol as going way beyond classical applications. I can even see [Cobol] being used to write fourth-generation applications in the future."

The Gartner Group's Timmins agrees. "Cobol will begin interfacing with other languages. I think it will be crucial for Cobol to incorporate new code structures to keep up with developments in artificial intelligence. If it doesn't, another language will fill the gap and push ahead."

SQL as a starting point

Timmins says a good starting point is IBM's SQL. SQL has become a de facto interface standard between users and various data base management systems. Prior to SQL, every DBMS supplier used its own data base language, in effect forcing applications developers to learn a new language each time they built software for a new DBMS.

To date, there have been a number of micro SQL/Cobol products coming onto the market from such vendors as Informix Software, Inc. of Menlo Park, Calif., and Oracle Corp., located in Belmont, Calif. What these vendors provide are high-level tools to build applications in Cobol, allowing direct access of SQL data bases from Cobol programs without having to convert data types.

"SQL will eventually give users the ability to start sharing Cobol code," Timmins says. "When that happens, they will be able to isolate the logical part of programs and move them to different [processor] platforms to be worked on."

"In spite of all these activities within the Cobol market," explains Micro Focus's McCandless, "it's good to remember that Cobol is still a language for programmers. While all these Cobol improvements are aimed at hiking programmer productivity, they might also be clearing the path for fourth-generation languages to fulfill their destiny as programming tools for end users." ■

Kolodziej is Computerworld Focus *senior editor.*

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CIRCLE READER SERVICE NUMBER 220

TECHNOLOGY TRENDS

Magnificent Monsters, Fabulous Hybrids

Increasingly, MIS officers are being asked to join Unix and IBM's proprietary operating systems into a single supersystem.

BY MICHAEL TUCKER

Linking dissimilar operating systems in the same data network can be one of the greatest challenges for MIS managers and one that is becoming increasingly important. In particular, MIS is being asked to link Unix-based computers with IBM systems.

Given a choice, MIS would probably pick one operating system and stick with it. But, the single operating system option may no longer be the best choice for most large corporations. In this age of open systems, chief executives hunger for the freedom of multivendor solutions. But the reality of corporate computing is usually a collection of Unix systems from assorted sources more or less grafted onto an installed base of IBM mainframes, minicomputers and Personal Computers. MIS is then expected to make this hybrid work efficiently.

As a result, MIS is desperately seeking software that allows it to link Unix systems downward to PCs and upward to mainframes. Fortunately, products that allow Unix to be linked with Microsoft Corp.'s MS-DOS and to IBM's VM and MVS do exist today. Indeed, MIS officers can actually use such products to manage and control personal computers and multiuser micros that fall outside their traditional authority.

The problems of integrating Unix and IBM systems are, of course, actually part of the larger issue of open systems and communications standards. As the integration efforts of such projects as the Manufacturing Automation Protocol (MAP) and the Technical Office Protocol (TOP) eventually bear fruit, the number of Unix-to-IBM options open to MIS will increase beyond measure.

But we're not there yet. Indeed, when *Computerworld Focus* contacted Boeing Computer Services Co. and General Motors Corp. about Unix-to-IBM links under TOP and MAP, respectively, both pointedly declined to comment. Still, for at least some situations and some machines, products that join Unix to IBM systems are becoming almost commonplace.

The most obvious link of operating systems is, of course, the connection between Unix-based departmental systems and the MS-DOS-based personal computers on end users' desks. And, because it is the most obvious link, the market has produced quite a number of Unix-to-DOS bridge products.

MIS managers wishing to link PCs directly with Unix systems can exploit such products as Synchrony from Ann Arbor, Mich.-based Cosi, Inc. Synchrony allows a PC to operate as a terminal of a Unix system, provides file transfer between the two systems and permits the Unix system to execute MS-DOS programs on the PC. Synchrony is currently being remarketed by AT&T.

One Synchrony user is Bell South, a regional Bell operating company in Atlanta. Jim Tamburrino, Bell South's segment manager for purchasing, notes: "I'm using Synchrony in a multimachine environment where we've got dumb terminals on some desks and PCs on others. All of them hook into a Unix departmental machine for office automation. The departmental machine then hooks up to a corporate mainframe."

Basically, Tamburrino says, Bell South is using Synchrony as a terminal emulator. But, he adds, "It also lets me unload some of the drainage on the departmental OA system. For instance, it lets me get the heavy word processing users off the Unix machine and onto their own PCs."

For those MIS people who need to go further and blend the two operating systems on a single machine, a number of options are currently on the market. Among the most popular of these is Multisystem Merge from Locus Computing Corp. Multisystem Merge, composed of Merge 286 and Merge 386 products, is an inexpensive and relatively undemanding method of joining MS-DOS and Unix on PC AT-class machines. Multisystem Merge allows MS-DOS to run as a task under Unix. Files can be transferred between the two with relative ease, and as such, a Merge-equipped machine can function as a gateway between a PC local-area network (LAN) and larger Unix systems.

AT&T is one of several firms currently reselling the product. The company's PC 6300 Plus, for instance, contains the product as

OS/Merge. But, Multisystem Merge's real future may be in still larger machines. At Comdex/Fall '86, Locus introduced Merge 386 for microcomputers based on the Intel Corp. 80386 processor. If, as some analysts suggest, 386 machines show up with increasing frequency as servers within PC networks, then products like Merge 386 could make MS-DOS-to-Unix links mundane.

However common the MS-DOS-to-Unix merger may become, wedding Unix to IBM's proprietary operating systems is bound to be a union with a bit more pomp and circumstance. In fact, the necessary vows can be restrictive and expensive.

Common Unix/IBM hybrid

Still, options do exist for networking Unix machines to IBM mainframes, and some MIS officers are finding such links useful in solving otherwise very thorny micro-to-mainframe problems. Indeed, the single most common manifestation of a Unix/IBM hybrid is probably where Unix-based multiuser micros (of the Personal Computer AT-class or above) are linking upward to IBM mainframes.

For example, Zellers, Inc., a Montreal-based department store chain, recently invested heavily in a mixed network connecting its 210 stores with a corporate IBM mainframe. The underlying physical reality of Zellers' problems was that each of the stores contained a collection of either IBM or NCR Corp. point-of-sale systems that had to communicate with a file-serving AT-class micro. The micro, in turn, then had to communicate with the corporate IBM mainframe in Montreal as well as perform bookkeeping and accounting operations for the local concern.

The micro's operating system thus had to be both multitasking and compatible with IBM's communications protocols. "If there had been a multiuser [MS-DOS] available, we would have gone with it," notes Terry Moore, Zellers' vice-president of information services. "We needed multitasking, and there wasn't a multitasking [MS-DOS] on the market. We really didn't have any choice."

So, Zellers went with Microsoft's Unix-derived Xenix for the PC ATs. Its suppliers were AW Computer Systems, Inc. of Mount Laurel, N.J., which did both hardware and software work, and the Santa Cruz Operation, Inc., which contributed Xenix and the Unipath SNA-3270 mainframe communications package, an IBM Systems Network Architecture (SNA) implementation.

Zellers now has its AT-based system up and running. The company is, in fact, planning to eventually install a second Xenix-based AT at each store. The second system would link to the first via a LAN to provide fault-tolerance functions. It would also relieve the first system of day-to-day accounting and bookkeeping chores. To make it possible for each store manager to do those accounting tasks on the local machine, Zellers is looking at Xenix-based Lotus Development Corp. 1-2-3 work-alikes.

When Zellers purchased an SNA implementation from the Santa Cruz Operation, it also picked a side in an ongoing debate — a debate that significantly affects the business of linking IBM systems with larger Unix machines.

Everyone agrees that discovering a standard communications protocol for Unix and IBM machines is the ticket to success. The arguments start on who should be doing the work. As a rough division, the two camps are composed of those who feel that Unix machines must take on an SNA protocol and those who feel that IBM users must install a bit of the Transmission Control Protocol/Internet Protocol (TCP/IP), Unix's standard file transfer and electronic mail facility.

Simply because of Big Blue's power, the SNA camp has the clear advantage in terms of numbers. Good SNA implementations for Unix machines are available from several sources. For example, Systems Strategies, Inc., located in New York, markets a number of communications products with the general heading of CSNA. Written in C, these provide varying degrees of SNA functionality. The most complete is CSNA/LU6.2, which is a full implementation of IBM's LU6.2 protocol.

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in the SNA game is Communications Solutions, Inc. of San Jose, Calif. The firm has been a supplier of IBM communications facilities since 1979.

In November 1985, Communications Solutions introduced Access/SNADS, a Unix-based implementation of IBM's SNA Distribution Services (SNADS) architecture. A SNADS product provides for data management within an SNA communications environment.

But, at the moment, the fraternity of SNADS sellers is a very limited club. As of 1986, even IBM was not a member.

Meanwhile, if SNA has the advantage of a Big Blue blessing, then TCP/IP has the moral fiber that comes from a dedicated user group. Because it has been around a long time, because whole generations of programmers have learned to use it and because the federal government and the U.S. military have both supported it, TCP/IP has emerged as a respectable alternative method of linking Unix and IBM systems.

One TCP/IP proponent is Stephen Tolchin, technical director of operational and clinical systems of Baltimore-based Johns Hopkins Hospital. Recently, Tolchin faced the quintessential MIS problem: "We had a collection of machines that didn't talk to one another very well," he says. His firm has 10 Digital Equipment Corp. PDP-11s, two Unix-based supermicros and two IBM mainframes.

Hardware homogeneity was out of the question. "Buy IBM?" Tolchin scoffs. "The 10 PDP-11s are owned by 10 different, independent departments. You're just not going to tell them what to do." And, software homogeneity was no more likely. "The data base management system people would like to have you go out and buy their product and put it in everything from micros to mainframes. But you can't do that. You've got existing applications that you're just not going to sacrifice," Tolchin says.

So, Tolchin set out to create a bridge between his diverse machines and operating systems. First, he produced a distributed application using the Ingres DBMS from Relational Technology, Inc. of Alameda, Calif. Second, he implemented TCP/IP on his mainframes. "Our goal," he says, "is to make the IBM mainframe a network citizen under TCP/IP. . . . It seemed better to teach it TCP/IP than make every other machine in the network talk SNA."

So, Unix and IBM hybrids are possible. But they are monsters of a sort, not because they are destructive but because they are unusual. The question, though, is whether MIS people should bother with these creatures.

The answer may be back at Zellers, with its Xenix-based ATs managing networks of intelligent cash registers.

The Zellers system presents an interesting kicker. Unix here is playing its traditional role of departmental operating system. It is managing groups of single-user systems and providing gateways into the corporate mainframe. But, it is also acting as the operating system of a very *personal* computer. The firm's ATs are essentially acting as MS-DOS systems, except that they have Unix's multitasking and communications facilities.

Thus, they provide MIS officers with rather good evidence that, at least as far as corporate data processing networks are concerned, Unix's real role may actually be that of a personal operating system for single-user machines. This means that espousing Unix as the PC operating system of choice could have significant advantages for MIS directors — both in terms of technology and politics.

> ”
>
> *If SNA has the advantage of a Big Blue blessing, then TCP/IP has the moral fiber that comes from a dedicated user group.*

In technology, the advantage of Unix is that it fits what seems to be the historical pattern of PC evolution. It provides multitasking and multiuser functionality at a time when Microsoft has proved reluctant to add those characteristics to MS-DOS. Unix is also capable of exploiting the full potential of 32-bit systems based on the Intel 80386 microprocessor, which MS-DOS clearly is not.

But, it is in terms of the politics that Unix and Unix/IBM hybrids could be most useful to MIS. No one doubts that micros and mainframes will ultimately be integrated. MIS has much to lose or gain on how that integration comes about. If the links grow from below, from micro managers and their PCs, then the profession of MIS will once more find itself forced to become a client, adapting its mainframes and its data to fit the requirements of desktop systems.

If, on the other hand, MIS officers establish the links themselves, then they could find themselves in a strong position. And, hybrids could be their weapon. By aggressively selling Unix to end users as a technically superior alternative to MS-DOS while making certain that Unix desktops are tightly integrated into hybrid data networks, MIS officers can undercut the power of MS-DOS-based, stand-alone machines. They might, finally, bring the management and managers of micros and PCs under their own authority. ■

Tucker is Computerworld Focus *features editor.*

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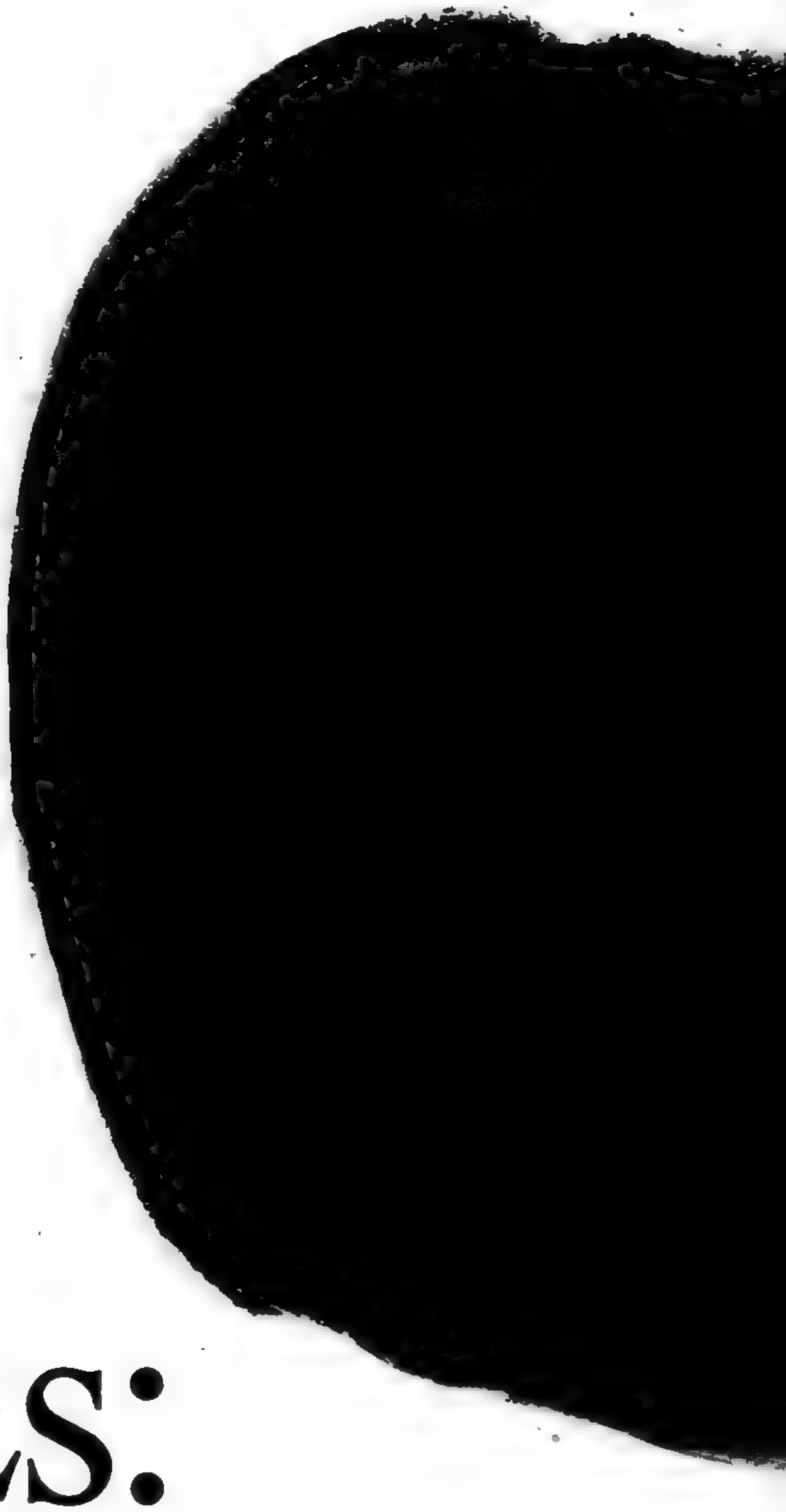
PRODUCT INSIGHT



DBMS And 4GLs:

• BY • REBECCA • HURST •

PAUL SCHULENBURG

Comparing data base management systems and fourth-generation languages (4GL) is not as easy as comparing apples and oranges. Most DBMS and 4GLs were introduced in the mid-1970s as separate products. But unlike apples and oranges, they have since begun merging into a new hybrid. Consequently, many DP and MIS professionals find that their attempts to distinguish between the products are confusing at best.

Many DBMS systems and 4GLs can serve overlapping functions, but they are not entirely interchangeable. As a result, the DP professional looking for the right software often walks a tightrope. The 4GL-based products may not meet a corporation's needs for complex file structures, backup and recovery. The DBMS may be overkill for companies or departments that require simple data filing systems.

First there were DBMS systems and 4GLs, but DP and MIS managers with DBMS wanted an easier way to create data base files and applications. Language vendors responded by providing interfaces to popular data bases and by adding data base functions to their 4GL products. Spurred by the success of the 4GL companies that provided DBMS interfaces, data base vendors began introducing their own 4GLs.

In fact, several vendors surveyed by *Computerworld Focus* indicated that they offer hybrid products. Since the 1970s, firms such as Information Builders, Inc. and D&B Computing Services Co. have marketed software products that combine a 4GL with data base management capabilities. These products have become more DBMS-like during the years, analysts agree. Still, these tools also work with traditional DBMS such as Datacom/DB from Applied Data Research, Inc. and IDMS/R from Cullinet Software, Inc.

In turn, vendors that primarily supply traditional DBMS indicate that they have introduced 4GLs or even combination DBMS/4GL products. For example, ADS/Online is Cullinet's 4GL offering. Products such as Unify Corp.'s

Splitting The Difference

Accel resemble combination offerings such as Information Builder's Focus and D&B's Nomad2. Then, too, firms such as Informix Software, Inc. provide 4GLs layered on top of their data base engines.

Many of the resulting products look perplexedly similar, and marking their differences and optimal uses has been a problem for users and vendors alike. The confusion is a vicious circle, according to Tom Melchiorre, a software analyst at Datapro Research Corp. in Delran, N.J. "Vendors aren't quite sure where they are going, so they're trying to cover all the markets," Melchiorre explains. "Customers aren't sure whether a 4GL is a language or a 4GL DBMS."

However, there are distinct characteristics between 4GLs and DBMS, several analysts agree. By using these to identify the products and their strengths, DP managers can examine which type of software is most likely to meet their needs.

In defining programming languages, many analysts eschew the term "fourth generation." Some languages are more fourth generation than others, Melchiorre says. According to Shaku Atre, president of Atre Consultants in Rye, N.Y., no true 4GL yet exists. However, like Melchiorre, Atre says she believes that some languages have more fourth-generation qualities than others, and she has devised a point scale running between 3.0 and 4.0 to explain how closely products approach a fourth-generation status.

Beginning with the general premise that languages like Cobol and PL/I represent third-generation technology, Atre rates the on-line application development language for IBM's IMS data base a 3.25. Software AG of North America, Inc.'s Natural, Applied Data Research, Inc.'s Ideal and Cincom Systems, Inc.'s Mantis fall into the 3.5 group of languages. Products such as On-Line Software International, Inc. Ramis II, Information Builders Focus and D&B Computing Nomad2, often referred to as 4GL data bases, are part of the 3.75 language group, Atre says.

One quality of most 4GLs is that they take on the characteristics of data bases. Even so, 4GLs are still languages, analysts agree. "The emphasis of 4GLs is on manipulating language," explains Herb Gepner, a senior associate at Datapro. A 4GL is a language processor that interprets English language statements into commands.

Because of their power, 4GLs can also be used to create files that can be grouped into meaningful conglomerates. By contrast, Gepner says, the emphasis of a DBMS is on data structure. "It has much more powerful manipulative capabilities that can handle extremely large, structured data bases."

To clarify whether a product is a DBMS or a language, Atre has devised the following nine-point checklist. If a product fails to meet all of the list's criteria, it is not a full data base management system, she maintains.

A DBMS must have a data model, which provides the underlying structure of the system.

A DBMS must have the ability to create physical files.

A DBMS must have a data definition language (DDL). The DDL describes the data in a language that the DBMS will understand.

A DBMS must have a data manipulation language (DML). A DML manipulates the physical files of data within the data base.

A DBMS must have a data control language (DCL). The DCL describes backup and recovery for the DBMS if it should go down during transmission or in the middle of a program.

A DBMS must have system installation capabilities, which include recovery, restart, space redundancy and reorganization.

A DBMS must have the ability to program in the host language.

A DBMS must perform data communications. Data communications is important for data transfer to a DBMS that resides on another computer. One form of communications is CICS, which manages terminal and transmission line access.

A DBMS must have a data dictionary or directory. The data dictionary or directory is similar to a road map in the DBMS, Atre says. It checks authorization and records file updates.

The areas in which combination DBMS and 4GL products such as Focus, Nomad2 and Ramis II are weak are the data dictionary or directory and system installation, according to Atre. Therefore, she asserts, they are not full DBMS.

System installation, in particular, is a critical element. "Without some kind of recovery and backup, the best data base management system is useless," she maintains. "What good is a data base if it's not up and running?"

More important than the characteristics that define DBMS and 4GLs are the types of solutions that the products provide. However, it is difficult to identify solutions without defining the needs that they address. "When customers consider a DBMS or 4GL, they have to ask what the needs of their operations are," Datapro's Melchiorre says.

MIS must assess needs of end users

MIS needs to look at its end users and the way they handle data, according to Anita Massey, product manager at Unify. "People will assume they're out for a high-performance product, but they'll base their decision on how fast an SQL query command is executed," she says. However, a query has to be performed in context. "If 60 users will be running data base applications at the same time," Masey explains, "the product should be tested under similar conditions."

To help MIS professionals assess their needs, Unify has printed an outline of criteria that fall into four categories: user description, data description, applications and system requirements. Under user description, companies should consider the types of users who will use the system and how they will access it, the number of users, the degree of data sharing and unscheduled use anticipated, response time and data access and control.

With regard to data description, MIS or DP managers should question both the present and future volume of data to be handled, the viability of the data structure and items, the quality and timeliness of the data, the sensitivity of data loss or damage and the transaction rates.

In the area of applications, users should look at the language they plan to use, the product's documentation and the portability of the software. Finally, in terms of system requirements, managers should consider the available memory, system administration, any disruptions in service, the cost of the system and the installation time. By analyzing these various requirements, Massey suggests, it will be harder to be swept away by individual product features.

While DBMS and 4GLs do not fit neatly into categories, there are some general ways in which these products address the requirements of various user environments.

The power of a DBMS is optimized for a production environment in which data integrity is critical and there are hundreds of thousands of transactions per day, Atre says. Melchiorre concurs, but he adds that the best software environment is one in which the applications are well defined and relatively unchanging.

The software best suited for DBMS includes those applications that serve as the nucleus of the organization, according to Ed Acly, a senior software analyst at International Data Corp., located in Framingham, Mass. These include programs such as accounts payable, accounts receivable and order entry.

However, using a DBMS in some environments is like shooting a moose with an elephant gun, Datapro's Gepner says. For companies or departments with simple data management requirements, a 4GL may provide all the necessary capabilities. A 4GL also has the flexibility to handle the personal or temporary application requirements of a dynamic office with changing conditions, Melchiorre suggests. In addition, corporations often use a 4GL and DBMS together to provide complementary functions.

Whether a manager is planning to purchase a DBMS, a 4GL or both, it is important to recognize that these products were not designed to be used extensively by end users. The best 4GLs are application developer friendly, Atre explains. Tools such as Informix Software's Informix-4GL were designed for application builders, according to Laura King, Informix vice-president. Even though fourth-generation products have friendlier interfaces, they are still designed for programmers, not end users, she says.

Although 4GLs were designed to enhance programmers' productivity, many favor third-generation languages to develop DBMS applications. "Fourth-generation languages eat up computing resources," Datapro's Melchiorre claims. Technical users and programmers will often bypass menus and simple English instructions and go to simple command codes, he says.

'I haven't written one line of C'

Other programmers like Mark Sobell, president of Sobell Associates, an application consulting firm in Palo Alto, Calif., argue that 4GLs can be used with a DBMS without degrading the speed of the system. It is also possible to write applications using a 4GL without turning to a third-generation language for subroutines, says Sobell, who has been developing applications for clients with Informix-4GL for 1½ years. "In that time," he says, "I haven't written one line of C code."

As a result of his experience with combination DBMS/4GLs, Sobell also questions the distinctions people are attempting to place between DBMS and 4GLs. "Any application can benefit from a fourth-generation language," he asserts. "You can do software prototyping, or you can build a production-quality application. There's no reason to go back to a DBMS."

DBMS and 4GLs have taken on many of each other's characteristics, Melchiorre agrees. But while that trend will continue, vendors will continue to offer separate products to DP and MIS professionals. "The fact is that some people will want a 4GL in their DBMS, and some people will not." F

Hurst is a Computerworld Focus *senior writer.*

The Secret Of A Successful DBMS: A Blend Of Technology, Management Issues

Data processing managers planning to purchase a data base management system may feel they need a scorecard to track the many available products. However, managers are more likely to succeed if they go beyond product details and ask how the DBMS will fit into their corporate game plan.

The use of one particular DBMS product over another does not affect the success of a user installation, concluded a report from International Data Corp. (IDC) of Framingham, Mass. All the systems had their share of successful and less than successful users. But, while the quality of the DBMS is not a strong factor, the number of DBMS systems is.

The most successful users surveyed by IDC reported a preference for using a single set of data bases for both production and information center processing.

System development tools key

Other factors that had an impact included the techniques and tools used in system development and the resources used to integrate a DBMS system into the work environment.

The most effective organizations made a markedly greater use of fourth-generation languages and application generators, while less successful ones made heavier use of third-generation languages, the study said. Notably, the troubled installations reported an inability to deliver affordable, flexible applications that meet users' requirements.

The implication is that more successful in-house developers may be spending fewer corporate hours and dollars developing applications. Consequently, they may also have more time to address backlogged requests for more job-specific software.

Application development techniques also affect how successfully a DBMS is used. The effective organizations used prototyping more frequently than did less effective companies. Other popular techniques among all survey respondents included stuctured analysis, design and programming and quality assurance testing. The use of these older techniques overshadowed the use of newer approaches such as process and function modeling and data modeling and analysis, IDC reported.

The IDC study also noted several management issues that contributed to winning DBMS installations. Among more successful organizations, senior management was more committed to finding an effective data management solution, and the data processing budget constituted a larger percentage of the total revenue. In fact, the IDC survey revealed a consistent correlation between the revenue spent on DP and the relative effectiveness of DBMS installations.

Devote more staff to development

In addition, the most successful companies devoted a substantially greater percentage of their MIS or DP staff to applications development.

Finally, the most effective organizations reported that they have been able to make information available on a responsive basis to all classes of users. They have also reported the ability to provide enhanced data security and privacy.

However, even these successful companies have not been able to provide all the answers. Both they and their less successful counterparts reported political problems that stemmed from users having to relinquish ownership of their data.

— Rebecca Hurst

SPECIAL SECTION: UNIX

Blending MS-DOS And Unix

DAVE RIDLEY

•BY•PHILIP•J.•GILL•

The new wave of microprocessors has left in its wake added power in personal computer hardware. Many PCs are unable to take advantage of these more powerful chips because of limitations in today's standard operating systems. MIS and users must look for a solution to bring the force of the new generation of PCs to desktops.

The operating system level is ripe for change. The first version of Microsoft Corp.'s MS-DOS was essentially an upwardly compatible, 16-bit version of Digital Research, Inc.'s CP/M, the de facto standard operating system for 8-bit microcomputers. That was good for the first IBM Personal Computer, based on the Intel Corp. 8088 8-bit chip that looked and performed like a 16-bit machine.

However, more powerful members of Intel's chip family have pushed the power of hardware far beyond the capabilities of MS-DOS. New operating system features are required to harness that power. This is especially true of the recent wave of Intel 80386-based machines, the first of which, the Compaq Computer Corp. Deskpro 386, was joined by almost 20 other products at Comdex/Fall '86 in Las Vegas.

For the time being, many of these vendors are planning to offer Microsoft's Xenix System V, an enhanced version of AT&T's Unix System V. These companies need the Xenix option because they realize that the benefits of running MS-DOS on a 386-based machine are dubious. Moreover, MS-DOS is incapable in its current form of taking advantage of some of the advanced hardware features of the 386, such as extended real and virtual memory and virtual 8086 modes. In short, there is a strategic and, some might say, critical, operating system gap between current-generation PCs based on 8088 and 80286 chips and next-generation PCs based on the 386 chip.

Unix is not without its drawbacks — it does not run any popular PC-based applications software programs such as Lotus Development Corp. 1-2-3, Microsoft Word and Multiplan and more. It is, however, fully capable of taking advantage of some of the very same 386 features MS-DOS is not, such as large memories, both real and imagined (or virtual).

There is a third option, one that is gaining more and more credence every day. That is, why not unite MS-DOS and Unix into a single operating environment?

Such a merger seems natural. After all, each offers many of the capabilities that the other sorely lacks. From its inception, MS-DOS was and is a fairly base-level, single-user, single-tasking operating system for PCs. In contrast, Unix was intended from the start to be multiuser and multitasking with strong integrated networking capabilities.

The first products that sought to marry the MS-DOS and Unix worlds came on the market long before the Intel 386 chip, before even the general availability of PC AT clones based on the 286 microprocessor. In large part, these products were part of an offensive strategy, a means of positioning Unix systems as coexisting rather than rivaling MS-DOS systems while opening up new horizons to MS-DOS users — more powerful processors, more main memory, larger disk capacities, networking, file and disk sharing and electronic mail between previously stand-alone systems. In other words, some clever marketeers had devised a way they thought they could sneak Unix systems in through the back door.

These earliest MS-DOS-to-Unix bridge products keyed in on one strategic flaw in the PC market: the lack of viable networking standards and options. The earliest MS-DOS/Unix bridge products, which began appearing in the early '80s, sought to tie stand-alone PCs together in star-like, local-area networks (LAN) in which either a Unix-based supermicro or mini served as a central file server. Not a bad positioning, considering the confused and uncertain state of PC networks at the time. Many users hesitated to commit to these products even though they needed to share data and expensive peripherals between individual PC users.

These MS-DOS-to-Unix bridge products offered very basic capabilities, such as permitting PCs to act as intelligent terminals to Unix-based supermicros and allowing them to use the multitasking, multiuser and communications capabilities of the Unix-based supermicros. In addition, the offerings served as central points for communicating with other PC users that might also be attached as well as with those users who merely had a dumb terminal on the Unix system.

> *It is Unix users who want access to MS-DOS applications and not MS-DOS users that want multitasking who are driving the MS-DOS/Unix merger.*

Among the first of these products was Touchstone Software Corp.'s The Connectables, which includes both PCworks, PC-based software, and Unihost, Unix-based software. The Connectables also allows IBM PCs and Apple Computer, Inc. Macintoshes, through a third product called Macline, to serve as workstations to a Unix-based host. Working together, the PCworks and Unihost software provide for file transfers from the PC workstation to the Unix host and vice versa as well as for E-mail and Digital Equipment Corp. VT52 and VT100 terminal emulation. Actual processing can be distributed between the PC or the host system. When operating in this mode, the Unix system performs I/O for the PC.

Locus Computing Corp. is another early pioneer in the MS-DOS-to-Unix bridge product arena. Today, however, it is probably best known for its work on what are considered to be the most sophisticated MS-DOS/Unix products available, Merge 286 and Merge 386, which enable MS-DOS applications to run as tasks under a Unix System V host operating system.

Locus started out a few years ago to build a much less ambitious, though still technically intriguing, bridge product that sought to marry MS-DOS workstations and Unix hosts in a LAN environment. It did so quite successfully with a product now called the PC Interface. The Santa Monica, Calif.-based software house says that its OEMs have sold more than 100,000 copies.

Like The Connectables, PC Interface entails both MS-DOS-based workstation software and Unix-based host software. Unlike The Connectables, which offers a direct connect between PCs and Unix hosts, the PC Interface software components work in tandem over a LAN, usually an Ethernet LAN. To the MS-DOS-based workstation, PC Interface software makes the Unix host look like a very large disk drive. Applications are processed locally on the PC, though PC applications can take data from either the local disk or the larger Unix system disks.

A third early MS-DOS-to-Unix bridge product was Synchrony, from Cosi, Inc. of Ann Arbor, Mich. Synchrony makes a PC look like a DEC VT52 or VT100, IBM 3101 or Tektronix, Inc. 4010 graphics terminal to a Unix host.

One of the sophisticated features of Synchrony is that even when a user is logged on to his PC as a Unix terminal, MS-DOS commands can still be executed through special commands. In addition, the user can direct program output from host to PC or PC to host and can also direct the host to run a program on a PC other than the one from which the command originated.

The Santa Cruz Operation, Inc.'s Xenix-Net is not strictly an MS-DOS-to-Unix bridge product in the same way the first three are. In fact, it is really a networking product, based on a prepackaged version of Microsoft's Networks for Xenix product that permits both MS-DOS-based PCs and Xenix-based microcomputers to work together and communicate with each other over a LAN.

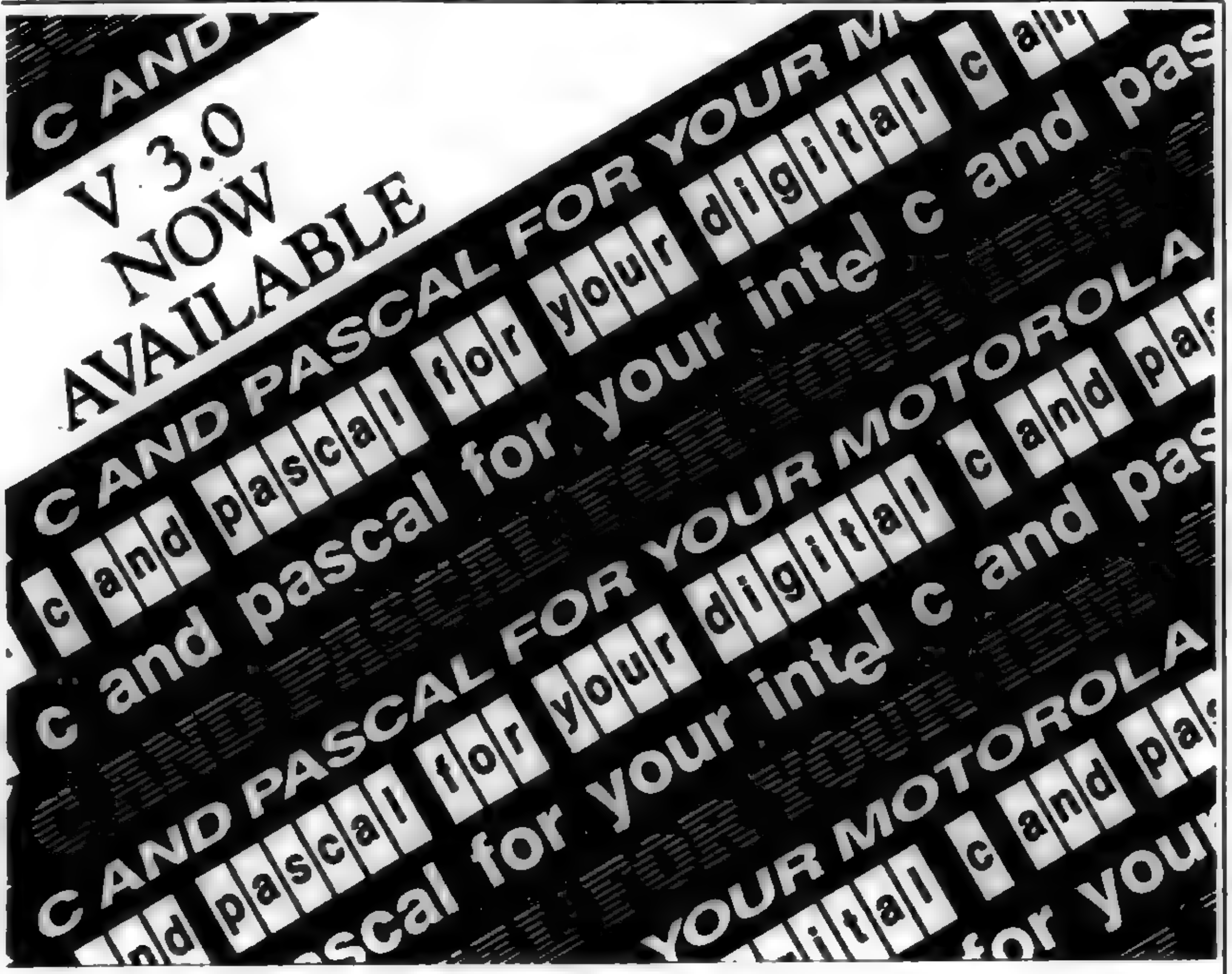
One of the major, substantive differences between Xenix-Net and the other products is that it has a distributed file system that integrates all Xenix and MS-DOS servers on the network into a single system, according to the Santa Cruz, Calif.-based firm. The earlier bridge products merely link MS-DOS and Unix systems together for sharing resources, processing power and, occasionally, E-mail. File systems are not integrated in any way.

Xenix-Net is probably a logical solution for users who are hesitating to commit to either a PC LAN or a multiuser Unix system as a departmental computing solution. It enables users to have both, without having to choose one or the other.

MS-DOS and Unix at the desktop

The earlier MS-DOS-to-Unix products were good as far as they went, though they fell short of the ultimate goal of integrating the MS-DOS and Unix worlds into a single environment. That task has been left for what might be called second-generation MS-DOS/Unix merger products.

In general, these second-generation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CIRCLE READER SERVICE NUMBER 211

MS-DOS/Unix merger products aim to do considerably more than permit MS-DOS-based PCs to serve as network workstations attached either directly or across a LAN to Unix-based hosts. Indeed, these products provide an integrated MS-DOS/Unix environment in a single desktop workstation in which the facilities of both operating systems are available to the user even though they share a single, common, integrated file system.

Locus Computing's Merge 286 is marketed by AT&T as the Simul-Task facility for its PC 6300 Plus. Simul-Task was developed jointly by Locus and AT&T and includes some AT&T proprietary hardware. The Merge 286 software, however, is available to other OEMs directly through Locus.

Merge 286 and its newer sibling, Merge 386, provide for the concurrent operation of MS-DOS and Unix on a single 286-based or 386-based workstation, respectively. The Merge products present either a Unix or MS-DOS environment to the user. Regardless, both environments share a single, unified file system so files can be called up transparently from either mode. The Merge products enable users to run one or more MS-DOS applications as though they were Unix processes.

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> *Ultimately, however, something totally new — neither Unix nor MS-DOS — will have to emerge.*

According to Mike Lewis, marketing manager for Locus, the major difference between Merge 286 and Merge 386 is that Merge 386 allows users to run multiple MS-DOS applications concurrently at both the console and remote terminals. With the 286 version, MS-DOS applications could only run at the console terminal.

Lewis says that current OEMs for the Merge 286 products include AT&T and Microport Corp., a Unix porting house in Santa Cruz. No OEMs for Merge 386 have been announced. Merge 386 is scheduled to ship by year's end.

Loeus is not alone in its endeavors. Currently, it has competition coming from VP/IX 86, an outgrowth of a joint development agreement signed last fall between Interactive Systems Corp., a Santa Monica Unix porting house, and Phoenix Technologies Ltd. of Norwood, Mass., a PC read-only memory BIOS firm.

VP/IX provides essentially the same capabilities as the Locus products except that a version will be available for the Xenix/386 operating system, according to a recently signed agreement between Microsoft and Phoenix. This pact, according to a Phoenix spokesman, will give VP/IX access to the largest body of users in the Unix community. Xenix is by far the preferred version of Unix on microcomputers.

The spokesman adds that it is Unix users who want access to MS-DOS applications and not MS-DOS users that want multitasking who are driving the MS-DOS/Unix merger. He says some MS-DOS users will buy VP/IX, but only those "who can't wait for IBM and Microsoft."

Some people, however, might disagree with the spokesman's assessment. Clare Fleig, director systems research at International Technology Group of Los Altos, Calif., says that many people simply don't realize that the 286 and 386 chips are incompatible with each other — the result of fundamental architectural differences between the 16-bit 286 and the 32-bit 386.

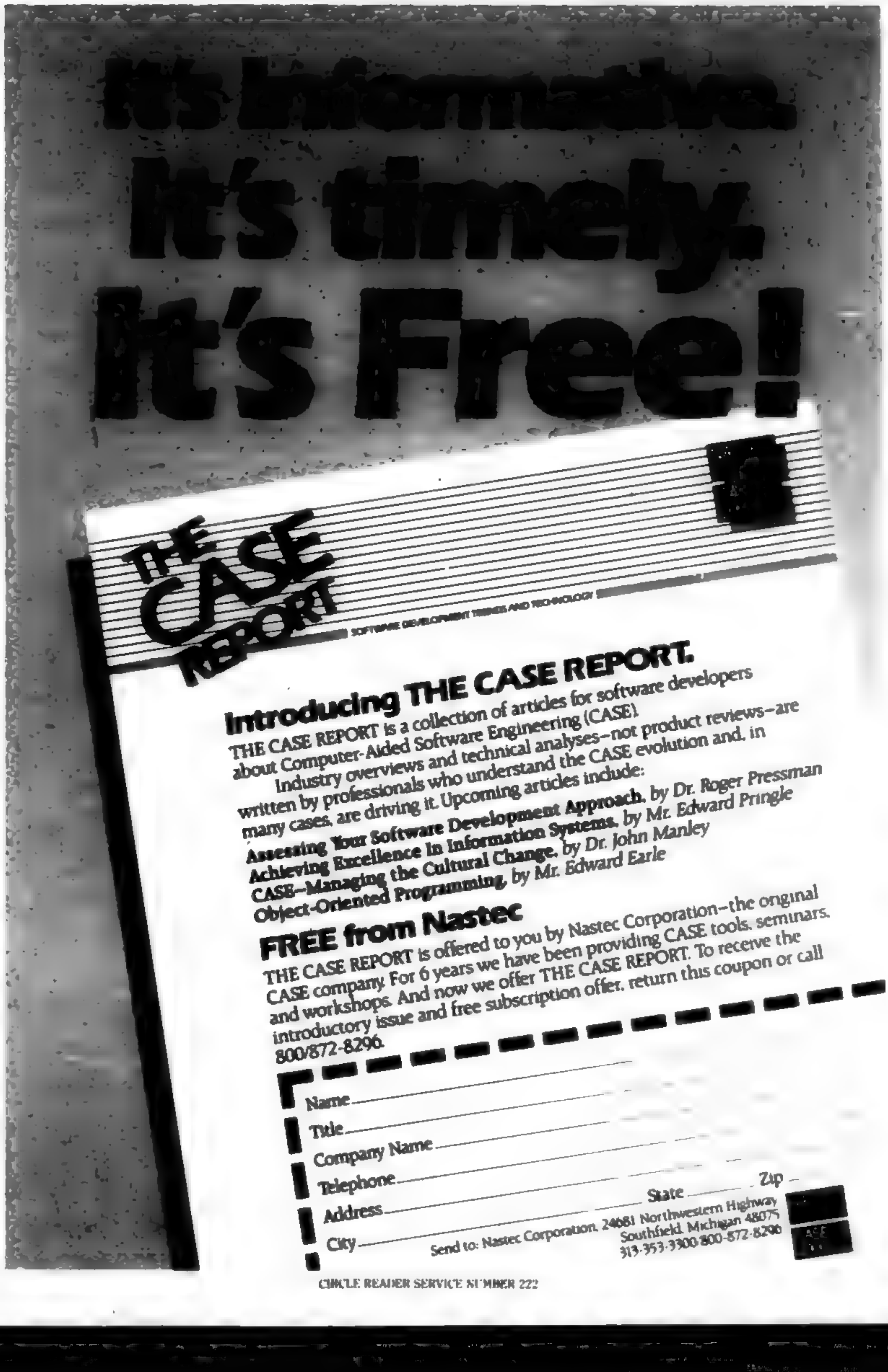
For Fleig, further convergence of the two operating systems is not only a probability but a necessity brought on by the features and requirements of the 386's 32-bit architecture. Fleig says an assessment she has made of future operating system requirements for 386-based micros has identified six critical features the new operating system must do well. The systems must be single user, multiuser, multitasking and have 32-bit memory management, networking and dual operating system support.

Unix/MS-DOS an interim solution

Of these six features, Unix/Xenix excels at four, according to Fleig's summation — multiuser, multitasking, 32-bit memory management and networking. MS-DOS, on the other hand, excels at only three — single user, multitasking (via Microsoft Windows or another upcoming enhancements) and networking. Fleig says both fall far short of the ultimate market requirements. In the meantime, Fleig suggests that Unix/MS-DOS may well be a viable interim solution for many users.

Ultimately, however, something totally new — neither Unix nor DOS — will have to emerge. "There has to be a new option," she maintains. "It can be called MS-DOS 230, but it's not going to be MS-DOS as we know it." And the same applies to the Unix side as well. "The new operating system will undoubtedly have Unix flavoring," she adds, but it will not be the Unix of today. ■

Gill, a seven-year veteran of computer journalism, is the former editor in chief of Unix/World Magazine. *He is currently a free-lance writer based in San Mateo, Calif.*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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

SPECIAL SECTION: UNIX

The Move To Fault Tolerance

DAVE RIDLEY

• BY • ANNE • LOVETT •

"Now that the world relies on computers, it needs computers to rely on," quip proponents of fault-tolerant systems. In the last 20 years, user expectations of computers have increased. Batch processing used to meet most users' needs, but the advent of enhanced communications and the accompanying "Instant Information Age" have created a large market for on-line transaction processing (OLTP). In turn, the increasing need for instantaneous data integrity in OLTP has spawned the need for fault-tolerant systems.

Currently, a surprisingly small percentage of OLTP needs are fulfilled by fault-tolerant systems. Of an OLTP market estimated by many at $30 billion annually, only 5% to 10% has been captured by the fault-tolerant vendors; the rest belongs to traditional hardware vendors such as IBM, Digital Equipment Corp. and Prime Computer, Inc. Of the approximately $2.5 billion to $3 billion fault-tolerant market, a reported $1 billion belongs to the fault-tolerant hardware vendors — Tandem Computers, Inc., Stratus Computer, Inc., Tolerant Systems, Inc., Sequoia Systems, Inc. and others.

The remaining $1.5 billion to $2 billion is attributed to systems houses and value-added resellers (VAR), which are enhancing fault-tolerant machines and even creating new fault-tolerant machines by pairing computers such as DEC PDP-11s and writing custom software.

Have user demands of vendor independence guided the OLTP and fault-tolerant markets solidly to Unix? Not exactly. Of the $1 billion hardware vendor segment of the fault-tolerant market, an estimated 9% to 12%, or $90 million to $120 million, belongs to Unix fault-tolerant vendors. This represents 0.3% to 0.4% of the total OLTP market.

To determine the suitability or viability of Unix in fault-tolerant systems, first consider the attributes and uses of fault-tolerant computers. These computers were designed with redundant hardware, which provides backup for every component whose failure could cause the system to stop, and special software, which protects against system failures by detecting when a component has failed and activating backup.

To date, the area of demand for fault-tolerant systems has been transaction-based, time-critical applications. The systems' areas of use include finance, airlines, telecommunications, retail point of sale (POS), government/defense and manufacturing. Data base integrity as well as reliable, speedy data communications that use a variety of protocols are extremely important.

With this in mind, fault-tolerant Unix systems at first seem to be a case of jamming square pegs into round holes. Unix is deemed unsuitable for fault tolerance for a multitude of reasons. The most frequently mentioned problem is its reputed habit of whimsically dropping files — not an insignificant shortcoming for a market demanding a high degree of instantaneous data integrity.

Standard Unix is also deficient for fault-tolerance in the area of terminal handling. Transaction processors, including fault-tolerant systems, generally use IBM 3270 terminals. Unix was built for one-character-at-a-time I/O over asynchronous lines and, therefore, does not provide robust support for these block-mode devices. While these criticisms are reasonable, none of them precludes an internal architectural change to Unix to make better use of fault-tolerant hardware.

The approach of Tolerant Systems, one of the few Unix fault-tolerant firms that utilizes Unix as the primary operating system in its machines, illustrates how to attempt to fix the problems.

Tolerant spent $10 million and 100 man-years modifying Unix from a call-based to message-based system. To make Unix a commercially viable fault-tolerant operating system required a safe allocation system, ensuring that files would not be lost in case of a power failure. The firm adapted Unix's file system by adding begin/end transaction markers

SPECIAL SECTION: UNIX

so that a record of transactions would tell the system where to pick up in case of an interruption. To alleviate the one-character, asynchronous I/O problem, Tolerant added standard protocols such as IBM Systems Network Architecture and X.25.

The company made many other changes to Unix, including giving its version of Unix the ability to deal with Unix files located anywhere on the system, not just with those that are resident in one particular Unix machine. To improve throughput further, Tolerant carved up Unix and placed the pieces on different processors, isolating the communications capabilities on one processor. Even with all these modifications to Unix, the company claims that a high degree of compatibility with standard Unix exists and that data can still be shared with dissimilar operating systems by utilizing standard communications protocols.

As an increasing number of vendors create Unix fault-tolerant systems, an equally rising number of multiprocessing Unix versions are produced. Companies in the Unix fault-tolerant market are concerned with the lack of Unix standards in transaction processing and real-time, guaranteed response systems. Many say they believe that the X/Open standard-making consortium, composed of European and U.S. vendors, is the furthest along in addressing these areas, compared with the U.S. standards committees, which have not even begun to address issues for transaction processing and real time.

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> *Likened to the user demand for local-area networks several years ago, interest in fault-tolerant systems is beginning to accelerate.*

The Unix fault-tolerant vendors hope that X/Open will lay the foundations and that the U.S. groups will pick up on its efforts. Technical problems are viewed as relatively straightforward and solvable; legal problems, however, may be a real stumbling block.

To alleviate confusion and not add a greater burden to existing Unix standards groups and committees, it is likely that there will be a bifurcation of Unix standards, with one version for fault-tolerant/multiprocessing Unix and another for single-processor Unix.

Another concern focuses on whether, after all the alterations to mold Unix into a commercially viable, fault-tolerant operating system, Unix programmers will still recognize it. Experts at AT&T claim that while a new Unix tool set for multiprocessing environments will be required, programmers can be readily retrained. Other experts claim that most of the changes are transparent to programmers.

The success of Unix fault tolerance is tied to the individual successes of fault tolerance and of Unix as well as to the suitability of such a marriage. Likened to the user demand for local-area networks several years ago, interest in fault-tolerant systems is beginning to accelerate.

The ability to program in only one environment — for mainframes, minicomputers, transaction processors and intelligent workstations — will help fuel Unix's success in all these markets. Furthermore, as prices decrease and performance increases, use of fault-tolerant systems will become more justifiable in many more applications.

The use of fault tolerance has been pioneered in six industry segments:

- Brokerage — stock exchanges and interfaces to stock exchange systems. If the system fails, orders and executed trades could be lost, resulting in loss of business and possible lawsuits. In the deregulation of the London Stock Exchange, Stratus figured prominently, selling major systems to 11 large brokerage houses in London so that the in-house systems could communicate with the stock exchange's system.
- Banking — principally automatic teller machines and electronic funds transfer networks. If the system goes down, the financial institution can face heavy penalties for transfers not being processed on a timely basis.
- Manufacturing — especially shipping and warehousing. At the European Container Terminus in the Netherlands, overhead cranes load semi-tractor trailers onto ships. If the Stratus system goes down, no loading can occur, resulting in lost time and money.
- Telecommunications — principally in billing. Companies cannot afford to have the system go down because long-distance calls would go unbilled. Communications Satellite Corp. (Comsat) provides ship-to-shore communications and, at its ground station, links the calls to ground-based carriers such as AT&T or MCI Communications Corp. Tolerant machines are used in the ground stations, controlling call setups, timing the calls, processing the billing and monitoring and controlling reconnections.
- Retail POS systems — especially credit authorizations. If the system fails, customers wait or the store waives the necessity for authorization, assuming the risk.
- Government — particularly in the area of defense.

The brokerage industry provides a

good illustration of the changing utilization patterns for fault-tolerant machines. There, the use of fault-tolerant machines is widespread and expected to increase rapidly. The advent of 24-hour, seven-day-per-week global trading would create enormous demands on traditional data processing systems, making fault tolerance even more attractive.

As prices drop, fault-tolerant systems will reach end users in the brokerage industry. While fault-tolerant machines currently are used in nearly all aspects of trading, in most installations, the fault-tolerant machines are used for gathering, storing and disseminating time-sensitive data.

Data processing (financial reporting, customer statements and so on) is usually performed on mainframes. Calculations such as current portfolio valuations are typically performed on brokers' workstations. Stratus offers interfaces to IBM Personal Computers and compatibles so users can take advantage of fault-tolerant file servers and download data on the PC for analysis.

"Currently these calculations are performed on non-fault-tolerant machines because the task is not deemed mission critical. In the future, more and more tasks will be classified as critical as the significance attached to these tasks grows," observes Jay Krone, Stratus program manager for product planning.

The Unix fault-tolerant bandwagon

To date, none of the large computer vendors has jumped on the Unix fault-tolerant bandwagon. In fact, IBM, with its Stratus deal, is the only big name to enter the fault-tolerant marketplace. This will soon change, however, with fault-tolerant pioneer Tandem's entry into the Unix segment of this market.

Furthermore, several traditional computer manufacturers are itching to join the fray on their own or more likely with the help of the young, fault-tolerant vendors, nearly all of which run Unix on their machines. All these small firms are rumored to be experiencing financial difficulties, which makes them even more willing to deal with the giants.

Tandem views fault tolerance as a requisite for its defined market, OLTP. Its proprietary, message-based operating system, Guardian, runs on all its machines. The architecture, geared to fault tolerance and to networking, enables many systems to be tied together and offers users a flexible growth path.

The company sells into a variety of OLTP applications, principally for larger, Fortune 1,000 customers hooking systems together. Smaller industry segments are handled by Tandem's Alliance Program, basically a VAR network with hundreds of software houses.

Classic users of Tandem machines fall into the industry segments detailed above, with brokerage and banking being Tandem's largest segments. Tandem claims to have installations in most of the major stock exchanges around the world.

As the undisputed leader in fault-tolerant systems, Tandem has been conspicuous by its absence in the Unix segment of this market. The company has seen a demand for fault-tolerant Unix systems but will not indicate its plans. Tandem prides itself on its strict adherence to standards, and as a Tandem spokesman stresses, "Unix is another standard, and if our users want it, we'll offer it."

Rumors have circulated that the company is working on two Unix offerings, code-named Quail and Falcon. In addition, Tandem announced a strategic business alliance with Altos Computer Systems, Inc. but is keeping very quiet about the details. Either on its own or with Altos, Tandem will bring out a fault-tolerant Unix system in the near future for the low end of the market.

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> *Several traditional vendors are itching to join the fault-tolerant fray on their own or more likely with the help of the young, fault-tolerant vendors.*

Stratus says it believes, perhaps self-servingly, that the fault-tolerant market is divided into two camps: its approach of heartbeat fault tolerance in which the computer *cannot* go down; and all others, with Stratus claiming that even Tandem machines can hiccup — maybe for a millisecond — because of a software-only approach. According to Stratus, these other vendors have high availability rather than fault tolerance.

Stratus runs AT&T Unix System V.2 in a host/guest implementation similar to IBM's IX/370. The host is Stratus's proprietary operating system called VOS. The two operating systems share the same VOS kernel, and the VOS and Unix shells run above the kernel. The Unix product, called Stratus/USF, reportedly runs fairly slowly. Because USF is weak in process creation (and Unix relies on process creation for nearly everything it does), the speed of the user interface is affected.

Stratus's distribution agreement with IBM, wherein IBM sells a Stratus machine as its own System/88, has given both the fault-tolerant market and Stratus enhanced credibility. The company classifies IBM as an OEM, bulk shipping to IBM and reportedly not even knowing how many systems have been sold. IBM

CIRCLE READER SERVICE NUMBER 219

provides all service for the machines, licensing Stratus's customer service software called Phone Home (in the case of a failure or problem, the machine automatically calls the service center).

While IBM has the option of licensing Stratus/USF, it has not done so to date. IBM has not clearly embraced the promulgation of Unix as a standard for a variety of reasons, including the basic fear of losing its control over the customer. Even Big Blue, however, reacts to market demand and, thus, can be expected to provide its customers with a Unix fault-tolerant system if demand is sufficient. Rumors of IBM development of fault-tolerant systems abound, although IBM is not expected to announce such a machine in 1987 or 1988, most likely waiting to evaluate its successes with System/88 first.

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> *With the probable exception of IBM, those large vendors that elect to develop a fault-tolerant system internally will choose Unix for the operating system.*

Tolerant chose to use Unix as the primary operating system in its fault-tolerant system because it was clear to the company that the cost of developing a proprietary operating system, including the necessary tools and compilers, would be prohibitive.

The firm is said to have experienced severe financial difficulties. Tolerant claims that another round of financing from both its original backers as well as some newcomers has put the company back into stable financial shape for the time being. Clearly, an IBM/Stratus-like deal for Tolerant would be a significant boost for the company and would fit nicely with its business plan of highly leveraged selling to avoid end-user sales and service. Tolerant has had discussions with a number of large computer vendors regarding OEM arrangements. Likely partners include NCR Corp., DEC and Unisys Corp., among others.

While it is somewhat surprising that the creator of Unix has not yet offered a Unix fault-tolerant system, AT&T has not ignored this market. Among the products to be announced in early 1987, of particular interest is a project code-named Apache, a multiprocessor system providing both parallel and redundant processing. The system is based on AT&T's totally redundant 3B20D, which is currently used in a switch as more of a controller than a computer.

Although Apache has been "about to be announced" for nearly two years, sources at AT&T indicate that the market will finally have a chance to see the machine. AT&T says it believes that the fault-tolerant market is just waiting to be addressed, finding that even customers without the appropriate need are asking about fault tolerance.

The Unix fault-tolerant mart is in a fledgling stage, not too far behind the overall fault-tolerant market. Growth in the Unix segment will far outpace the proprietary operating system segment, fueled both by users and by vendors. The U.S. government may be one of the major forces in this arena with a high percentage of its request for proposal criteria now specifying Unix fault-tolerant systems.

New entrants to the fault-tolerant market have chosen Unix because they cannot afford to develop a proprietary operating system and want to take advantage both of the vast pool of Unix talent and the instant recognition and credibility of a brand name.

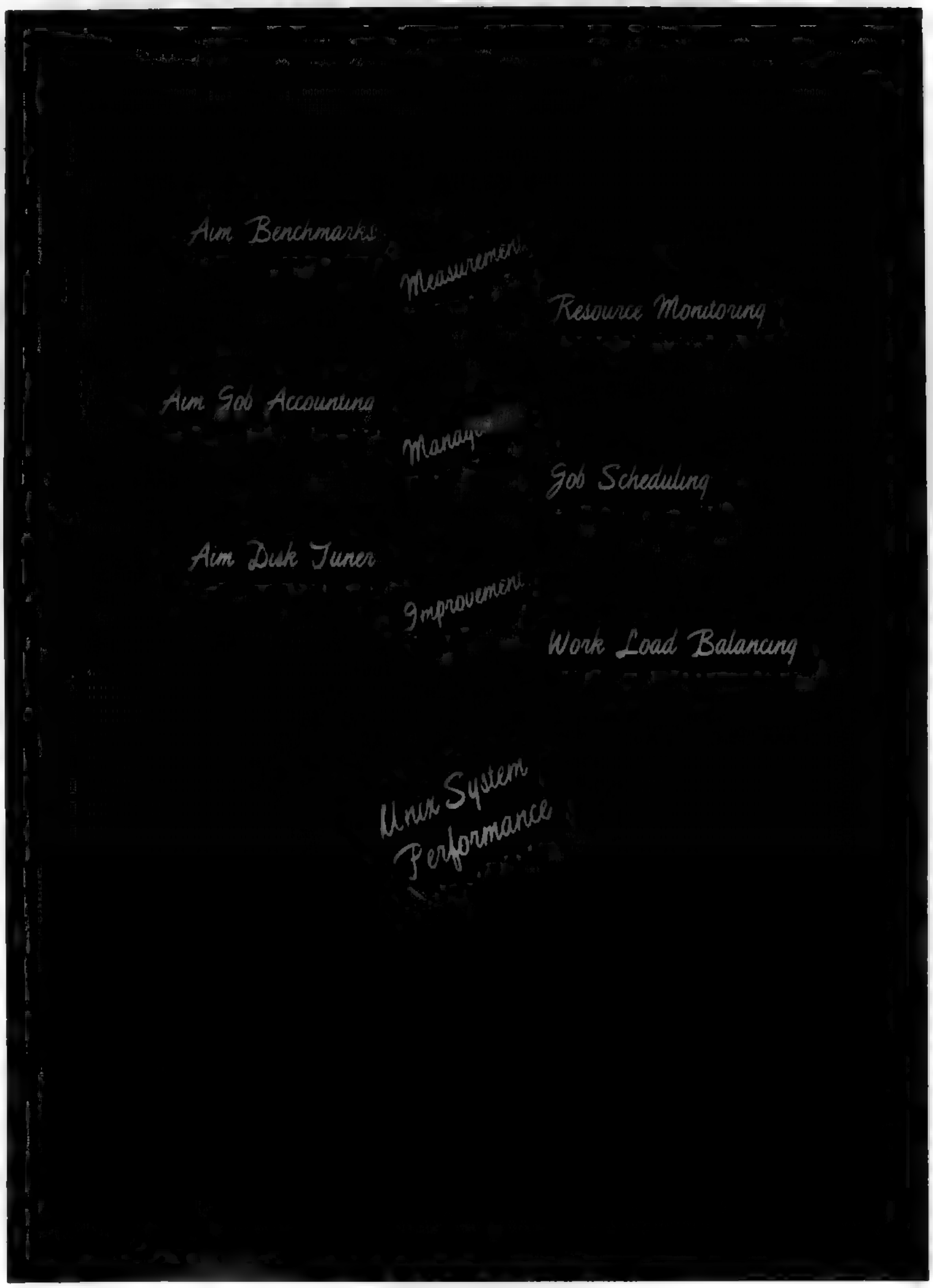
Large vendors as OEMs

As the market gains momentum, the large computer vendors will increase their participation either by developing their own machines, by acting as OEMs for smaller fault-tolerant vendors' products or even by acquiring the smaller vendors. As it is unlikely that many of the large vendors will act as OEMs for the same machine (such as Stratus's or Tandem's), the smaller Unix vendors will have the chance to deal with the big players. With the probable exception of IBM, those large vendors that elect to develop a fault-tolerant system internally will choose Unix for the operating system to avoid adding another proprietary operating system and to address user demand for Unix.

While some of the current small players will benefit from the consolidation, in the long term, the small vendors will either be squeezed out of or absorbed into the Unix fault-tolerant mart.

Gregory M. Avis, vice-president of Summit Ventures, a Boston-based venture capital firm, concurs. "Although the demand for fault-tolerant Unix systems is increasing rapidly, frankly, we don't see many attractive opportunities for investing in the new fault-tolerant Unix vendors. We believe the large computer vendors, either on their own or in conjunction with the existing small fault-tolerant vendors, will dominate this market."

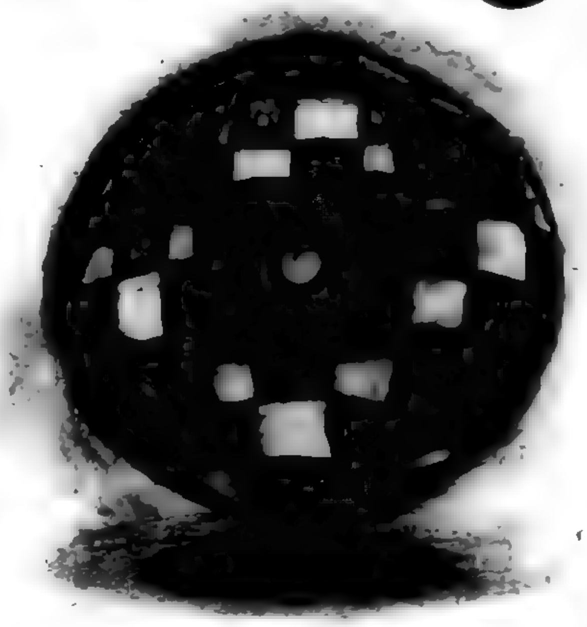
Lovett is a principal of Avenir Associates, a Boston-based marketing consulting firm specializing in high-technology and financial services markets.



CIRCLE READER SERVICE NUMBER 218

**SPECIAL SECTION:
UNIX**

Multiprocessing Unix Meets Users' Needs



DAVE RIDLEY

·BY·REBECCA·HURST·

A group of multiprocessor Unix computer users is a lot like a patchwork quilt. Separately, the pieces bear little resemblance to each other, but together, they form patterns.

This variety stems from the many different purposes that multiprocessor computers can serve. Some multiprocessor machines are designed as fault-tolerant systems in which the multiple processors perform redundant tasks. Others are parallel computers that execute different programs or parts of a program simultaneously.

Fault-tolerant systems are often employed in matters of life and money. The most common use of these systems is on-line transaction processing (OLTP) in banks, but other businesses that need fault-tolerant OLTP computers include those in the gaming and wagering market. These multiprocessor systems are also essential for critical applications in such areas as manned space flights, hospitals and emergency service dispatches.

Parallel processing computers are built for speed. The users who purchase these systems are often technical researchers and developers looking for a faster way to run their software. Parallel computers also offer developers greater flexibility in their program design because users can write code that is optimized for running in parallel or sequential order.

Technical experts are not the only users of parallel computers, though. Some general-purpose computer users are choosing multiprocessor systems over conventional minicomputers because even sequential applications can be distributed across several processors. The result, users say, is a marked increase in price/performance over the minis.

Many multiprocessing computers introduced in the past few years, both parallel processing and fault tolerant, run the Unix operating system. The issue of Unix, in fact, has been largely a concern for multiprocessor vendors. For them, Unix is part of a broader decision to base their entire systems on such industry standards as microprocessors from Motorola, Inc. and National Semiconductor Corp. as well as Ethernet and Intel Corp. Multibus. The advantages the manufacturers see are lower development and production costs and flexibility.

As a result, many users end up with Unix almost by default. Among businesses that require the specific functions of a parallel or fault-tolerant computer, Unix is simply the operating system that comes with the machine. Other users purchase their computers as part of a turnkey system. For them, the applications are critical, and they may not even be aware of the operating system.

Those users who do seek a Unix-based multiprocessor system commonly give one of two reasons. Some users want to preserve applications already running on Unix. Other, first-time Unix users state that they had to rewrite several applications for a new computer system and chose Unix in order to avoid rewriting their software in the future.

The multiprocessor Unix users who recently spoke with *Computerworld Focus* came from the lottery business, an animal toxic control center and computing research labs. Together, they reflect the variety of purposes and reasons for choosing fault-tolerant or parallel processing systems. They also point out the relative importance of Unix in different applications.

Much like banks, companies that provide lottery services rely heavily on fault-tolerant OLTP. They face a credibility loss among their customers and heavy financial penalities should their systems fail. For example, a lottery supplier could be fined $10,000 for every minute of downtime, says Steven Greenfield, vice-president of on-line systems for Scientific Games, Inc. "We're required to carry liability limits of up to $25 million," he adds.

Scientific Games, based in Norcross, Ga., is a wholly owned subsidiary of Bally Manufacturing Corp. and the leading supplier of

SPECIAL SECTION: UNIX

lottery products in the U.S., Greenfield says. The 11-year-old firm provides a variety of lottery-related services for 17 of the 22 states that currently run lotteries. It helps states pass legislation permitting lotteries and helps set up their lottery systems. Scientific Games also provides turnkey systems based on fault-tolerant computers, software to handle accounting and lottery validation and facilities management for the turnkey systems.

Scientific Games uses a combination of fault-tolerant computers from Parallel Computers, Inc. and Stratus Computer, Inc. The lottery company has 12 to 14 Stratus XA600 computers running VOS, Stratus's proprietary operating system, and between 16 and 20 Parallel Computer 300XR systems running Unix.

For Scientific, operating systems take a backseat to the hardware, Greenfield reports. "We were more concerned with the box than we were with the operating system," he says. "We wanted a box that was fault tolerant." The firm also needed systems that could operate in real time. "We have thousands of terminals for placing bets, and we can't keep them waiting," Greenfield explains.

State governments generally specify in requests for proposals (RFP) response rates that can best be met by high-speed, fault-tolerant computers. "They usually request that the systems handle 2,000 transactions per second," he says, "and each computer in the system has to have minimum transaction rates of about 100 to 200 transactions per second."

States further stipulate that the computer system handle every transaction that come in within 4 seconds, Greenfield adds. Finally, to ensure that the systems work reliably, state governments enact stiff penalties for computers that fail.

By contrast, states do not specify a particular operating system in their RFPs, and Scientific Computers writes applications in several languages including Cobol, Fortran, Pascal, PL/I and C. "For the Parallel computer, which runs Unix, we wrote software in the language most native to that system — C," Greenfield explains. "For the Stratus machine, we wrote our applications in Cobol."

> *Fault-tolerant systems are often employed in matters of life and money.*

The operating system is not an issue, agrees Paul Pickering, data processing manager for the West Virginia Lottery, located in Charleston, W. Va. The state lottery uses both Stratus and Parallel computers. "I'm not really familiar with Unix," Pickering notes. However, he says, "We don't have to worry about the operating system because Scientific Games provides the applications."

While writing applications for the two computers was not a problem, Scientific Games had to create custom communications to connect the Stratus and Parallel systems. "The Parallel computer had Ethernet, but the Stratus [one] didn't," Greenfield explains. To make the computers communicate across Ethernet, Scientific Games wrote communications software for Ethernet and built Ethernet controllers into the Stratus computer. Additionally, to maintain fault tolerance across the network, the company provides redundant Ethernet systems in all its computers. In their final configurations, both computers are meeting Scientific Games's needs, Greenfield says.

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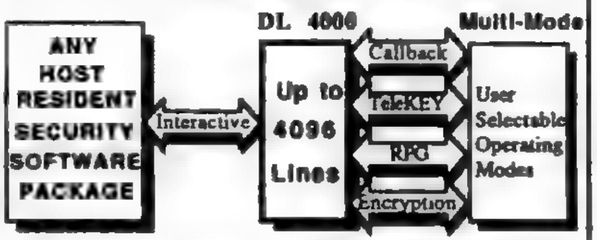
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CIRCLE READER SERVICE NUMBER 223

The University of Illinois Urbana-Champaign National Animal Poison Control Center is not a transaction-intensive environment in the financial sense. Nor is it a high-tech computerized research lab. Instead, the veterinary organization depends on data base information stored on a Sequent Computer, Inc. multiprocessor system to identify and evaluate toxic substances in animals.

The poison control center was the first one of its kind in the nation from 1978 to 1986. By 1985, the center was handling 14,000 calls annually; in 1986, that number grew to almost 22,000, according to Harold Trammel, the center's associate director. Each call becomes a record in the data base, which is based on Informix Software, Inc.'s Informix-SQL. Each record uses roughly a kilobyte of memory, he says.

Originally, the center used an Altos Computer, Inc. 586 microcomputer with a 40M-byte internal drive and another 40M-byte external drive to hold the Informix data base. However, as the veterinary office began putting in the data, Trammel recalls, "the Altos computer's limitations and reliability problems reared their ugly heads." Eventually, the center found itself running reports and entering data separately.

The center clearly needed a more powerful computer, but the overriding purchase decision factor was not power — it was Unix. "We had no desire to go with anything other than Unix," Trammel reports. "We like the portability of the applications and having the shell command language."

The veterinary center began looking at the AT&T 3B2 and Digital Equipment Corp. VAX, but it eventually settled on a Pyramid Technology Corp. minicomputer as the Unix machine with the best price/performance, Trammel says. But, when he contacted the university's Computing Services Office about the Pyramid, the staff there recommended Sequent's Balance minicomputer.

After several months, the poison control center decided to purchase a Balance system. Trammel recalls, "The computing services office had a Balance system up for 18 months and had not had problems." The issue of money also contributed to the decision. "We could afford a used Pyramid computer, or we could get a new Balance system for not a lot more," he notes.

The poison control center installed a six-CPU Balance system with between 6M and 8M bytes of memory and 800M bytes of storage. "A smaller Sequent machine could have met our immediate needs;" Trammel admits. However, the memory of expanding the Altos 586 to its limits is still clear. "We want a system that will meet our needs in two years," he says. And if it doesn't, the present system has room for six additional processors, more internal memory and several hard drives. "We don't see ourselves getting boxed in with this system, " Trammel explains.

Texas is the home of the Microelectronics and Computer Technology Corp. (MCC) and the National Aeronautics and Space Administration's Johnson Space Center, two organizations performing leading research in parallel applications.

Both are looking for faster ways to call up information and make decisions using computer systems. For them, speed is the motivating factor for purchasing parallel processing computers from Flexible Computer Corp. located in Dallas.

Developing a parallel data base is one charter of MCC, a consortium for cooperative research on behalf of shareholder companies, according to Gene Lowenthal, vice-president of programming. There are 21 shareholders in all, including such companies as Honeywell, Inc. and Control Data Corp., that will use the technology developed at the facility in their commercial products.

MCC is using a Flexible Flex/32 computer with 40 Motorola 68020 processors, each with an associated hard disk. This system is being used by researchers both to run experimental software and to see how parallel machines are designed, Lowenthal explains.

The researchers expect the hardware to play an integral role in their data base solution. "We're looking at the software data base system in terms of replacing the software with a hardware combination that executes commands in parallel," Lowenthal says. As such, the Flex/32 not only contributes to the research, it is a part of it.

Although researchers have been developing experimental software that runs on Unix, that operating system will not be part of the data base solution, Lowenthal asserts. "Ultimately, we expect to have a dedicated operating system optimized for the particular data base software executed on the system," he says.

As at MCC, the Johnson Space Center did not consider Unix as an important decision purchase factor in its research. "Our requirement is simply that the operating system be robust enough for our development work," explains Gary Riley, a NASA aerospace engineer. "The question we had was what *hardware* approach the designers took with the computer."

At the NASA artificial intelligence laboratory, a six-processor Flex/32 computer is being used to develop expert system software. "We've used the Flex/32 to develop an expert system shell — a high-order language built on top of C," Riley says. Using the shell, researchers will then develop expert systems that can work on a variety of computers, not just those based on Unix.

The purpose of the resulting expert systems will be to help NASA plan and control manned space missions similar to its *Apollo*, Skylab and space shuttle flights.

By using a parallel computer such as the Flex/32, researchers hope to overcome some of the inherent limitations of conventional sequential computers. "For example," Riley says, "an engineer may have thousands of pieces of data and may want to perform the same 100 operations on each." A Cray Research, Inc. computer could run each operation quickly, but it would still run them sequentially, Riley notes. A parallel processor can cut down runtime by handling several of the processes simultaneously.

The theory of multiprocessing

Theoretically, the more processors there are running simultaneously, the faster and more efficiently a computer can run applications. This is the idea behind the Connection Machine from Thinking Machines, Inc., a computer that figures prominently on Riley's wish list.

Reportedly, the Connection Machine has 64,000 1-bit processors and can emulate up to 250,000 processors through software. The computer is fast and allows programmers to write very simple programs to handle large tasks.

"The Flex/32 comes a lot closer to conventional thinking," Riley says. The computer can split a program across six processors. "From then on, each processor thinks it's sequential until the pieces get back together and decide what they did." But, he adds, "Six is enough for us to figure out if what we're doing is working." ■

Hurst is a Computerworld Focus *senior writer.*

SYSTEMS UPDATE

Secrets Of Survival For Alternate Systems

BY MICHAEL TUCKER

OK, all the operating system questions are answered, right? We know now that basically there are only a couple of operating systems in the whole wide world. Things have pretty much boiled down to AT&T Unix System V, or one of IBM's systems or maybe one of the proprietary solutions. That's it. The whole ball of wax. Right?

Wrong.

For some MIS departments, operating systems remain very much an open question with several answers. Alternatives to Unix, IBM and proprietary behemoths have retained both users and market position. Indeed, in combination with the new, 32-bit microcomputers, these other operating systems could become the most important weapons by which MIS finally gains control of personal computers.

Consider Pick, from Pick Systems headquartered in Irvine, Calif. Pick is the brainchild of the colorful Richard Pick, who put down the foundations of his system with colleague Don Nelson during the late 1960s when the two men had been asked to develop a data management facility for the U.S. Army. Intrigued by the problems of information management, Pick decided to create an operating system that would take data management as one of its underlying principles, rather in the same way that University of California at Berkeley Unix 4.2 assumes as a given that it will be used for software development.

The result, by the early 1970s, was the Pick System, an operating system tailor-made for multiuser business applications. It is a simple, direct and focused system; it is meant for the business user, not the programmer. The Pick System offers a built-in data base, a built-in programming language (a Basic variant with an English-like vocabulary and syntax) and an almost fanatic degree of standardization.

Where Unix was a committee effort and so is only now achieving some level of standardization, Pick is the creation of an individual, and Pick, the man, has fought to give Pick, the system, a level of purity unmatched in operating systems. Every one of the estimated 25,000 authorized installed minicomputer and mainframe Pick installations and the unknown number of Pick-based IBM Personal Computer installations look pretty much the same to both programmers and applications.

For a brief period in the 1970s, it seemed that Pick would emerge as *the* generic operating system for business applications. It was widely remarketed under various names as the operating system in several brands of minis — for instance, Microdata, now McDonnell Douglas Computer Systems Co., located in Irvine, packaged it under the name Reality. In the process, Pick became the darling of those value-added resellers that were depending on minis to get their products to market. This passionate affair was blessed with issue on a grand scale, and the number of vertical market applications running on Pick now exceeds 3,000. Perhaps only Microsoft Corp.'s MS-DOS can boast a more energetic following of independent software developers.

Perhaps the fact that Pick did not become the MIS standard was an accident or a mugging of history. The system was sandbagged from two directions. On the technological side, the microcomputer boom in the late 1970s and early 1980s seriously damaged Pick's traditional, mini-based market. Fortunately for Pick, its vendor was able to address this issue, and an IBM Personal Computer XT version of the operating system appeared by 1984.

Less easy to combat was the marketing side of Pick's problems. After years of relative inactivity, Unix abruptly emerged from its university labs as a "commercial" product in the early 1980s. If software were sold on technical merit alone, Pick probably could have met the Unix threat with relatively little loss of blood. But, Unix's history and widespread university use made Unix tremendously popular with programmers. Unix had an elan that Pick could not match.

More importantly, Unix had as its patron AT&T, one of the most powerful corporations in the world; Pick could claim only Pick Systems and a handful of users.

The low point for Pick came somewhere around 1983. Analysts and trade journalists were seriously discussing its demise. The best Pick could hope for, the pundits said, was a sort of living death. Perhaps historians would keep Pick source code about as a museum case example of a loser in a great Darwinian competition.

By 1985, it was clear that Pick was anything but extinct. Upgrades of the product had produced true multitasking versions, and it had been ported to still more microcomputers and even some mainframes. A Pick users group, the Spectrum Manufacturers Association, had been formed, and its members included such industry heavyweights as General Automation, Inc., Fujitsu America, Inc., Nixdorf Computer Corp., Prime

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SYSTEMS UPDATE

A Dedicated User Community May Be The Secret Of CP/M's Power

CP/M from Digital Research, Inc. of Monterey, Calif., was the first great generic operating system for personal computers. For a brief time, it seemed as though CP/M would be dominant in the single-user field forever. Then, IBM lowered the Microsoft Corp. MS-DOS curtain on the industry, and Digital Research hasn't been the same since.

But CP/M remains. It has grown, been diversified into a family of operating systems, become MS-DOS compatible and cultivated users.

There is a multitasking version called Concurrent DOS that gives users of the IBM Personal Computer and compatibles the ability to run up to four applications at the same time.

Originally for 286-based units

Concurrent DOS was, in fact, originally advertised as an operating system for the Intel Corp. 80286-based systems, which means that it was designed for the same marketplace that Microsoft is only now addressing with its 286DOS.

Concurrent DOS has not been able to claim the major share of the 80286 operating system that Digital Research would have liked. However, CP/M's real power may exist with its users. Since its introduction, the operating system has maintained a dedicated following among programmers who point out that the theoretically more powerful MS-DOS is actually slower and less fully featured than CP/M Release I for some tasks.

As 80386-based machines come to the fore, this large user community could be important. It was the existence of a very similar community of hackers, trained on Unix-based university systems, who made it possible for Unix to become a successful commerical product in the 1980s.

— **Michael Tucker**

Computer, Inc. and Ultimate Corp.

Pick Systems, meanwhile, was looking forward to a comfortable and interesting future in the new, 32-bit multiuser microcomputer, which made desktop machines look like the old-time minis that had been Pick's meat and drink.

Why had Pick survived? Mostly because Pick users had weighed other solutions and found them wanting. "Unix is simply not a business operating system," says Phil Gerber, MIS director for Norm Thompson, a direct mail firm based in Portland, Ore. "It wasn't designed to be one. Pick was. It's meant for interactive, people-oriented things."

Gerber also has limited patience with IBM systems. "It's been my general experience that IBM can do anything if you've got enough money and people to throw at the problem. We're doing a lot with very little. Our choice of Pick was a question of value."

Norm Thompson performs all of its data processing on two 16-bit computers from Ultimate, located in East Hanover, N.J. One machine is supporting 68 ports while the other supports 58. "We've got all our resources integrated through Pick. We do accounting, run spreadsheets, do financial modeling [and] maintain our customer mailing list."

Gerber is considering the purchase of a third Pick-based system, possibly another 16-bit Ultimate machine. However, Ultimate offers Pick on a number of different computers. Ultimate is an OEM vendor, purchasing hardware from several sources and configuring it for its own enhanced version of Pick called Ultimate. The newest of these, and the one that may say the most about Pick's future, is the Series 7000, a 32-bit system based on Honeywell, Inc. hardware. The largest Ultimate version is the 9000 series — a Pick implemention for IBM 370 architecture machines.

A Theosophical society

At this point, poor, harrassed MIS officers usually ask something like the following: "But, if larger machines cannot be counted on for simple choices when it comes to operating systems, surely, microcomputers can be. Surely, for micros, the options boil down to one vendor — Microsoft of Bellevue, Wash. — and three products — Microsoft's MS-DOS and Xenix and IBM's PC-DOS version."

Actually, things are a bit more complex than that. The microcomputer world swarms with operating systems. And, worse, there are times when MIS cannot avoid looking at some of them.

Even before the introduction of the IBM PC and the gradual standardization of the market around it, business users had found that existing operating systems did not meet their needs. For one thing, most of the PC operating systems assumed that PCs would indeed be personal — that is, single-user systems.

In fact, for organizations doing such things as low-level data entry or forms management, single-user systems were not what was wanted. For them what made sense was a very inexpensive multiuser system. The most cost-efficient path to such systems was often to purchase the cheapest possible machine (that is, a PC) and turn that into a small-group multiuser system via dumb terminals. This depersonalized PC could provide the necessary computer-powered boost in productivity and a gateway into the corporate mainframe as well.

Developers plunged into the work group operating system market. One of the first vendors into the pool was a company now called Theos Software Corp. of Lafayette, Calif. As early as 1978, Theos Chairman Tim Williams wrote and marketed the Oasis operating system, which turned Zilog Corp. Z-80 machines into two- to three-user systems. Oasis gradually dried up with the demise of the Z-80 market, but by then the IBM PC had appeared. Williams and his staff retooled Oasis for the PC and renamed it The Operating System, or Theos.

By 1985, Theos was far more than just an average work group operating system. It was shaping up as a competitor to both Xenix and the various DOS systems as the operating system of choice on the new multiuser microcomputers. Theos 86 runs on such Intel Corp. 8086-8088- and 80186-based machines as the IBM PC AT and the Altos 586 from Altos Computer Systems, Inc. Theos 286-V, announced in 1986, runs on all Intel 80286-based machines and supports up to 32 users. It provides MS-DOS emulation as well, meaning that in addition to the 500 to 600 Theos applications already on the the market, Theos-based machines will be able to exploit the huge software library of the IBM PC. Theos also has the advantage of being a very simple, very low-maintanence operating system.

One company exploiting those aspects is Shoreman Food Technologies, a manufacturer of dehydrated carbohydrate fractions for major food companies, which has used Theos on an assortment of machines in MIS operations for almost a decade.

Shoreman's President, Elon L. Bateman, first came to the company as its controller, and he was responsible for the choice of what was then Oasis as the firm's operating system. Originally, Shoreman was using an operating system the firm had written itself, but, Bateman says, "We realized we'd gotten to the point that we needed a system that didn't have to have a specialist to come and burp it every time something went wrong." After shopping around, he settled on Theos. ""I'm doing accounting and business functions. I need tools to do that. I need things like ISAM files. Theos provides those tools, as well as a resident Basic."

Currently, Shoreman does most of its computer work on a supermicrocomputer from Third Coast Technologies, headquartered in Foster City, Calif., a vendor that specializes in multiuser Theos-based systems. Bateman explains his loyality to Theos: "It's a very easy system to work with, particularly for nontechnical people. . . . For instance, your chances of destroying the system are just about nil. It always assumes you may not know exactly what you're doing at all times. Unix assumes you're always an expert."

So, nothing is safe in the operating system world. Just when you thought that all the operating system choices were made, other options come popping out of the woodwork.

But, just because the options are there, does that mean that MIS officers should take them? After all, industry-standard operating systems already provide most of everything MIS wants for its existing machines.

Create A Custom Operating System

There are times when no operating system available on the open market meets your needs and you have to write one of your own.

Should such a grisly fate be yours, help is available. One company, Wendin, Inc. of Cheney, Wash., markets the O/S Tookit for IBM Personal Computers and compatibles. O/S Toolkit is a library of source code on two floppy disks. With it, even relatively unsophisticated programmers can produce custom operating systems with a few weeks work.

Wendin itself has already used O/S Toolkit to produce two operating systems that it markets: PCUnix, a Unix-like system for microcomputers, and PCVMS, a Digitial Equipment Corp. VMS work-alike.

O/S Toolkit is priced at $99.00.

— **Michael Tucker**

However, the operative phrase here is "existing machines." Pick, Theos and other alternatives are not aiming for existing machines.

As usual, the real cause of all the fuss is the microcomputer. A glance at the history of both Pick and Theos reveals an interesting pattern. Both got their start in an earlier day of computing, before the current rage for standardization had begun. Both suffered when MS-DOS-based, 16-bit computers replaced their existing markets — Pick's minis and Theos's Zilog-based micros. Both are now suddenly active in the micro market.

Why are they active again? Perhaps because once more micros are on the move. Indeed, the machines are evolving so quickly that traditional micro operating systems, such as Xenix and MS-DOS, may or may not be able to keep pace with them. Even the newest and most powerful of the advanced Microsoft MS-DOS systems, the sophisticated 286DOS, is meant for machines based on the 80286 processor, not the more recently introduced 32-bit Intel 80386 chip.

Yet, computers built on the 386 and other 32-bit processors are already on the market, and more are coming. MIS is now being called upon to decide how an entirely new order of micros can be integrated into larger corporate strategies at a time when not even the former generation of 16-bit micros has successfully been digested and when the standard operating system for 32-bit machines has not yet been clearly established.

The alternative operating systems are thus taking a shot at an entirely new class of machine, not competing with existing mainframe and microcomputer products. The recent major introductions of both Pick and Theos have been for 32-bit or 16/32 bit computers.

Operating System War II

It may be that the computer industry is about to enter an age of operating system wars, rather like the early 1980s when Digital Research, Inc. CP/M squared off with MS-DOS in a titantic struggle for the future of the personal computer. If so, then operating systems that seem like exotica today may have a real chance of winning the emerging multiuser micro market — operating systems, like Pick, that have brought multiuser and multitasking functionality down from minicomputers or systems like Theos that have added this functionality to existing 16-bit systems.

This movement could be important to MIS directors. Industry observers have already suggested that 32-bit systems will be increasingly used to manage the large number of PCs already on end users' desks. If MIS professionals become the managers of these multiuser micros, then such machines may return to MIS some of the control of technology that it has lost to micro managers, chief information officers and end users.

But, for MIS people to gain control of the machines, they will have to participate in the debate about which operating systems will become the multiuser micro standard.

Of course, the systems with the best chance of winning in the 32-bit world are Xenix or some future 386 DOS. Yet, sure bets are not always winners. Perhaps, in this race, a dark horse like Pick or Theos could take all.

Tucker is Computerworld Focus *features editor.*

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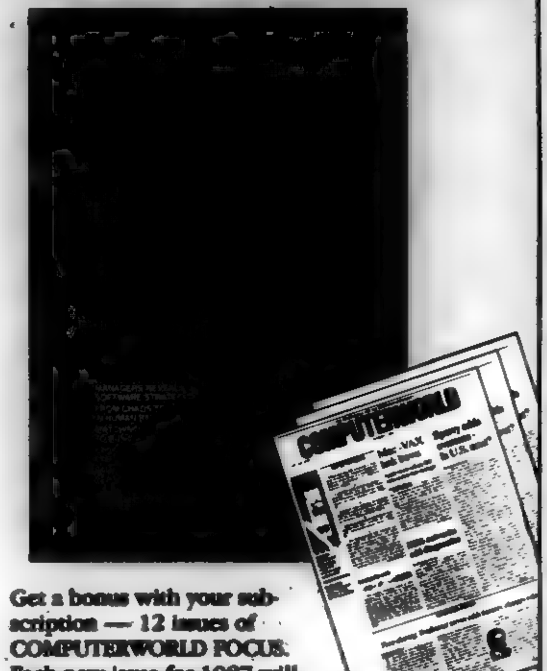

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SOFTWARE PRODUCTS

DEC Extends Vaxcluster

Treats Vaxstation, Microvax As Unit

MAYNARD, Mass. — Digital Equipment Corp. has introduced Local Area Vaxcluster Systems, which, through the use of Ethernet baseband networking, integrate Microvax II and Vaxstation II systems into a single computing environment and extend Vaxcluster capabilities to the work group.

DEC said its Local Area Vaxcluster System software enables the connection of up to 13 Vaxstation II or Microvax client systems to a central Microvax or VAX server. The server or central Microvax, in turn, manages the system software, all software applications and a shared common file system.

According to DEC, the Local Area Vaxcluster Systems allow participating systems to act as a single unit, sharing resources, such as disks, tapes and printers, while using a single, distributed file system and maintaining the independence of each processor.

System manager functions

A system manager reportedly can perform the necessary management functions for all members of the Local Area Vaxcluster Systems, eliminating management tasks for client users.

As a result, DEC claimed, users of the company's All-In-1 integrated office system, the Vaxset integrated software development environment and the EDCS engineering information management system will notice marked improvement in productivity when using these products with the Local Area Vaxcluster Systems.

Local Area Vaxcluster Systems software is priced at $1,000 on the Vaxstation, $1,900 on the Microvax II and $9,500 on the VAX 8800.

New hardware configurations

DEC also introduced three Microvax II and two Vaxstation configurations to work with Local Area Vaxcluster Systems.

According to DEC, the computers and workstations will extend shared data and distributed computing capabilities.

The Vaxstation II configurations range in price from $19,900 to $23,900. The Microvax II configurations are priced from $19,900 for a diskless/tapeless system to $94,855 for a preconfigured Local Area Vaxcluster server complete with DEC's VMS operating system, Decnet/Ethernet networking and the Local Area Vaxcluster Systems software licenses.

For further information, contact Digital Equipment Corp., 111 Powdermill Road, Maynard, Mass. 01754.

Circle Reader Service Number 301

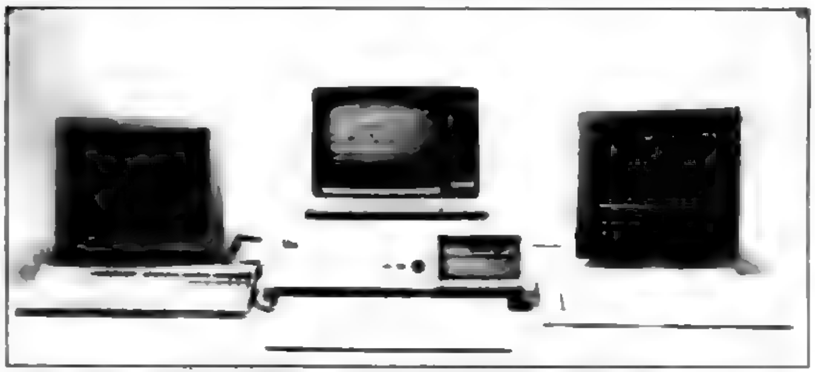
Locus Adds Merge 386 To Line

SANTA MONICA, Calif. — Locus Computing Corp. has added Merge 386 to its line of Merge operating environment products, which include Merge 286 and AT&T's Simul-Task for the AT&T Personal Computer 6300 Plus.

Merge 386 allows an Intel Corp. 80386-based computer to run both Unix and Microsoft Corp. MS-DOS concurrently using either MS-DOS or Unix commands that the user has input directly from the system prompt.

When a user enters a command, Merge 386 determines whether the command is Unix or MS-DOS. If it is a valid Unix command, it is executed by Unix. However, if :he command is MS-DOS, the Merge 386 software creates a Virtual 86 environment and executes the MS-DOS application program within it.

In the Merge 386 product, MS-DOS runs as a task under Unix, so users can execute several MS-DOS and Unix tasks simultaneously. Because Merge 386 contains a full-implementation MS-DOS, almost all MS-DOS and PC-DOS programs will run on it without modification.



Merge 386 allows a 386-based unit to run MS-DOS and Unix concurrently.

Merge 386 will be available in the first quarter of 1987 for MS-DOS and PC-lease 3.0. It requires an Intel 80386-based computer, with 1M byte of random-access memory. Merge 386 is expected to cost less than $500.

application program within it.

For further information, contact Locus Computing Corp., 3330 Ocean Park Blvd., Santa Monica, Calif. 90405.

Circle Reader Service Number 302

Oracle Interface Directs SQL Users

BELMONT, Calif. — Oracle Corp. announced Easy SQL, an interface designed for Oracle data base management system users unfamiliar with IBM's SQL.

Easy SQL includes pop-up windows, function keys, flexible menus, automatic hints and context-sensitive Help. In addition to ad hoc relational query capabilities, Easy SQL provides facilities for writing reports, using color graphics, creating data base tables and performing maintenance.

The output of the user queries is normally directed to the user's screen, but users can redirect the output to standard personal computer data file formats. To exchange information outside the data base, Easy SQL incorporates Oracle's Easy Link micro-to-mainframe link and it provides menus that let users access other Oracle programs such as SQL Calc.

Two key features, according to company spokesmen, are a query preview facility and color graphics. Easy SQL's preview facility allows the user to press a key that opens up a window and displays up to five records to satisfy the user's query. The interface's graph facility lets users directly graph the contents of the data base using bar, pie and line charts with colors, patterns, labels and axis scales that the user defines.

Easy SQL works on IBM Personal Computers running PC-DOS and the Oracle DBMS. It is sold separately for $395 or with Oracle for $995.

For further information, contact Oracle Corp., 20 Davis Drive, Belmont, Calif. 94002.

Circle Reader Service Number 303

Gold Hill LISP Out For PC Expert Applications

CAMBRIDGE, Mass. — Gold Hill Computers, Inc. has introduced its LISP System for developing large expert systems applications on microcomputers.

The LISP System has two components: the Hummingboard, a 6M-byte plug-in board based on the Intel Corp. 32-bit 80386 microprocessor running at 16 MHz, for IBM Personal Computer XTs and Personal Computer ATs; and the Golden Common LISP (GCLISP) 80386 Developer.

The firm said the Hummingboard serves as a coprocessor capable of executing GCLISP programs five times faster than an IBM PC AT. The system shares memory with the base processor in accordance with the Intel/Lotus/Microsoft Expanded Memory Specification, enabling standard micro applications to take advantage of the extra memory available.

The Hummingboard's directly addressable on-board memory will be expandable to 24M bytes with the availability of 1M-byte dynamic random-access memory (RAM) chips.

According to the company, the 32-byte memory data paths and 12K-byte line high-speed cache memory yield a processor/memory cycle time comparable with that of superminicomputers.

Gold Hill added that the GCLISP 386 Developer includes a large memory interpreter and compiler, editor, tutorial and on-line Help system. The GCLISP Developer also supports lexical scoping, packages and transcendental functions.

LISP System costs $7,000 and includes the Hummingboard with 6M bytes of RAM and the GCLISP Developer.

For more information, contact Gold Hill Computers, Inc., 163 Harvard St., Cambridge, Mass. 02139.

Circle Reader Service Number 304

Microsoft Unveils Xenix 386, Xenix 286 Upgrade Kit

REDMOND, Wash. — Microsoft Corp. introduced the Xenix System V/386 operating system and the Xenix System V/386 Toolkit, an upgrade package for Microsoft Xenix System V/286.

Like Xenix System V/286, Xenix 386 is multiuser, multitasking operating system that fully complies with AT&T's Unix System V Interface Definition.

The full Xenix implementation will utilize all the capabilities of the Intel Corp. 80386 chip, Microsoft reported.

Virtual address space of 4G bytes

These abilities include the provision of a 4G-byte virtual address space, use of the full 32-bit instruction set and support for virtual memory and demand paging.

Xenix 386 is scheduled for availability in the first quarter of this year.

Pricing for Xenix 386, including the operating system, C language compiler, macro assembler and writing utility, will be approximately $1,000.

Microsoft also introduced the Xenix System V/386 Toolkit to allow independent software developers to begin developing Xenix 386 applications before the release of Xenix 386.

The Toolkit consists of program development tools to create Xenix 386 applications, the execution environment for running them and a modified version of the Xenix 286 documentation.

Development tools include a Microsoft C compiler for the 80386 and an extended version of Microsoft Macro Assembler that supports the 80386 instruction set and addressing modes as well as a debugger for 386 programs, according to a spokesman.

Toolkit requires Xenix 286

The program development tools in the Toolkit can be installed on any computer running Xenix 286, however, the execution environment requires an 80386-based system with Xenix 286.

Programs built with the Toolkit can run on any IBM Personal Computer AT or compatible equipped with an 80386 processor.

The Toolkit is available immediately for a price of $395.

For further information, contact Microsoft Corp., Box 97017, Redmond, Wash. 98073.

Circle Reader Service Number 305

SOFTWARE PRODUCTS

Convergent Technologies Announces The 386 Ngen Workstation

SAN JOSE, Calif. — Convergent Technologies, Inc. has introduced the Series 386 Ngen workstation, which the company said provides concurrent access to application bases developed for multiple operating systems.

The Series 386 pairs Convergent's CTOS/VM network operating system and the Intel Corp. 80386 microprocessor. In addition to CTOS/VM, the Series 386 runs AT&T's Unix System V and Microsoft Corp.'s MS-DOS operating systems, allowing users to utilize the base of applications written for these operating systems.

The 386 Ngen runs multiple operating systems and provides multitasking capabilities, enabling users to simultaneously run programs such as Lotus Development Corp. 1-2-3 and Microsoft Multiplan spreadsheets.

Two models available

The Series 386 Ngen comes in two models: the CP-003 with a 16-MHz Intel 80386 processor and the CP-003/287 equipped with a 16-MHz 80386 and a 10-MHz Intel 80287 math coprocessor. A basic system comes with 1M byte of random-access memory (RAM) expandable to 4M bytes of RAM in 512K-byte or 1M-byte increments; I/O support for two RS-232C ports; parallel printer port; and RS-422 operations at speeds up to 1.8M bit/sec.

Convergent's CTOS II operating system is a distributed network, real-time, multitasking system. The company added that CTOS II runs applications written for the IBM Personal Computers and compatibles.

Convergent said a base 386 Ngen system configured with 1M byte of RAM, a 20M-byte hard disk and floppy disk is priced for sale to OEMs at between $8,700 and $9,000.

For further information, contact Convergent Technologies, Inc., 2700 N. First St., San Jose, Calif. 95150.

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Lotus Unveils Updated Freelance Plus

CAMBRIDGE, Mass. — Lotus Development Corp. announced Lotus Freelance Plus, an upgraded version of the Lotus Freelance graphics package acquired from Graphic Communications, Inc. Freelance Plus builds on Freelance's core of graphics modules, including charting, chart editing diagrams, word charts, freehand drawing, symbols and maps, with two new modules and enhanced capabilities.

Enhancements to Freelance's existing core capabilities include more powerful freehand drawing; fill patterns that show gray scales when printing in black and white; and expanded file export capabilities that allow users to incorporate Freelance Plus graphics into documents created with word processing or desktop publishing packages.

Freelance Plus is immediately available for $495. Registered Freelance users can pay $100 and exhange their current packages for Freelance Plus.

Map sets debut

Lotus also introduced Freelance Maps, a collection of map sets designed to work with Freelance Plus and provide a complete library of map symbols. Freelance Maps includes four individual sets: Continents & Countries, U.S. Counties, U.S. 3-Digit ZIP Codes (a subset of the standard five-digit codes) and U.S. Major Cities and MSAs (metropolitan statistical areas) as well as the U.S. Complete Set.

Lotus's suggested retail prices are $145 for each of the individual sets and $395 for the U.S. Complete Set.

For further information, contact Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, Mass. 02142.

Circle Reader Service Number 307

SOFTWARE PRODUCTS

Multitasking PC Tool Bows

SANTA CLARA, Calif. — Softguard Systems, Inc. announced VM/386, a control program that brings multitasking to personal computers.

VM/386 takes an Intel Corp. 80386-based computer that is compatible with the IBM Personal Computer and sets up virtual machines inside the computer. VM/386 reportedly runs all existing PC and PC-compatible applications, including all Microsoft Corp. MS-DOS and single-user versions of Xenix.

The virtual machines run concurrently, and each thinks it has exclusive access to all the real computer's resources. Each virtual machine can have its own operating system as well.

Incorporates VM/370 features

VM/386 was written in 80386 assembly language by mainframe software developers who wanted to use IBM's VM/370 operating system concepts to bring features such as multitasking and record locking to 80386-based computers.

The advantages of writing in assembly includes better speed and less disk space, according to a spokesman.

VM/386 will be available in the second quarter of 1987 and will retail for less than $350. Discounts for OEM quantities are available.

For further information, contact Softguard Systems, Inc., Suite 201, 2840 San Tomas Expwy., Santa Clara, Calif. 95051.

Circle Reader Service Number 306

Micros Get Theos 386-Based Version

LAFAYETTE, Calif. — Theos Software Corp. has introduced a version of its Theos multiuser, multitasking operating system for the Intel Corp. 80386 microprocessor. The initial version of Theos 386 will address up to 16M bytes of random-access memory and support 32 users in a multiuser environment, the company claimed.

The company added that Theos 386 will offer the features of a mainframe operating environment for 80386-based microcomputers. An interface using built-in Help files instructs novice users about Theos commands, their functions and syntaxes.

Theos 386 is also complemented by Basic, C and assembly languages for software development. Theos Software claimed these languages feature a bridge enabling software developed under one microprocessor version of Theos to be translated and run under newer Theos versions, including Theos 386.

Theos 386 is initially available on the Ensign 386:100, an 80386-based system from Integrated Business Computers, Inc. of Chatsworth, Calif. Theos Software said other system implementations will be forthcoming. The operating system is separately priced at $895 per processor.

For further information, contact Theos Software Corp., Suite 100, 201 Lafayette Circle, Lafayette, Calif. 94549.

Circle Reader Service Number 209

Software Link Unveils PC-MOS/386 Pricing

ATLANTA — The Software Link, Inc. has announced pricing for PC-MOS/386, its multiuser operating system.

The company said PC-MOS/386 is available in three versions: the PC-MOS/386 MT single-user version, which is priced at $195 and provides concurrency for multiple applications; PC-MOS/386 Multiuser-5, which is priced at $595 and enables as many as five users to run applications at remote dumb terminals powered by a single Intel Corp. 80386 machine; and the PC-MOS/386 Multiuser-25, which is priced at $995 and lets up to 25 users run applications at dumb terminals.

Software Link said that all versions of PC-MOS/386 are Microsoft Corp. MS-DOS-compatible operating systems that support the four operating modes of the 80386 processor. Through support of the processor's real mode and virtual 8086 mode, the Software Link said that PC-MOS/386 will be compatible with all the existing base of MS-DOS application software.

Standard multitasking/multiuser features of PC-MOS/386 include support for record and file locking, intertask communications through the IBM Netbios protocol, print spooling, remote modem access, usage statistics, nested batch files and security at the user, file and directory levels.

Software Link added that applications that write directly to the video memory are intercepted by PC-MOS/386 and managed for users running multiple tasks or operating at remote terminals. According to the firm, PC-MOS/386 supports MS-DOS function calls while adding only a few extra functions to deal with memory management.

For further information, contact The Software Link, Inc., Suite 632, 8601 Dunwoody Place, N.E., Atlanta, Ga. 30338.

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Mary Krummenacher, Manager of Marketing Communications for Polygon, Inc., wanted corporate end users to know about their new IBM PC/VAX poly-COM/240 software communication package. She chose Computerworld.

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CALENDAR

Jan. 12-14, Park City, Utah — **Competitive Technology Strategies of AT&T, the BOCs and IBM.** Also being held March 19-20, Chicago. Contact: Telestrategies, Inc., P.O. Box 811, McLean, Va. 22101.

Jan. 14-16, Dallas — **Data Administration and Data Resource Development.** Also being held April 27-29, New York. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Jan. 14-16, San Diego — **Computer Graphics '87.** Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Jan. 14-16, Washington, D.C. — **Telecommunications Management.** Contact: BCR Enterprises, 950 York Road, Hinsdale; Ill. 60521.

Jan. 22-23, Boston — **The IBM PC XT/AT & Compatibles: Maximizing Their Potential.** Also being held Jan. 29-30, Orlando, Fla.; Feb. 9-10, San Diego; and Feb. 26-27, Washington, D.C. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Jan. 28-30, New York — **Computer Graphics New York '87.** Contact: Exhibition Marketing & Management, Inc., Suite 690, 8300 Greensboro Drive, McLean, Va. 22102.

Jan. 28-31, San Francisco — **The Seybold Group's Conference on Desktop Communications.** Contact: The Seybold Group, Suite 132, 20695 Western Ave., Torrance, Calif. 90501.

Feb. 2-5, Dallas — **Software Trends for Executive Planning and Strategy.** Contact: Digital Consulting Associates, Inc., 6 Windsor St., Andover, Mass. 01810.

Feb. 3-5, San Francisco — **Data Base: A Manager's Guide.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Feb. 4-6, San Francisco — **Data Networks: Management, Operation and Control.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Feb. 5-6, Boston — **An Intensive Introduction to T1 Networking.** Also being held Feb. 9-10, Atlanta; Feb. 12-13, Detroit; and Feb. 19-20, Princeton, N.J. Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015.

Feb. 9-10, Boston — **Fourth- and Fifth-Generation Data Management Software.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Feb. 9-10, St. Louis — **Implementing Low-Cost CADD.** Also being held Feb. 12-13, Washington, D.C.; April 27-28, Cleveland; April 30 to May 1, Chicago; and June 11-12, Boston. Contact: National Computer Graphics Association, P.O. Box 3412, McLean, Va. 22103.

Feb. 9-11, Boston — **End-User Strategies: The Convergence of OA and the PC.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Feb. 9-12, Washington D.C. — **Communication Networks Conference & Exposition.** Contact: Communication Networks, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Feb. 9-12, Chicago — **Supercomputers and AI Machines.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

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Aim Technology	*415-856-UNIX*	28
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BMC Software	*800-841-2031; 713-240-8800; in Canada, 800-231-2698*	17
CGI Systems, Inc.	*800-PAC-1866; 914-735-5030*	Cover 4
Computer Technology Group	*800-323-8649, 312-987-4084*	7
CW Circulation	*800-544-3712; in PA, 215-768-0388*	24
CW Focus	*617-879-0700*	Cover 3
CW Testimonial	*617-879-0700*	35
Gould, Inc.	*800-327-9716*	34
Informix Software, Inc.	*415-322-4100*	26-27
Language Processors, Inc.	*617-890-1155*	16
MBP Software and Systems Technology, Inc.	*800-231-6342; in CA, 800-346-4848*	4
Micro Focus, Inc.	*415-856-4161*	14
MicroFrame, Inc.	*609-395-7800*	30
Nastec Corp.	*800-872-8296; 313-353-3300*	23
Sage Software, Inc.	*800-638-8703; 301-230-3200*	Cover 2
Software Technologies & Research, Inc.(STAR,Inc.)	*800-258-STAR; in CT, 203-529-7128*	12
Unitech Software Inc.	*703-860-3000*	6
Whitesmiths, Ltd.	*800-225-1030; 617-692-7800*	22

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2	22	42	62	82	102	122	142	162	182	202	222	242	262	282	302	322	342	362	382
3	23	43	63	83	103	123	143	163	183	203	223	243	263	283	303	323	343	363	383
4	24	44	64	84	104	124	144	164	184	204	224	244	264	284	304	324	344	364	384
5	25	45	65	85	105	125	145	165	185	205	225	245	265	285	305	325	345	365	385
6	26	46	66	86	106	126	146	166	186	206	226	246	266	286	306	326	346	366	386
7	27	47	67	87	107	127	147	167	187	207	227	247	267	287	307	327	347	367	387
8	28	48	68	88	108	128	148	168	188	208	228	248	268	288	308	328	348	368	388
9	29	49	69	89	109	129	149	169	189	209	229	249	269	289	309	329	349	369	389
10	30	50	70	90	110	130	150	170	190	210	230	250	270	290	310	330	350	370	390
11	31	51	71	91	111	131	151	171	191	211	231	251	271	291	311	331	351	371	391
12	32	52	72	92	112	132	152	172	192	212	232	252	272	292	312	332	352	372	392
13	33	53	73	93	113	133	153	173	193	213	233	253	273	293	313	333	353	373	393
14	34	54	74	94	114	134	154	174	194	214	234	254	274	294	314	334	354	374	394
15	35	55	75	95	115	135	155	175	195	215	235	255	275	295	315	335	355	375	395
16	36	56	76	96	116	136	156	176	196	216	236	256	276	296	316	336	356	376	396
17	37	57	77	97	117	137	157	177	197	217	237	257	277	297	317	337	357	377	397
18	38	58	78	98	118	138	158	178	198	218	238	258	278	298	318	338	358	378	398
19	39	59	79	99	119	139	159	179	199	219	239	259	279	299	319	339	359	379	399
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4	24	44	64	84	104	124	144	164	184	204	224	244	264	284	304	324	344	364	384
5	25	45	65	85	105	125	145	165	185	205	225	245	265	285	305	325	345	365	385
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7	27	47	67	87	107	127	147	167	187	207	227	247	267	287	307	327	347	367	387
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9	29	49	69	89	109	129	149	169	189	209	229	249	269	289	309	329	349	369	389
10	30	50	70	90	110	130	150	170	190	210	230	250	270	290	310	330	350	370	390
11	31	51	71	91	111	131	151	171	191	211	231	251	271	291	311	331	351	371	391
12	32	52	72	92	112	132	152	172	192	212	232	252	272	292	312	332	352	372	392
13	33	53	73	93	113	133	153	173	193	213	233	253	273	293	313	333	353	373	393
14	34	54	74	94	114	134	154	174	194	214	234	254	274	294	314	334	354	374	394
15	35	55	75	95	115	135	155	175	195	215	235	255	275	295	315	335	355	375	395
16	36	56	76	96	116	136	156	176	196	216	236	256	276	296	316	336	356	376	396
17	37	57	77	97	117	137	157	177	197	217	237	257	277	297	317	337	357	377	397
18	38	58	78	98	118	138	158	178	198	218	238	258	278	298	318	338	358	378	398
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5	25	45	65	85	105	125	145	165	185	205	225	245	265	285	305	325	345	365	385
6	26	46	66	86	106	126	146	166	186	206	226	246	266	286	306	326	346	366	386
7	27	47	67	87	107	127	147	167	187	207	227	247	267	287	307	327	347	367	387
8	28	48	68	88	108	128	148	168	188	208	228	248	268	288	308	328	348	368	[illegible]
9	29	49	[illegible]	[illegible]	109	129	149	169	189	209	229	249	269	[illegible]	309	329	349	369	389
10	30	50	70	90	110	130	150	170	190	210	230	250	270	290	310	330	350	370	390
11	31	51	71	91	111	131	151	171	191	211	231	251	271	291	311	331	351	371	391
12	32	[illegible]	72	92	112	132	152	172	192	212	232	252	272	292	312	332	352	372	392
13	33	53	73	93	113	133	153	173	193	213	233	253	273	293	313	333	[illegible]	373	393
14	34	54	74	94	114	134	154	174	194	214	234	254	274	294	314	334	354	374	394
15	35	55	75	95	115	135	155	175	195	215	235	255	275	295	315	385	355	375	395
16	[illegible]	[illegible]	76	96	116	136	156	176	196	216	236	256	276	296	316	336	356	376	396
17	37	57	77	97	117	137	157	177	197	217	237	257	277	297	317	337	357	377	397
18	[illegible]	[illegible]	78	98	118	138	158	178	198	218	238	258	278	298	318	338	358	378	398
19	39	59	79	[illegible]	119	139	159	179	199	219	239	259	279	299	319	339	[illegible]	379	399
[illegible]	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400

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INSIDE

In Depth — RISC vs. CISC: The debate goes on. **Page 57.**

■

Executive Report — Capacity planning: Management finally sees the light. **Page 41.**

■ ■ ■

Lotus ships developer tools and readies RAM-resident manager. **Page 7.**

■

Gateways to connect both sides of the Unisys family debut. **Page 8.**

■

Pressure mounts for IRS clarification of contract programmer tax status. **Page 2.**

■

NCR aims to broaden retail systems market with fault-tolerant capabilities. **Page 13.**

■

DP trainers battle lack of respect for corporate service function. **Page 73.**

■

Final approval awaited for interfacing TCP/IP and Netbios. **Page 29.**

■

DEC adds real-time products to VAX line. **Page 19.**

■

Ashton-Tate's Esber predicts closed-door IBM operating system for next line of PCs. **Page 119.**

■

Cincom's Supra outscores IBM's DB2 in relational critique, according to Edgar F. Codd. **Page 25.**

■

Digital Communications Associates rolls out first products resulting from acquisition of Cohesive Network Corp. **Page 4.**

■

ETA Systems delivers the first field-test version of its ETA-10 supercomputer. **Page 10.**

IBM reboots data dictionary

Said to focus on needs of DB2 users

By Charles Babcock

An IBM effort to develop a repository, or global dictionary, has recently been refocused in hopes of yielding a DB2 dictionary this year, according to outside observers.

A data dictionary would be good news for users of DB2, who find the existing DB2 catalog too limited in function. But the shift would also indicate that the global dictionary for IBM's MVS subsystems — such as TSO and CICS — for defining terminal networks and for controlling application development is farther off than anticipated, the observers said.

The repository project had been under way for at least three years in Poughkeepsie, N.Y., but was moved at the end of last year to the IBM development lab in Santa Teresa, Calif., where work on IMS and DB2 is performed, according to IBM customers and knowledgeable observers.

IBM spokesmen refused to confirm or deny the move.

"IBM has scrapped its repository project in Poughkeepsie. It's in complete disarray. IBM is starting all over again in Santa Teresa," said a customer for a large IBM site in the Midwest.

"I think it's a positive step," said Edgar F. Codd, president of the Relational Institute in San Jose, Calif., and one of those familiar with the changes. "In Poughkeepsie, there was an old-line team that wanted to stick with old concepts. Those concepts were not suitable for dictionary support for relational systems."

IBM replacing parts in 3380 head-disk assemblies. Page 6

The shift indicates a change in development teams and the possibility of a long delay before the repository comes to market, said the IBM customer, who did not know whether any members of the Poughkeepsie development team are still on the project.

"When IBM originally placed the repository project in Poughkeepsie, it was more interested in what it could do for MVS than for DB2," said another observer who asked not to be identified. With production use of DB2 growing, IBM is ready to give priority to the DB2 dictionary, he said.

Although it has not been officially announced as a product, the repository has been the subject of IBM briefings to major customers. It was described as an integrator of IBM's major MVS subsystems with a dictionary for DB2 as one of several components, customers said. The repository has also been referred to by IBM officials during conferences sponsored by research firms and other public events.

Although he declined to comment on the reported changes, an IBM spokesman

See **IBM** page 8

'Dbase IV' will run with SQL

By Douglas Barney

TORRANCE, Calif. — Ashton-Tate, the leader in the microcomputer data base market with Dbase III Plus, is planning a two-pronged approach to data base product development, aimed at maintaining the firm's No. 1 position in the midst of increasing competition.

The first approach involves a product that is code-named Nova. This product is the next version of Dbase that is designed to run under existing versions of Microsoft Corp.'s MS-DOS and is expected to be released later this year.

The package will contain an implementation of IBM's SQL and an improved user interface using pull-down menus similar to Ashton-Tate's Framework integrated package, sources and an Ashton-Tate executive said.

See **'DBASE'** page 6

Stumbling in DP, Wang will post loss; cuts salaries, jobs

By Clinton Wilder

LOWELL, Mass. — Wang Laboratories, Inc., showing the continued effects of its failure to crack the data processing market, last week announced its second major work force reduction in 18 months and projected an unexpectedly large, second-straight quarterly loss.

Wang will cut 1,000 positions from its worldwide work force of about 30,000, including 600 by layoff. In addition, most salaried employees must take a 6% reduction in pay through the end of Wang's fiscal year, which runs until June 30. The actions are intended to save $50 million in the next six months, according to President Frederick A. Wang.

Fred Wang: Moves to pare losses

Robert L. Doretti, Wang's senior vice-president of marketing communications, said the company has been hurt by deferred orders for its VS 300 minicomputer, in part because of operating system bugs that have now been corrected.

"We had selected 10 to 15 top customers that we were sure would order 300s in October, but instead, we got them in December," Doretti said. "The operating system problems were fixed late in the first quarter, but from there you have to build up customer confidence again."

Analysts and users, however, suggested last week that Wang's problems run far deeper than software fixes

See **WANG** page 119

Odd couple to battle Pentagon security plan

By Mitch Betts

WASHINGTON, D.C.— An unusual alliance of a civil rights organization and an electronic information trade group has begun a major political assault on the U.S. Department of Defense's plan to regulate what it calls "sensitive information" available from commercial data base services.

The Information Industry Association, representing on-line data base vendors, has linked up with the American Civil Liberties Union in an attempt to counter the Pentagon's stated intent to limit access to information that, while unclassified, is deemed by the military to be of a sensitive nature.

Jerry J. Berman, legislative counsel for the ACLU, said, "Any time you can have the traditional First Amendment coalition plus a high-tech business group, you have the potential for a powerful coalition."

The controversy was triggered by two related events: the creation of a new information security category called "sensitive but unclassified" [CW, Nov. 24], and a Pentagon official's declaration last November that some controls would be placed on unclassified, on-line data bases to protect sensitive national security information from disclosure to foreign adversaries [CW, Nov. 17].

The IIA and the ACLU are forging a coalition that is expected to include the American Library Association, the American Association for the Advancement of Science and the American Newspaper Publishers Association, according to Kenneth B. Allen, IIA vice-president for governmental relations, and other sources.

Berman said the emerging coalition maintains the Pentagon has overstepped its bounds by attempting to restrict the flow of information that is already in the public domain. He said a public debate is needed to strike a bal-

See **ODD** page 4

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IRS to clarify tax law change

Amendment threatens independents' status

By David A. Ludlum

Widespread confusion continued among independent computer professionals, their clients and their brokers last week as all waited for the Internal Revenue Service to clarify a change in the federal income tax law.

The IRS was working on the clarification of Section 1706 of the Tax Reform Act of 1986, which threatens the independent status of many of the independents. The section took effect Jan. 1.

IRS spokesman Wilson Fadely said he could offer no estimate of when the clarification will be issued or even what form it will take.

One of the major questions surrounding Section 1706 — whether it applies only to independents working through brokers, only to those working directly with clients or to both — remains unanswered, Fadely said.

Safe-harbor provision

Section 1706 removes the so-called safe-harbor provision that had shielded independent computer and engineering professionals from standards used to determine whether most taxpayers are employees or independent contractors.

Independents who without the safe harbor are found to be employees stand to lose many income tax deductions available to independent contractors and become subject to withholding for federal income and Social Security taxes.

Amid the vacuum of concrete information last week, independent professionals found themselves in varying circumstances, and brokers and employers addressed the confusion in different ways.

"Everybody's employer is treating the situation differently," said a consultant employed by a New York computer services firm who was looking into independent work and requested anonymity.

"Some employers are holding part of contractors' pay in escrow against tax liabilities, while others are offering employee status at about a 20% cut from contract wages," the consultant said.

An independent consultant working at a Buffalo, N.Y., steel plant through a large computer services firm, who also asked not to be named, faced termination of his contract with the firm at the end of the week and the option of becoming an employee of the firm — at a 40% pay cut. He hoped to contract directly with the steel company but said the company did not know if the new law allows it to do that.

The consultant, who has set up his own corporation, said his biggest setback in becoming an employee would be losing a retirement plan, available to him as a business owner, that lets him defer taxes on up to 25% of his income.

Dan Victery, a Chapel Hill, N.C., independent consultant working at Gulfstream Aerospace Corp. in Savannah, Ga., was not working while he awaited clarification of the law. Some fellow contractors began working as employees, taking 8% to 10% pay cuts to cover tax withholding and benefits, he said.

Comsys, Inc., a Rockville, Md., broker for about 80 independent contractors, was doing business as usual and planned to ask the IRS to rule on its status, Vice-President Howard Stein said.

The firm was also seeking to form an association with other brokers in the area to hire a lobbyist to try to repeal the section, according to President Fred Shulman.

The St. Louis-based Independent Computer Consultants Association also was planning to try to overturn Section 1706 once the section has been clarified.

Atari, Commodore enter IBM PC-compatible market

By Douglas Barney

LAS VEGAS — Long-standing rivals Atari Corp. and Commodore Business Machines, Inc. will now do battle in the low-cost IBM Personal Computer-compatible marketplace.

The two firms previously fought to establish a foothold in the non-IBM-compatible market but last week joined the ranks of Victor Technologies, Inc., Amstrad PLC and Hyundai Electronics, all of which market low-cost compatibles through mass market channels.

The Atari machine comes standard with support of IBM's Enhanced Graphics Adapter (EGA). It will sell for $699 with a floppy disk drive and monochrome monitor that supports EGA's 16 colors through the use of scales of gray. The product will be available through mass merchandisers and computer specialty stores, said Neil Harris, director of marketing communications for Atari.

Also last week, Commodore announced the PC10-1 and PC10-2. For $999, users can purchase an Intel Corp. 8088-based system with five expansion slots and 512K bytes of random-access memory (RAM). The PC10-2 sells for $1,199 and comes with dual floppies and 640K bytes of RAM. Commodore officials were not available for comment at press time.

Laser printer

In addition to its IBM PC-compatible, Atari announced a $1,500 laser printer that works only with the Atari ST product line.

The laser printer is part of a complete desktop publishing system that Atari expects to sell for less than $3,000.

According to Atari's Harris, the desktop publishing system is less than half the price of a comparable system based on Apple Computer, Inc.'s Macintosh and will be available only through computer specialty stores.

In this issue

NEWS

DCA previews development of CAD data management/ **4**
IBM replacing head-disk assemblies to prevent crashes on DASD models/ **6**
Lotus begins shipping development tools for 1-2-3, Symphony users/ **7**
Metro's introduction expected to evoke competition for desktop managers and Lotus/ **7**
Applitek premiers Unisys family gateways/ **8**
ETA Systems delivers single-CPU supercomputer to Florida university/ **10**
Codex debuts packet-switching products/ **12**

SYSTEMS & PERIPHERALS

DEC extends capacity of VAX systems with product introductions/ **19**
Gulfstream Micro aims family of supermicros at small- and medium-size facilities/ **19**
Research firm predicts growth in departmental computing/ **19**

SOFTWARE & SERVICES

Cincom Systems' Supra receives highest relational model rating/ **25**
VM Software releases tools for IBM VM/SP operating system/ **25**
Software package converts PCs into SQL workstations/ **25**

COMMUNICATIONS

Further AT&T rate cuts have long-distance fees at three-year low/ **29**
Task force members work to implement standards for Netbios-to-TCP/IP interface/ **29**

MICROCOMPUTERS

Seven microcomputer software vendors charge Canadian firm pirated software/ **37**
Datasheet should increase Lotus 1-2-3 users' data access/ **37**

MANAGEMENT

DP trainers demand more respect at recent conference/ **73**

COMPUTER INDUSTRY

Pansophic's 1986 acquisitions are part of plan for the future/ **99**
Ashton-Tate charges Migent with unfair competition/ **122**
IBM closes analytical instruments subsidiary/ **122**
Unisys exits MCC research and development programs/ **122**
Olivetti licensed to implement direct document exchange software/ **122**

EXECUTIVE REPORT

Senior management has come to view capacity planning as a permanent part of MIS strategy. By Michael Sullivan-Trainor/ **41**

IN DEPTH

An index of 1986 feature articles/ **55**
RISC vs. CISC: Most MIS managers ignore the subject of CPU architecture. But the RISC debate centers on system compatibility and price/performance — topics worthy of MIS' attention. By Karl Reed/ **57**

OPINION & ANALYSIS

Newquist calculates his memory storage capacity/ **17**
Connolly takes a look at optical computing/ **19**
Safirstein maps out steps to improve processing performance/ **25**
Horwitt longs for AT&T's predivestiture days/ **29**
Zachmann reviews 101 Macros for Lotus 1-2-3 users/ **37**
Bernacchi and Frank untangle the complexities of the new tax law/ **73**
Blumberg discusses the manifestation of IBM's new service strategy/ **122**

DEPARTMENTS

Editorial/ 16
Calendar/ 74
New Products/ 83

PAGE 17 ILLUSTRATION BY ALAN WITSCHONKE

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DCA enters network processor market

Products spring from merger with Cohesive

By Donna Raimondi

ATLANTA — Digital Communications Associates, Inc. (DCA) last week unveiled a network processor and a network management system from the former Cohesive Network Corp., the T1 multiplexer manufacturer that merged with DCA in September.

The System 9000 network processor merges elements from Cohesive's existing low-end and high-end T1 network processors to create a modular system that can be upgraded as users' needs expand.

The entry-level product supports both voice and data transmission over two 1.5M bit/sec. T1 trunks and can be expanded modularly up to a 36-trunk system without user loss of investment in hardware or software, according to DCA.

While the modular approach is not unheard of, what makes this product significant is the size and stability of DCA, said communications consultant Richard Kuehn of RAK Associates in Cleveland. There are many small start-up companies with good products in the network processor arena, he said, but they are so small that it is often difficult for them to provide good support for customers.

The System 9000 costs $18,250 for a T1 two-trunk system. A basic two-trunk redundant system, the typical initial configuration, costs $21,250 and includes two small system CPUs, one of which takes over if the first crashes.

CPU addition

Any larger systems require the addition of different CPUs, which cost $14,000. Depending on the size of the configuration, users also may have to add data, voice and T1 cards (interfaces to T1 facilities), which cost $2,500, $2,500 and $3,000 each, respectively.

The company also released a network management system based on Sun Microsystems, Inc. workstations. The management system is a partial integration of Cohesive and DCA products, in that a user may monitor DCA or Cohesive networks through windows in the system, according to a DCA spokesman. "We plan, at a later date, to integrate all DCA information into the Cohesive data base," the spokesman said.

The dual-vendor window approach is unusual and probably indicates the beginning of a trend, Kuehn said. "It is increasingly falling on the user to manage his own network. There is a lot of mixing of vendor products within a network because of the quantity of vendor layoffs coupled with intermixing of various vendor products and/or carriers, and the central responsibility keeps moving back to the end user," he said. Equipment integrators are building test centers to monitor various vendor products, but it is not usually done by the vendors themselves, Kuehn added.

An entry-level system, which is based on a relational data base written on top of the AT&T Unix System V operating system and updated in real time, is based on the Sun 3/52 workstation. It is available for $15,000.

The Sun arrangement will allow DCA to move toward one management system for both companies' products and to eventually add sophisticated graphics monitoring capabilities, according to the DCA spokesman. "We will have pictorial representations with color coding in the future. We are shooting for the Telecommunications Association Conference in September to have a big graphics announcement," he said.

The Sun systems also add higher and lower end options to DCA's current NCR Corp. Tower-based network management workstations, which the company will continue to support, a DCA spokesman said.

Initial deliveries of both products will be made this quarter.

Odd couple battle Pentagon plan

From page 1

ance between national security interests and the need for the free flow of information.

The coalition has not yet devised its legislative strategy, but sources said it ultimately wants to enlist Congress's help to thwart the Pentagon efforts.

Furthermore, the IIA's board of directors, in a strongly worded letter to Defense Secretary Caspar Weinberger, urged withdrawal of the new sensitive but unclassified information category and called for a congressional inquiry.

"We just think the whole issue needs to be moved out of the Pentagon and into the public forum," Allen said.

Allen claimed that Pentagon controls would also hurt the business of information vendors. "Citizens aren't going to be willing to tie into data bases if they know the government's monitoring them. And if the data is not available to begin with because the government has classified it, you can't sell it to people," Allen said.

In response, Pentagon spokeswoman Jan Bodanyi said, "It's not the Defense Department's intent to restrict access to commercial or private data bases. The new sensitive but unclassified information policy is intended to prevent the release of sensitive information that rightfully requires protection and to prevent it from getting into these data bases in the first place."

> ”
>
> ***'Citizens aren't going to be willing to tie into data bases if they know the government's monitoring them.'***
>
> — **Kenneth B. Allen**
> **Information Industry Association**

The controversy is somewhat murky because the Pentagon has not announced what sort of national security controls it proposes for unclassified data base services; that announcement may be months away, sources said.

In the meantime, IIA members are upset that during the past few months, representatives from the Defense Department, the Central Intelligence Agency and the Federal Bureau of Investigation have been visiting information vendors to ask questions about the users of their services.

Carl Valenti, IIA board chairman and vice-president of information services at Dow Jones & Co. in New York, said it appears to some IIA members "that the government is attempting to achieve its objectives through intimidation and coercion — apparently hoping that private information companies will voluntarily restrict access to their information or police who uses it."

In addition, IIA officials reported that the Department of Commerce recently attempted to obtain customer lists from information vendors. They also said that the National Aeronautics and Space Administration has established a so-called "no-no list" of companies that are to be denied subscriptions to NASA technical literature because they have foreign customers.

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Editorial Assistants
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News Bureaus

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201/967-1350
Alan Alper, Correspondent

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202/347-6718
Mitch Betts, Correspondent

Southeast
404/394-0758
James A. Martin, Correspondent

West Coast
415/424-8844
Jeffry Beeler, Chief
Peggy Watt, Correspondent

Midwest
312/827-4433
Jean Bozman, Correspondent

CW Communications International News Service
Susan Blakeney, Director

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171 617/879-0700

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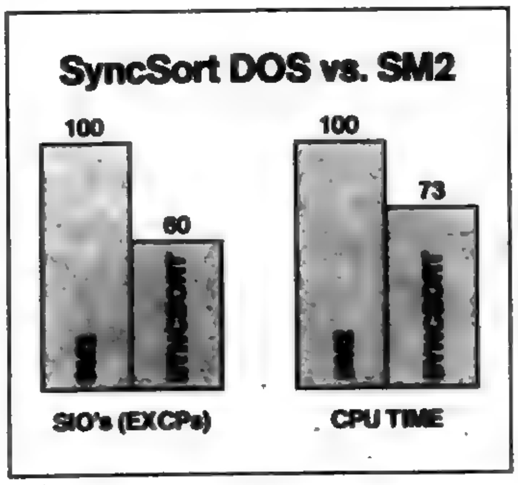

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IBM mandates revamp of older 3380s in response to crashes

Estimated 40,000 units impacted

By Stanley Gibson

Seeking to avert possible head crashes, IBM is in the midst of replacing parts of the head-disk assemblies on some 40,000 storage devices.

The replacements, which an IBM spokesman termed mandatory under IBM's maintenance agreement, are intended to prevent crashes on three models of its 3380 2.5G-byte direct-access storage device (DASD): the AO4, BO4 and AA4 made between 1982 and 1985. These drives are no longer in production, and IBM's latest models, the D and E series of 3380s, are not affected, IBM said.

The head-crash problem stems from the release of two flame-retardant chemicals, antimony and bromine, that have been bonded to plastic parts of the air-intake assembly. Over time, the bonding can fail, allowing the chemicals to enter the system, build up on the heads and cause them to crash.

To prevent this occurrence, IBM is replacing four parts: the intermediate filter, the absolute filter, the J-tube and the plenum. All new assemblies use a bonding method different from the old method, according to an IBM spokesman.

"Only a very small percentage of drives have had problems," the spokesman said, but he declined to give a specific number. IBM, under warranty, has replaced the drives that crashed, the spokesman added.

One user reported that 2% of his drives have failed and have had to be replaced by IBM. Ellis Stickels, manager of hardware technical service for Bank of America National Trust & Savings Association in San Francisco, said four of the approximately 200 AO4, BO4 and AA4 assemblies have failed since May 1986.

Jerry Ritter, manager of product planning at Sorbus, Inc., said his firm has noted a higher than usual rate of failure in the heads. "We have seen problems with this particular drive and have requested that IBM do something about them," he said.

At one Sorbus account, Ritter said, his firm replaced two head-disk assemblies that failed. Every 3380 contains two head-disk assemblies, each of which costs $35,000, he added.

Another customer, who asked to remain anonymous, said he experienced six crashes among 120 AO4s, BO4s and AA4s. The crashes occurred in late 1985, and IBM replaced the units in early 1986. He said he discussed the problem with a dozen other users who together had encountered some 48 crash-[illegible]

James Porter, president of Disk/Trend, Inc., a disk drive research firm in Los Altos, Calif., said, "I'm sure [IBM] must have found some sort of degradation that would haunt them, otherwise they would not do this sort of thing," referring to the wholesale parts replacement program.

He explained that most assemblies would continue in use for several more years but would generally be replaced five years from now, so IBM must be certain the degradation would occur within that time.

The IBM spokesman said the current parts replacement is different from, but related to, a previous replacement program undertaken in response to head crashes on the same 3380 drives.

That problem was attributed to fungicides used in air-conditioning coolants that found their way into the drives' air-intake system.

Dbase to run with SQL

From page 1

While Ashton-Tate declined to comment on the timing of the next version of Dbase, a developer close to the firm said that Ashton-Tate targeted a fall 1987 introduction. In addition, Robert Therrien, an analyst with Paine Webber, Inc., said Ashton-Tate had told the financial community to expect the product sometime this year. "We are well under way. We have a clear plan and design," said Roy E. Folk, executive vice-president for Ashton-Tate's Software Products Division, in an interview last week.

The second prong involves a development effort code-named Diamond. This is a data base product that will run only on Intel Corp. 80286 and 80386-based machines running a version of MS-DOS that Microsoft has yet to release. This program could make use of a graphical user interface similiar to that of Dbase Mac, Ashton-Tate's data base for Apple Computer, Inc.'s Macintosh, sources said.

SQL will be implemented on both Nova — which many expect to be named Dbase IV — and Diamond. According to Folk, Ashton-Tate will use embedded SQL in the Nova product. "It will exist as a subset of the Dbase language and use all of the basic SQL primitives," Folk said. Based on Ashton-Tate research, Folk expects most users to use a combination of SQL and the Dbase language. "That is the most efficient," Folk said.

Ashton-Tate has felt pressure from its large corporate accounts and the investment community to move to SQL. "We are committed to SQL and recognize it as an MIS standard," Folk said.

Observers and data base experts believe that the improved Dbase interface is a direct response to competitive products such as Paradox from Ansa Software Co., which uses Query By Example (QBE), an interface in which the user gives the package an example of what he is looking for, and the product develops an algorithm to respond to the query.

But according to Folk, the menu-driven interface is in response to the growing base of new users. "We still believe that the most important audience is the new user. The market is vastly unpenetrated," Folk said.

While declining to give specific details, Folk said Ashton-Tate would implement a nonprocedural language, adding that QBE is a nonprocedural language. "You can already see some of that direction with the Assistant mode, pull-down menus and Framework-like extensions," Folk said, referring to the menu-driven front-end announced as part of Dbase III Plus. A former Ashton-Tate employee, however, told *Computerworld* that Nova would implement QBE.

A key concern of users is the inclusion of a sophisticated compiler and an interpreter for Dbase. Folk declined to comment on a possible compiler and an interpreter but said, "Clearly, requests from developers and users indicate that we take a close look at approaches such as compilers."

According to a developer who has seen the specifications for Nova, the Dbase programming language will receive little attention in the next release. "There are some token things in there for the programmer, but there really are not a lot of enhancements to the language," said the developer, who asked not to be identified. "They will be putting in user-defined functions such as Clipper [a Dbase compiler from Nantucket Software] but with some limitations." One is the inability to call commands in overlays, he said.

Folk agreed that enhancing the programming language was not a major concern. "There were not significantly more commands that people wanted," he said.

Because of the addition of SQL and the enhanced user interface, Nova is expected to require at least double the memory needed to run Dbase III Plus. While Dbase III Plus requires only 256K bytes, Nova is expected to need at least 512K bytes. According to Folk, most machines currently sold have at least 512K bytes, and the cost of upgrading memory is continuing to decline dramatically. Folk declined to comment on Nova's memory require-[illegible]

The product is not expected to be optimized to run under an operating environment such as Microsoft Corp.'s Windows or IBM's Topview. Both these environments take up valuable memory and do not run efficiently on Intel 8088-based machines, observers agreed. Folk added that neither Windows nor Topview has emerged as a standard operating environment.

A key goal for Ashton-Tate is to maintain file compatibility with the existing version of Dbase. Ensuring total compatibility with the Dbase command language is difficult, if not impossible, with the inclusion of SQL commands. "The embedded SQL would keep us from achieving total backward compatibility."

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Lotus ships tools to create 1-2-3 add-ons

By David Bright

CAMBRIDGE, Mass. — Lotus Development Corp. last week began formally shipping some development tools that will make it easier for software companies and user corporations to create add-in programs for the Lotus 1-2-3 and Symphony integrated packages.

To give an idea of the many types of add-in products it expects to be developed, Lotus hosted 11 software vendors that showed products they have built using Lotus Developer Tools in assembly language. Lotus also announced that it is developing two new programs with Developer Tools — Speedup, for selective recalculation, and Learn, for building 1-2-3 macros.

Because the add-in programs can be tied directly to Releases 2.0 and 2.01 of 1-2-3 and Symphony code, users will not have to learn new interfaces, and developers can focus their efforts on the application, rather than the interface, said Ed Belove, vice-president of research and development at Lotus.

Specialized applications

Rather than just making templates for companywide distribution, Belove predicted that many more corporations will now make specialized applications for their specific needs. Belove said that some corporate developers, as yet unnamed, are already working on add-in applications that customize 1-2-3 and Symphony.

Belove and many software vendors said that 1-2-3 will increasingly be used as a central control program. "It's not an operating system, but it's a technology base for a wide range of PC applications," Belove said.

Paul Funk, president of Funk Software, Inc., added that the market for closely integrated 1-2-3 add-in products will be quite enormous. A good indication of the demand, he said, is that his company has sold some 220,000 copies of its Sideways utility for printing wide spreadsheets.

Funk Software will soon release the Noteworthy cell-annotation tool, the Inword word processor and a version of Sideways that lets users print documents without leaving 1-2-3.

Developer Tools, priced at $150, represent a "lower entry barrier for developers," said Bill Lynch, head of Computervoice Corp. Computervoice sells a voice annotation add-in product for 1-2-3 and built Noteworthy for Funk Software.

The other developers showing available or soon-to-be-introduced add-in products were Amazon Systems, Inc.; Applied Decision Technology, Inc.; Blossom Software Corp.; Enfin Software Corp.; Informix Software, Inc.; KEL Systems, Inc.; Personics Corp.; Softbridge Microsystems Corp.; and Turner Hall Publishing.

The most popular category in the new products is word processing. Other products include relational data base management systems, a screen data compression package and a work sheet catalog system.

Metro sparks competition in RAM market

By Douglas Barney

CAMBRIDGE, Mass. — Competition in the market for random-access memory (RAM)-resident desktop managers will heat up with the announcement today of Metro from Lotus Development Corp.

The announcement marks the end of Spotlight, a $75 desktop manager that Lotus acquired from Software Arts, Inc.

The Lotus product includes 12 functions, such as a text editor, calculator, Microsoft Corp. MS-DOS file manager and a watch.

The non-copy-protected product utilizes an interface similar to that of Lotus 1-2-3 and can be customized by the user.

The package uses a RAM-resident core program that controls the 12 components. Users can load the core and then load only the components they will need.

'Build-your-own product'

"It is a build-your-own product. Metro is basically an environment. You can use whatever pieces you choose," said Connall Ryan of product marketing, business applications group, for Lotus.

The package also contains a macro generator that records keystrokes and plays them back. The macro generator includes a command language that allows the user to automate data transfer between programs, the vendor said.

In addition, users can create templates, custom menus and text screens for applications.

'A platform for other products'

Lotus hopes that other firms and users will develop applications that work with Metro.

"The technology forms a platform for other products. The specs of the Metro kernel will be released in six to eight months for developers," Ryan said.

Metro is currently shipping and requires 80K bytes of RAM to load the kernel, with more memory needed to load additional components. It costs $85, and a hard disk is recommended.

Gateways provide dual link to Sperry, Burroughs systems

By Elisabeth Horwitt

WAKEFIELD, Mass. — Gateway products that connect both sides of the Unisys Corp. family through a local-area network were introduced last week by Applitek Corp.

The gateways, called Sperry NI10/G and Burroughs NI10/G, enable asynchronous terminals to access either type of host through Applitek's proprietary local-area network (LAN), Unilan, the company said.

Based on Applitek's existing NI10 line of network interfaces, the gateways provide solutions to organizations whose users want to access both types of hosts from the same terminal, according to Applitek marketing manager Jerry McDonald. "The government sector in particular has both Burroughs Corp. and Sperry Corp. installations," he said.

Mitre Corp., a nonprofit company that performs systems engineering and specifications for the Department of Defense, already is using Unilan internally. Mitre "will consider the gateways' potential use in DOD installations that have Burroughs and Sperry systems," said Lee La Barre, who is a member of the Bedford, Mass., company's technical staff.

"Applitek has replaced direct terminal-to-host links with its Unilan local-area network, which offers an advantage in ease of moving devices around," said La Barre. "Burroughs does offer an Ethernet LAN connection, and Sperry computers can be linked to Ethernet through third-party vendor Bridge Communications, Inc., but Applitek's product may be unique in its ability to allow an asynchronous terminal to access both Burroughs and Sperry hosts."

Replacing direct terminal-to-host connections with Unilan increases maximum distance of the links from hundreds of feet to at least 20 miles more than the broadband version of the LAN, according to McDonald. Unilan is a backbone network that supports baseband Ethernet 802.3 subnetworks and up to 60 assignable 10M bit/sec. broadband channels.

Proprietary protocols overcome the problem of increasing frequency of signal collisions that occurs on Ethernet LANs when distances between nodes go beyond a certain point, McDonald said.

"The gateways would be even more useful if you could use them to establish interprocess communications between Sperry and Burroughs hosts," commented La Barre. The solution is for Burroughs and Sperry systems to support common communications protocols, such as Transmission Control Protocol/Internet Protocol or Open Systems Interconnect, he noted.

Unisys currently offers "nothing similar to Applitek's products," according to company spokesman James Kenyon. "I'm certain there are customers of ours who could use the gateways," he added.

The Sperry NI10/G Gateway uses a bisynchronous poll-select link to connect to either a Sperry DCP 10, DCP 20 or DCP 30 network controller, or to a Sperry Group Controller Secondary. It emulates Sperry's T-Mux terminal multiplexer when it communicates with the Sperry host.

The Burroughs NI10/G Gateway uses a poll-select link to connect to a Burroughs B874, CP3680 or CP2000 front-end processor. The gateway appears as one of the preceding Burroughs devices to a Burroughs ET1100, MT980 or TD830 terminal or to another Burroughs host. It provides Burroughs Display Station screen emulation for different types of asynchronous terminals.

Both gateways support up to 64 virtual circuits at a maximum speed of 9.6K bit/sec. Prices start at $600 per connection for both the Burroughs and Sperry gateways. The products are available now.

IBM reboots data dictionary

From page 1

did remark on the need for a repository-type function. Thomas R. Belz, with IBM's Information Systems Division in Rye Brook, N.Y., said IBM "recognizes that there are key customer requirements to provide repository capabilities. . . . To meet those requirements, one would have to provide the ability to define information for systems management or application development purposes.

"Accomplishing this not only involves building a system repository capability but also identifying the information that needs to be stored in a repository," he said. "IBM has been working with customers for some time to understand and prioritize their requirements." Belz declined to say at what site this effort is centered.

Some observers warned against putting too negative an interpretation on the project's move. Michael Braude, vice-president of the Gartner Group, said responsibility for the Repository rests with three IBM development labs, including both Raleigh, N.C., and Santa Teresa, "with nominal leadership in Poughkeepsie."

Sharon Weinberg, president of the Codd & Date Consulting Group in San Jose and a former IBM senior technical planner for DB2, said the shift does not necessarily negate the work done in Poughkeepsie. The Poughkeepsie effort centered on "what descriptors were needed to define each subsystem. That's a fairly sizable piece of work, and it can be transported [to Santa Teresa]," she said.

Nevertheless, all parties agreed the shift indicated at least a temporary setback for the repository. "There's going to be a delay; some throwing of stones back and forth. I'm sure that's taking place," one observer said.

Poughkeepsie is the center of IBM's MVS operating system development. The repository project originally grew out of the need to integrate the many subsystems of MVS and IBM's Systems Network Architecture.

Weinberg described the Poughkeepsie work as producing a repository based on data entities and relationships when it needed to be based on the logical relations of a relational data base management system. "Any time a request was made for information, the request had to be tranalated to logical relations before it could be passed on to the DBMS. The same thing happened when the answer came out. You're paying an enormous penalty in terms of performance. It becomes an impossible bottleneck," she said.

Spokesmen for both Cullinet Software, Inc. and Applied Data Research, Inc. (ADR), both of which sell active dictionaries with their data base management systems, noted that their dictionaries manage application development and fourth-generation languages as well as data.

"Our dictionary has become the centerpiece of all our integration efforts — not without a lot of work. IBM faces a very large integration problem," said Joseph W. Farrelly, vice-president for research and development at ADR.

Cullinet's development tools and DBMS are, likewise, integrated through the data dictionary, according to David A. Litwack, executive vice-president.

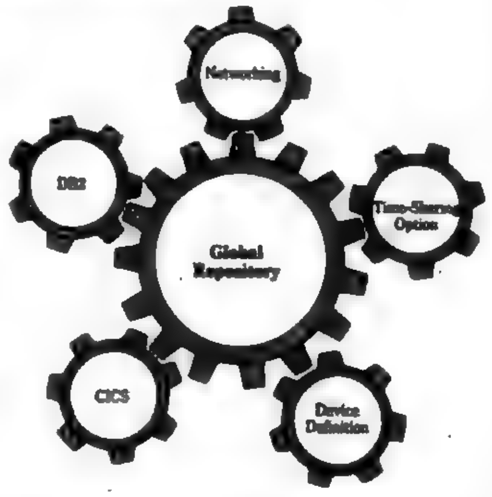
Moving its repository project to Santa Teresa will help IBM tie the dictionary to DB2, but the company must still move its fourth-generation language, Cross System Product, into the dictionary. It has been developed as an application rather than as part of the Santa Teresa data base site, Litwack claimed.

George Schussel, president of Digital Consulting, Inc., data base consultants in Andover, Mass., remained skeptical that IBM will ever master the intricacies of a multisystem repository. "I don't have any facts on the repository, but I know IBM software. I have found the claims IBM has made for it to be absurd," Schussel said.

MITCHELL J. HAYES

Global repository

IBM's super data dictionary concept



An IBM global repository theoretically would be a super data dictionary managing the data definitions and rules governing MVS subsystems, including DB2, CSP, TSO, CICS and software development tools. It would also be the central facility for network management and device definition, a set of tasks that IBM is apparently finding more difficult to accomplish than anticipated.

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SOFTWARE ENGINEERING OF AMERICA SEA

ETA delivers first field-test single-CPU supercomputer

By James Connolly

TALLAHASSEE, Fla. — What is reported to be the first field-test version of an ETA Systems, Inc. ETA-10 supercomputer was delivered last week to the Florida State University Computing Center.

The unit installed at Florida State is a single-CPU version, rather than the full 10-CPU system that ETA Systems — the supercomputer group spun off from Control Data Corp. three years ago — expects to formally announce within several months.

Robert Johnson, vice-president of research and graduate studies for Florida State, said the university is awaiting delivery of three more CPUs and a shared-memory facility, due to be shipped later this month.

Much of the university's supercomputing work is in support of a Department of Energy contract.

Early commitment

Johnson said Florida State ordered the four-CPU supercomputer in 1983 and has been running an ETA Systems Cyber 205 in the interim. He reported that the university was chosen as a test site because it committed to the ETA-10 so early. The original $13 million contract called for June 1987 delivery. The installation at Florida State gives an early look at the ETA-10's technology.

Johnson said the ETA processor, like the processor of competitor Cray Research, Inc.'s Cray-2 supercomputer, is immersed in a coolant based on liquid nitrogen rather than using traditional coolant piping. The company claimed that a 10-CPU system will perform up to 10 billion floating-point operations per second (FLOPS), compared with the 800 million FLOPS maximum of the Cyber 205.

Performance match

Johnson said he expects the performance of each of his four CPUs to match the Cyber 205's performance. The installed CPU, which has 32M bytes of memory, uses only 240 chips, compared with 8,200 chips in the Cyber 205.

He also said the new system is much more compact than the Cyber 205. The ETA Systems' CPU is three feet by four feet by one foot, while the Cyber 205 was 17 feet long, 10 feet wide and seven feet high.

"It is performing far better than we expected," Johnson said. He reported the system was delivered on Monday and installed within hours. The coolant was added later in the week. He said the software that will be initially run on the system will be a combination of applications ported from the Cyber 205 and software chosen by ETA Systems.

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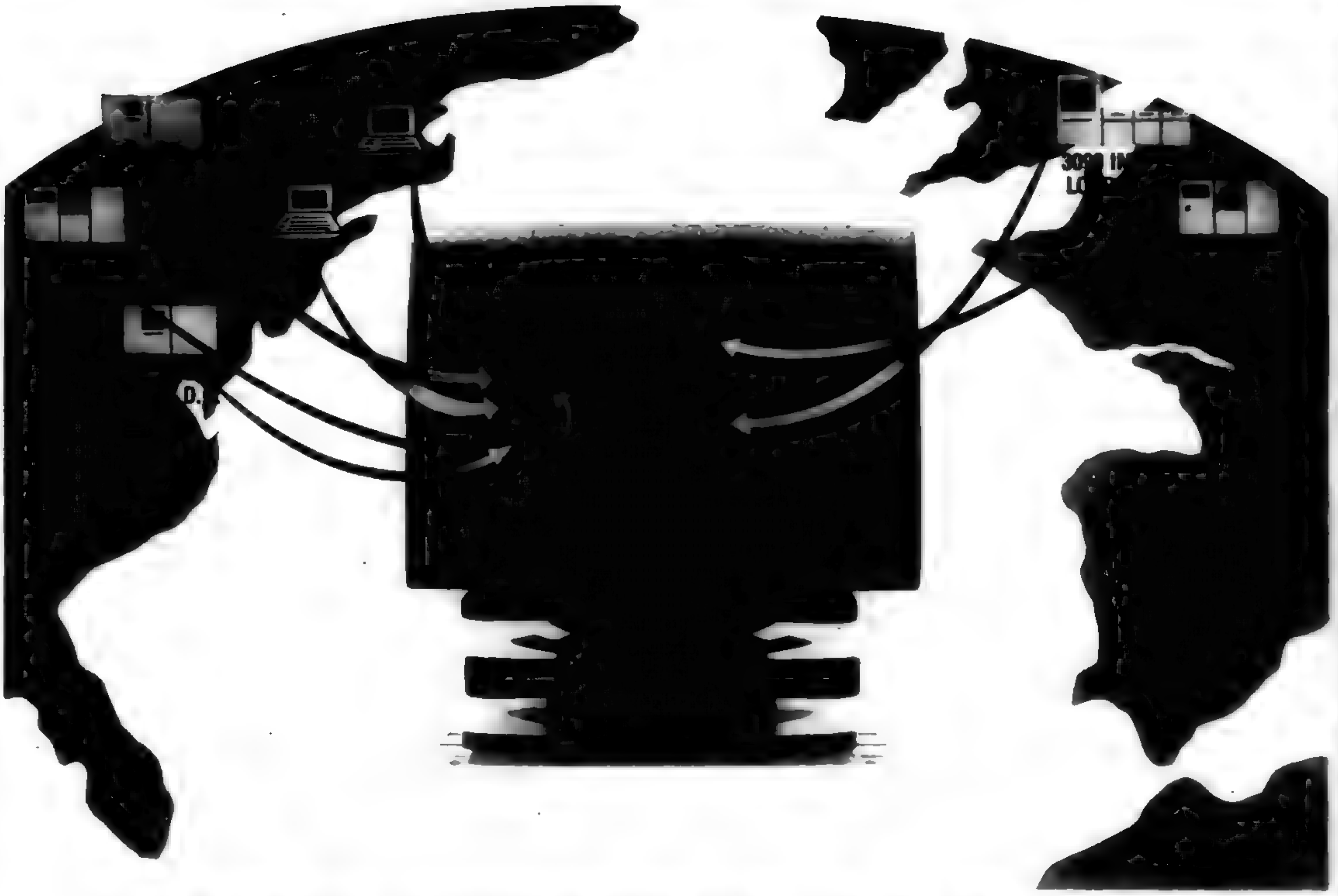

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Codex enters X.25 arena as market braces for changes

Packet-switching tool could be money-saver

By Elisabeth Horwitt

CANTON, Mass. — Codex Corp. will make its debut today in the X.25 packet-switching equipment arena, at the start of what may be a shakeout, or at least a shaky time, for the industry, according to some analysts.

The Codex 6510 IXP, an X.25 network concentrator with some switching and packetizing capabilities, is the first of a projected series of Intelligent Network Processors targeting the X.25 market, according to Codex.

By concentrating incoming X.25 data streams from multiple terminals into one line, the concentrator is economical in two ways, according to product manager Barry Michaelson.

Funnels data streams

First, a concentrator installed at the host site can reduce port requirements by funneling multiple data streams into one host port. Second, it can concentrate data streams from geographically separated sites within a local access and transport area (LATA) before sending them to a host site in another LATA. This can save companies on costly inter-LATA telecommunications links.

The product can also help users economize on the cost of linking up with a packet-switching network service, such as Telenet Communications Corp., by concentrating transmissions from multiple workstations or sites before sending them on to the nearest service node, Michaelson pointed out. Potential markets for the product include brokerage houses, financial firms and retail operations that need to collect information from point-of-sale and credit validation terminals.

The 6510 IXP can also act as a low-end switch, routing X.25 transmissions among a "limited number of nodes, say 10," Michaelson said. For larger networks, the concentrator can be linked up to a more powerful statistical multiplexer from Codex, he added. The 6510 IXP supports Codex's proprietary Muxport protocol so that it can accept asynchronous transmissions from a Codex statistical multiplexer, add X.25 routing and handling information and send the packets over an X.25 network.

Codex decided to break into the X.25 arena with a concentrator because that is currently the fastest growing segment of the X.25 market, with an estimated 32% annual growth rate during the next five years, said Lee Sudan, Codex's director of wide-area network marketing. "Today, with X.25 interfaces on hosts from nearly every major computer vendor, there is a growing demand for X.25 products that function as network concentrators," he added.

A more pessimistic view of the X.25 market was presented by Paul Bell, president of New York-based consulting firm The 23K Group. The year "1987 is going to be brutal" for the X.25 equipment industry, claimed Bell, who has consulted on several businesses' packet-switching network projects in the past few years.

"A lot of small companies will fail, while large companies will either get out of the market or turn their packet assembler-disassembler operations into cash cows and cancel their product development plans," he said. "What's killing packet switching is the fact that everyone is waiting for Integrated Services Digital Network to arrive. That will make packet-switching unnecessary since it is an integral part of ISDN."

Ken Bosomworth, president of Norwalk, Conn., research firm International Resource Development, Inc., sees the X.25 service and equipment industry as in flux rather than in deep trouble.

"On the positive side, IBM is rapidly making it simpler and cheaper for Systems Network Architecture communications to take place over public and private packet networks," Bosomwerth said. "On the negative side, AT&T is developing technologies that will increase the transmission capacity of optical fiber by a factor of 100. The whole purpose of packet switching is to squeeze more stuff onto the same cable. If long-distance capacity becomes dirt cheap, the whole point vanishes."

ISDN to force change

Integrated Services Digital Network, according to Bosomworth, will not wipe out the packet-switching industry but will "force vendors to change their product lines" to meet the needs of the new networking environment.

The Codex 6510 IXP has an X.25 throughput of 500 packets per second. It features automatic rerouting in case of link failure, password protection for designated resources, network monitoring and performance optimization and billing/usage accounting. It has been certified by Telenet, as well as by packet-switching services in Canada, France, the Netherlands, UK and West Germany.

The product costs $16,200 for two X.25/Muxport links and can be upgraded to support up to 28 links, each supporting up to 255 users with a total nodal capacity of 1,000 addresses. Availability is five weeks after receipt of order.

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3317-8782

NCR focuses POS system on continuous processing

By Alan Alper

NEW YORK — Striving to bolster its leading position in the retail systems market, NCR Corp. last week unveiled a family of point-of-sale (POS) systems that support continuous processing operations.

Introduced at its sales office here, NCR's 7000CP comes in three versions and is aimed at mass merchandisers, supermarkets and department stores. The Motorola, Inc. 68000-based processors replace NCR's Models 1255 and 2153 POS systems that were introduced in the early 1970s and used transistor-to-transistor logic (TTL) and large-scale integration (LSI) technology, NCR said.

The 7000 family offers price/performance enhancements of roughly 25% to 30% more than the previous generation of products, said Charles Exley Jr., NCR chairman and president. Prices range from $11,860 for single-processor versions to $48,155 for the top-of-the-line system.

"Nothing is available in this price range that provides continuous processing," Exley observed. He said NCR expects to install approximately $1 billion worth of 7000CPs over the product's life cycle. International Data Corp., a Framingham, Mass.-based market research concern, estimated that POS systems sales are expected to increase from $370 million in 1985 to $540 million next year.

NCR said it has installed 10 7000CPs worldwide at sites where customers have tested and subsequently purchased the system.

One of the earliest users, Cook-United, Inc., a Maple Heights, Ohio, operator of a 41-member chain of discount stores, installed a 7000CP at its Cambridge, Ohio, branch in October 1985. The 7000CP replaced a standard cash register system, said Larry Reznick, vice-president of MIS and distribution.

"The total cash control of the system is great. Our store manager swears by it," Reznick said. "It has also enabled us to increase productivity by providing information on each checkout lane, clerk and department. It helps us to determine staffing by telling us when volume is different by the time of day."

Reznick said Cook-United purchased the 7000CP in December and is considering purchasing additional systems for its other stores.

Market penetration

NCR said it expects to use technology embodied by the 7000CP to penetrate markets outside the retailing business. One area already identified is the banking market, Exley said, noting that the 7000CP is already installed in branches of a European bank that he did not identify.

"We see that marketplace as a good opportunity," he added. "We intend to use the 7000CP as a platform to sell systems into transactional processing environments where continuous processing is needed."

Using the firm's 68000-based Tower multiuser computer as a platform, NCR designed the 7000CP for high-speed transactional processing, using an open systems approach. The systems run both Unix and CP/OS, a proprietary operating system designed for continuous operations in retail applications.

In the dual-processor configuration, the 7000CP's processors, memory, disks, software and data are mirrored for uninterruptible operation. If one processor stops, the other continues processing without operator intervention or performance degradation, NCR said.

The high-end 7032 is designed around the Motorola 68020 16- or 32-bit microprocessor running at 25 MHz. It is for use by large retailers that need exceptional terminal capacity or systems throughput or have large application processing requirements.

The entry-level 7010 is based on the 68010 16-bit microprocessor running at 8 MHz and supports up to 8M bytes. The mid-range 7011, targeted at higher volume small retailers, is based on a 10-MHz 68010 microprocessor and can address up to 8M bytes of main memory.

Four high-level programming languages are supported by the system: Pascal, C, Micro Focus, Inc.'s Cobol and Pilot. Each has its own set of debugging tools, although text editor and utilities are common to all four.

NCR also said it has developed three vertical-market applications packages. Additionally, in conjunction with 50 software tools and utilities available to enable retailers to tailor the 7000CP to a particular application or systems environment, remote mainframe software is being offered to provide for unattended operation.

NCR is offering three types of wide-area network communications to enable the 7000CP to communicate with remote mainframes. A gateway to IBM's Systems Network Architecture is available, allowing the 7000CP to transfer files or obtain credit authorization from a remote mainframe. Support for bisynchronous communications is also available for IBM 3780 batch and 3270 dedicated communications.

For managers, application programmers and cashiers, NCR offers a variety of interactive and programmable retail terminals. The programmable terminal — the 7052 — is based on the IBM Personal Computer AT-compatible NCR PC8. It provides local storage and operates in both on- and off-line modes.

The terminals range in price from $3,125 in a unified configuration to $4,555 for a programmable terminal. Three interactive terminals are currently available, while the 7052 and 7053 terminals will begin shipping in the second quarter and first quarter of 1988, respectively.

The terminals and other peripherals in a 7000CP system communicate via local-area networks (LAN). NCR is offering its Mirian LAN, which supports up to 96 physical addresses, for clustered checkout environments in mass merchandisers and supermarkets. A Starlan-compatible LAN, supporting up to 256 physical addresses, is available in environments in which use of existing twisted-pair wiring is possible.

Mirian is currently available, while Starlan is slated to be delivered in the first quarter of 1988.

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Canaan adds processors, says 9370 legitimizes market

By James Connolly

TRUMBULL, Conn. — With claims that IBM's 9370 mid-range system announcement validated its own strategy, Canaan Computer Corp. last week introduced two additions to its family of departmental systems.

Canaan's DCS 6000 series, which includes two models, reportedly provides greater memory and disk capacities than did the DCS 5800 introduced a year ago. Like the DCS 5800, the DCS 6100 and DCS 6300 models are designed to run IBM VM/CMS software to support departmental end users in production mode and application developers.

Referring to IBM's October introduction of the 9370 as a low-end IBM 370 architecture system, Canaan's Director of Product Marketing Richard Schreiber said, "We don't have to sell the concept of a low-end 370 market any more. Just by making their announcement, IBM made the market for us."

However, one analyst familiar with the Canaan announcement warned that the 9370 debut could hurt Canaan as well as validate the smaller company's market. "It's certainly going to make it a much harder sell for Canaan. In relation to where they were a year ago, they have made some progress, but in relation to the whole market, they are still kind of small," said Richard Mikita of International Data Corp., a Framingham, Mass.-based market research firm. Mikita added that some of Canaan's success is a result of aggressive, one-on-one marketing.

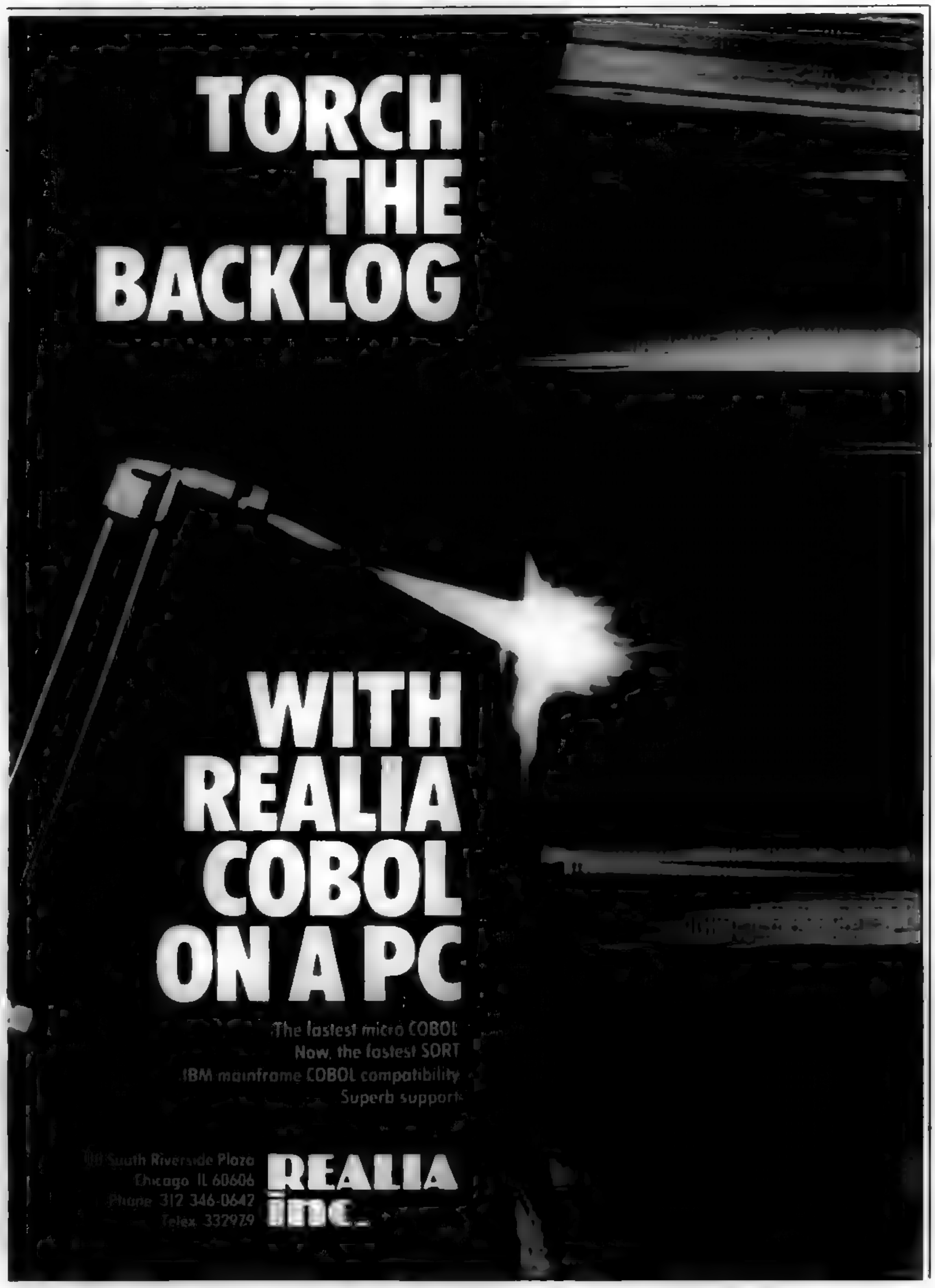
Schreiber positioned the DCS 6000 series between the IBM 9373 Model 20 and the IBM 9375 Model 60 in terms of throughput performance, while claiming lower prices for the Canaan systems.

Available now, the DCS 6000 series uses the same core components as the DCS 5800, which can be upgraded to the new products with the addition of memory and replacement of disk drives. The new systems feature 4M bytes of cache on each disk controller. Canaan claimed the cache, which is optional on the DCS 6100 and standard on the DCS 6300, improves performance by 30% to 50%.

The DCS 6000 series uses 5¼-in. disks rather than the 8-in. disks used in the DCS 5800. The DCS 6000 supports four to 36 users but features up to 16M bytes of memory and 3.4G bytes of disk storage. Schreiber said the DCS 5800, which was limited to 12M bytes of memory and 664M bytes of storage, remains in production.

The entry-level DCS 6100, with support for four users, 2M bytes of memory, a streaming tape drive and 170M bytes of disk storage, costs $42,500. A 20-user DCS 6300 costs about $80,000.

Schreiber also said Canaan is now delivering software to support IBM Systems Network Architecture, and that the DCS 6000 series can run IBM CICS Cobol applications at the department level with Unicorn Systems Co. VMCICS, a recently announced CICS production environment.



Multiplan 3.0 links files over network

By Peggy Watt

REDMOND, Wash. — Microsoft Corp. is scheduled to announce today a network version of Multiplan, its spreadsheet for the IBM Personal Computer and compatibles.

The new release includes a spreadsheet auditor, can record macros upon entry and can directly import ASCII files, enabling access to many microcomputer data base and large system spreadsheet data formats, said Pete Higgins, Microsoft group product manager.

On a network, Multiplan Version 3.0 supports multiple users with file locking, password protection and data encryption. The user can view as many as eight different worksheet files in windows simultaneously and link and consolidate several spreadsheets, Higgins said.

Multiplan now has some of the same features as the Microsoft spreadsheet Excel for the Apple Computer, Inc. Macintosh, Higgins added.

Both programs allow the user to view multiple files and include date and time formats for calculation.

"Multiplan also picked up some word processing type functions," Higgins said. It accommodates column widths of up to 64 characters and can print headers, footers and page numbers.

Multiplan 3.0 replaces Version 2.0, released in September 1985. It is available immediately for $50 to existing customers, and it costs $195 for new copies. Microsoft will ship to multiple sites for corporate users, Higgins said.

The Multiplan license allows one user per package, with additional licenses for network use available for $95 each. As with earlier versions, Multiplan runs under Microsoft Windows.

Feds back OSI standards

Will require vendors to put specifications in bids

By Mitch Betts

GAITHERSBURG, Md. — The U.S. government, a user organization with a $16 billion information systems budget, is throwing its weight behind the Open Systems Interconnect (OSI) standards with a new contracting document that will require vendors to supply off-the-shelf networking systems that meet certain OSI standards.

Federal agencies may now incorporate the Government OSI Procurement (GOSIP) specification in bid requests at their discretion, but eventually GOSIP will be a mandatory part of government contracts, according to Shirley M. Radack, coordinator of standards programs at the National Bureau of Standards Institute for Computer Sciences and Technology.

In addition to saving money and headaches by buying open systems, the government hopes to use its clout to prod vendors into developing standard OSI products [CW, Sept. 8].

OSI is the seven-layer reference model for communications standards that has previously been established by the International Standards Organization.

MAP/TOP-compatible

According to the U.S. Government OSI Users Committee, GOSIP is compatible with the industry's Manufacturing Automation Protocol (MAP) and Technical Office Protocol (TOP) and will be updated as new OSI protocols are developed and approved.

For starters, the government is adopting the File Transfer and Access Management (FTAM) standard for file transfer and the Message Handling System (X.400) standard for electronic mail as well as X.25 for wide-area networking and the Token Bus (IEEE 802.4) for local-area networking.

"GOSIP addresses the need of the federal government to move immediately to multivendor interconnectivity without sacrificing essential functionality already implemented in critical networking systems," the GOSIP document said. It noted that the capabilities required by GOSIP "exist as standard products or are close enough to market that they can be proposed by vendors."

In 1988, the government expects to adopt standards for document interchange, transaction processing and the token-ring local-area network. Standards for graphics, the exchange of financial and management data, videotext and data base updates are slated for 1989. An Integrated Services Digital Network (ISDN) standard for voice, data and video traffic is expected in 1990.

The Dec. 18 version of GOSIP is intended for use in procurements of new networks of mainframes and minicomputers through September 1989. The National Bureau of Standards plans to adopt it as a Federal Information Processing Standard later this year, and the General Services Administration plans to incorporate it into mandatory procurement rules, Radack said.

"In the past, vendor-specific implementations of data communications protocols led to isolated domains of information, very difficult and expensive to bridge," the GOSIP document explained. "By implementing open systems, the government expects to realize significant savings through reducing duplicate circuits and wiring, training, custom software, workstations and custom hardware interfaces."

However, some observers said the government faces a big challenge in standardizing on OSI, given the fact that many existing networks depend on the Pentagon-developed Transmission Control Protocol/Internet Protocol and IBM's Systems Network Architecture.

IBM cuts PC XT, AT prices

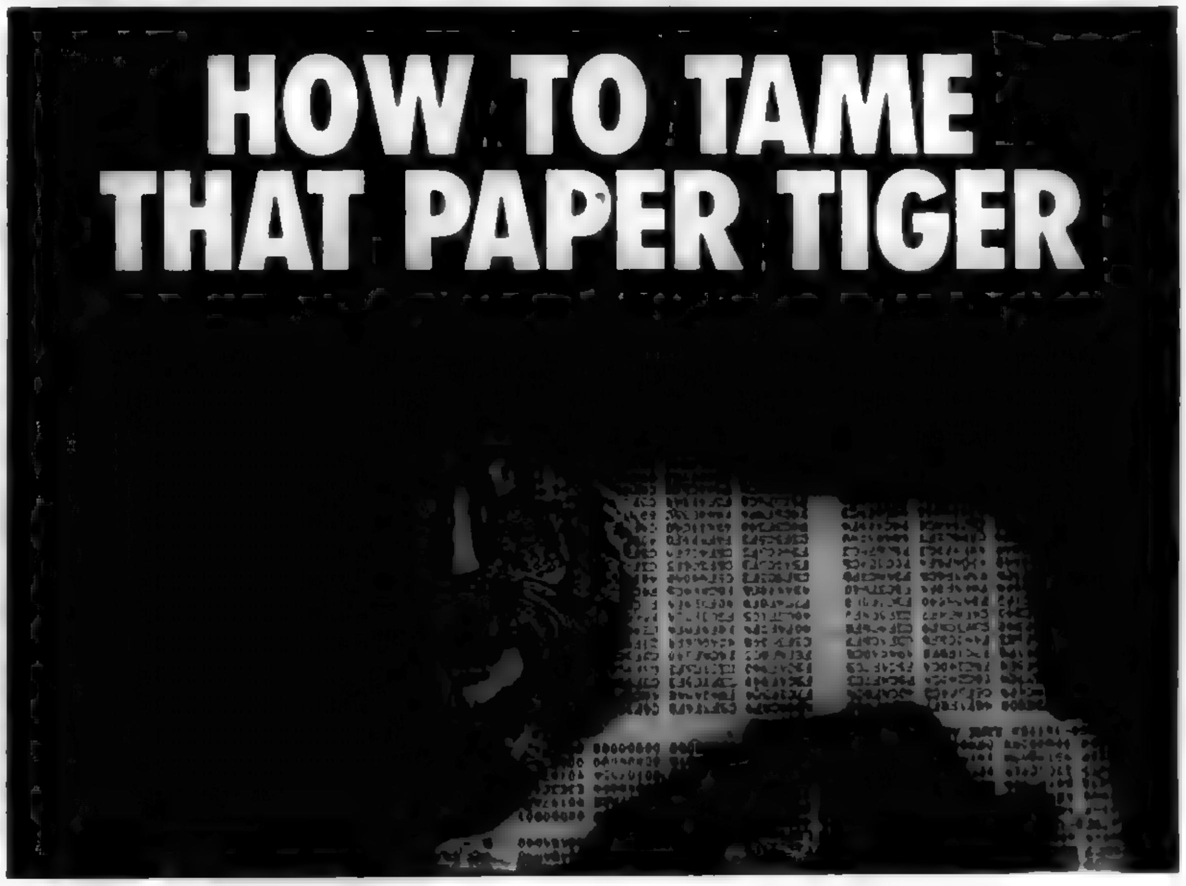
MONTVALE, N.J. — After slashing dealer prices on two IBM Personal Computer XT models earlier this month, IBM last week reduced the single-unit prices on two other XT models and one Personal Computer AT model by as much as 15%.

The three systems involved are the XT Model 286, the XT Model 089 and the AT Model 068. While low-priced clones have been steadily cutting into IBM's PC market share, the computer giant said it made the price changes as the result of a "normal busines review."

The price of the XT Model 286 with 640K bytes of random-access memory (RAM) and a 20M-byte hard disk drive fell from $3,995 to $3,395. Introduced by IBM last September to fill the gap between the company's XT and AT models, the Intel Corp. 80286-based system has yet to achieve much popularity. The primary reasons cited by managers are the XT 286's slower performance relative to the AT and its inability to accept most add-in cards designed for the AT.

For an XT Model 089 with 640K bytes of RAM and a 20M-byte hard disk, IBM dropped the price from $2,895 to $2,660.

A low-end AT Model 068 with 256K bytes of RAM and a 1.2M-byte floppy disk drive now sells for $3,395, compared with $3,995 previously.



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EDITORIAL

Some things new

The year 1987 is a special one for *Computerworld*. For one thing, it marks our 20th year in print. Given the frenetic pace of change that shapes and reshapes the environment of computing professionals, 20 years can seem like an eternity.

As a publication that has tried to stay a stride or two ahead of this change, *Computerworld* has gone through quite an evolutionary process of its own. During the next month, we will begin to unveil further changes in our editorial focus, composition and design and editorial staff size. These changes were born of a common impulse, namely the ever-dynamic needs of our readers.

The best and perhaps only solution to ensuring a publication doesn't fall behind its readers' needs is to throw greater resources toward its mission. Thus, we are increasing the size of our editorial staff by 15% compared with last year. A good portion of this increase will go to enhanced coverage of two specific areas: business microcomputing and networking. And with good reason, we think.

All available data points to rapidly increasing MIS outlays to cover the costs of supporting the burgeoning business microcomputer population. The very nature of the micro in a business setting is in transition, moving from the stand-alone, single-user mode toward composing the ever-widening bottom tier of the totally integrated computing environment.

Further, networking solutions are increasingly showing the way to more cost-effective use of the massive installed base of computer equipment.

Network management and development issues, heated quickly to the boiling point in a climate of communications deregulation, are perplexing at best and, at worst, untenable to information professionals.

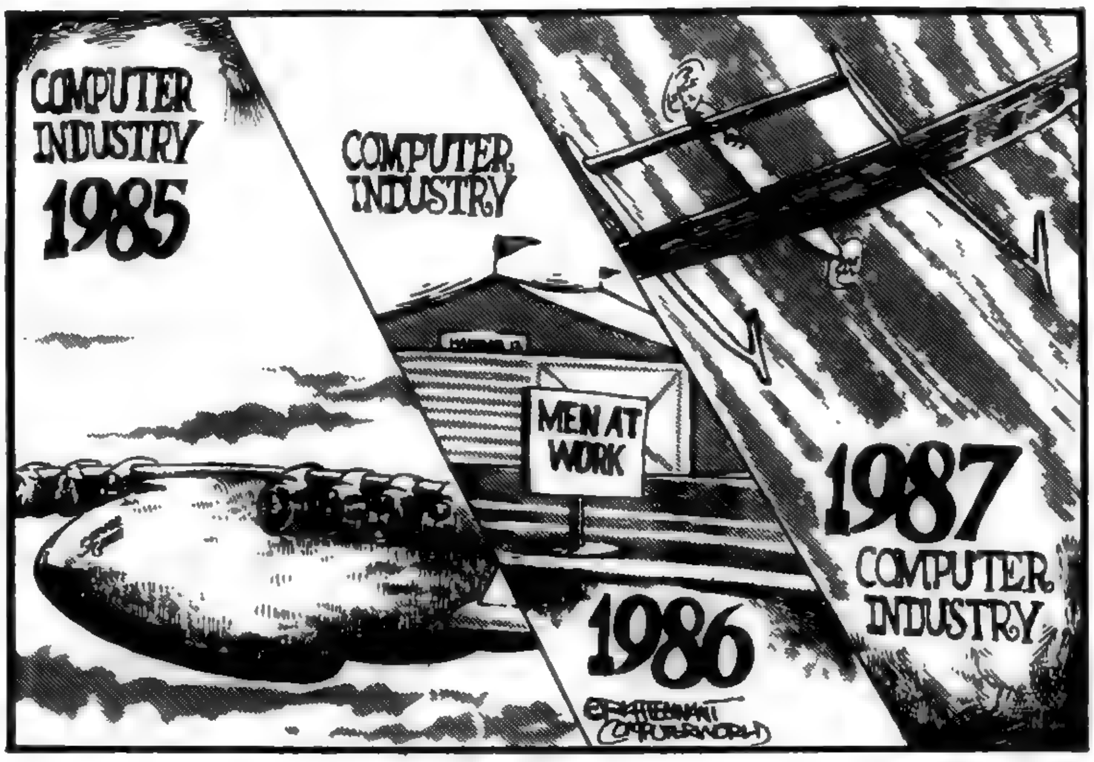
These are compelling reasons for boosting our coverage of these key areas. By increasing staff size, we will bolster our micro and networking coverage while maintaining other areas of coverage.

We have also opened an editorial office for the first time in Chicago. Our new Midwest correspondent, Jean S. Bozman, is now on board.

Each year we conduct extensive readership surveys, and year after year our readers rank comprehensive computer product coverage as their primary information need. So, while continuing with our coverage of new product information in the regular pages of *Computerworld*, we will launch a special supplement next week, inserted into the regular edition. This Product Spotlight section will highlight specific product categories — display terminals, local-area networks and PC storage devices. The supplement will feature a comprehensive set of tables listing vendors, products and product features as well as user stories and articles on technology trends.

With our Feb. 2 issue, readers will see a number of design changes, each intended to enhance the readability and overall appeal of *Computerworld*.

Ultimately, you the reader will judge whether these and other changes meet your needs better than *Computerworld* has before. Your phone calls and letters of critique would be, as always, a welcome barometer.



LETTERS TO THE EDITOR

Tax reform and DP free-lancers I

Computerworld deserves to be complimented for a fine piece of reporting in the article, "Tax reform dooms DP free-lancers" [CW, Dec. 15].

Our moral indignation should be aroused by this instance of technical service firms distorting the tax reform bill to their own ends. Apparently, they secretly pressured the Joint Committee on Taxation to add a clause thats primary intent was to put most of their competitors out of business. It seems to be easier to do this than compete by offering a better product or service in the marketplace.

I have worked as a DP free-lancer for many years. If I wasn't good at what I do, I would not have survived in this role. In fact, several times I have been brought in to correct appalling mistakes that were made by employees of some of the larger consulting firms.

Independent consultants tend to have more years of experience and a larger variety of experience than the typical DP employee. If large vendors cannot compete effectively with free-lancers or with firms using them, then it is probably an issue of quality rather than price.

Section 1706 of the tax act is not just an effort to collect more taxes, it is an effort to keep a specific group of people from continuing to do business. For obvious reasons, this section was enacted secretly and without any debate. It is very frightening that as a nation we allow any group of people to be deprived of their livelihood so quickly and so easily.

Alkin Jatich
Chicago, Ill.

Tax reform and DP free-lancers II

Computerworld's article summarizing how Section 1706 of the Tax Reform Act dooms DP free-lancers makes it clear the author does not understand the economics and taxation of subcontracting any better than Sen. Daniel Patrick Moynihan's (D-N.Y.) tax counsel, Joseph Gale.

In 1987, the combined employer/employee FICA tax paid by ADAPSO companies will be 1.5% more than the tax paid by the self-employed. By 1990, there will be no difference. Most high-tech professionals pay close to the maximum Federal Insurance Contributions Act (FICA) tax (about $6,000 on $43,000 income) whether or not they are employees.

Concerning other taxes, can it be proven that the sum of the payments, from self-employed and the service firms, is less than the whole paid by the ADAPSO companies on the same revenue? With their expensive images and overhead deductions, employee-based firms may actually pay less tax. Exactly where is this alleged tax inequity?

It seems ADAPSO's real complaint is that the self-employed have Keough retirement plans and don't rely on the ADAPSO corporations to guarantee their futures. If our profession is exterminated, who will provide for the independents' retirement? Social Security? The technical service firms?

Maybe the ADAPSO companies feel an injustice exists because they squandered their resources convincing congressmen to eliminate the competition from a cost-effective alternative provided by legitimate entrepreneurs in an unregulated marketplace. If our better mousetrap threatens their monopoly, they should ask themselves why technicians won't be their employees, instead of manufacturing this tax inequity smoke screen.

Glenn Kerr
Glenn M. Kerr Associates
Alexandria, Va.

Telecommuting opens labor market

The cover story, "VAX boom triggers hiring war" [CW, Dec. 1], again proves that money isn't always the best way to attract and retain top-notch talent. Training people internally helps increase the labor pool, but this doesn't help employers fill today's critical openings.

In tight labor markets like this, savvy employers look for options that set them apart from others competing for the same scarce talent.

One such option is the selective use of telecommuting as a way to appeal to well-qualified people who can't, or won't, work in a traditional office setting.

Though it's far from the only answer to the VAX problem, employers who've tried this find it often opens the door to improved recruiting and retention.

It's a nice change, though, to find applicants seeking out employers who provide for telecommuting, instead of the employers doing the chasing.

Gil E. Gordon
Editor
Telecommuting Review
Monmouth Junction, N.J.

VIEWPOINT

Measure for measure: The decrease in information storage

By HARVEY P. NEWQUIST

A few weeks ago, I broached the subject of computer memory and storage by referencing an acronym being used in the laser and optical storage industry: LOC. LOC means Libraries Of Congress. This phrase is used to reference the potential size of laser-directed memory, We're talking . big memory here.

This matter was brought to my attention by a gentleman I sat next to on the plane headed for Comdex. He was lamenting the fact that the old days were over, the days when you really had to be intimate with your computer — especially a personal computer — in order to optimize the potential of limited-memory. machines.

Now, he said, you can get memory by the truckload for the price of a bag of doughnuts. Where's the struggle in that?

I, for one, do not like struggles. I like lots of memory, enough to sink a battleship when I can get it. Anyway, this plane conversation got me thinking about how far we've come to be able to reach the level of LOC.

The price we've paid

Later, as I looked around my office at all the paper, all the floppy disks and the 20M-byte hard disk, I began considering the price we've paid for our memory and data storage. I'm not talking about price in terms of the philosophical price we pay in life. I'm talking about cold, hard cash and credit cards. I'm talking dollars.

So I've decided to put all this LOC and data storage stuff into perspective, starting with my office. I store all my important papers, from tax returns to grade-school report cards, in four four-drawer filing cabinets. Each cabinet cost me an average of $110. Each has roughly 10 cubic feet of storage. So I've bought about 40 cubic feet of storage for $440. Not too bad until you consider that there's nothing inside them for that cost.

Each of the 16 drawers is pretty full, and I figured that each drawer holds about five reams of shuffled paper. A ream equals 500 sheets of paper and typically sells for about $6. Five reams per drawer times 16 drawers is 80 total reams for a final price of $480 (not counting any printing or copy costs). So now I've got about 40,000 pieces of paper packed into 40 cubic feet of storage space.

Turning now to floppy disks, the calculations get easier. My word processing program saves about 150 pages per 5¼-in. floppy. A fairly good brand of 12 diskettes costs about $25. (I know that you can get them for $.73, but I have a fondness for disks that come with protective devices, like sleeves and boxes.) So, figuring I can get 150 pages to a disk for about $2 per disk, it will take me 288 disks to store 40,000 pages. This at a cost of just under $600. If you buy the disks mentioned above — with the box — the storage container is included. It will take 24 of these boxes to store my 288 disks.

So for $600 and approximately a cubic foot of space, I have shrunk my storage space by a factor of 40 and my cost a few hundred dollars.

Now I go to my 20M-byte hard disk. I got it for $400. Unfortunately, it only holds 8,000 pages of information at a time, which means I'll need a total of five to store all of my information. That shoots my cost back up to $2,000, and it will ultimately take up more room than my floppies. No apparent saving here, until you take into account that I don't like struggles, including searching through 288 floppy disks to find a file.

The name of the game here is convenience, and that's where the efficiency of hard disks lies. Think of all the manpower saved by not having to move from your chair to access all of your files.

This convenience brings us to laser and optical technology. Though still in relative infancy, optical storage brings the promise of cheap storage and small space consumption.

The average optical storage disk runs about $70 in the 5¼ in. format, which is the same size as compact audio disks. How many of these do I need for my 40,000 pages? One. Actually only part of one, but they don't sell them that way. Total storage space needed is about the thickness of three floppy disks. Now we're talking.

A recent advertisement in a laser industry magazine stressed the manufacturer's potential for putting the entire Library of Congress in a storage medium the size of a sugar cube. The Library of Congress contains all the published written material generated in this country and then some. This is the place where workers use roller skates in order to expedite your request for material.

Now imagine putting all the information contained in the Library of Congress on something that could be crushed under the wheels of a roller skate.

Still, the key word above is potential. The sugar-cube technology is not commercially available yet, but it's getting close.

A company called Drexler Technology Corp. may well be putting a laser storage unit into your wallet in the near future. Drexler has developed the Lasercard, an optical read-only memory device that includes 4M bytes of memory on a piece of plastic that hides behind your American Express Card.

Internal transactions

These cards are already a big hit in Japan, where large banks are beginning to issue them to consumers for use as credit and debit cards in supermarkets and retail stores — without having to use cash. The Lasercard stores all of its transactions *internally*.

A number of U.S. hospitals are looking into using the card as a means to store patient data. Instead of trying to get bulky files transferred from doctors to hospitals and back again, the patient can simply produce the card, which will hold an up-to-date and comprehensive medical history in memory. You now have the opportunity to carry megabytes of information in your back pocket. Depending on who issues it to you, it may well end up costing next to nothing for all that memory space.

After all of this discussion, the guy next to me on the plane sighs and looks out the window. "I remember when I got my first 128K of internal memory," he says wearily. "Back then it was so much memory you didn't know what to do with it. You'd think, 'Wow, 128K! I could probably write a program to simulate God.' "

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

The distinction between 4GL and relational environments

READER'S PLATFORM

By FABIAN PASCAL

I agree with Daniel Nolan's In Depth article, "Stone Age programming cripples 4GL environment" [CW, Nov. 17]. Old habits die hard. But his imprecise and confused use of terms obscures a most important point: Fourth-generation language environments that are not based on a relational architecture bear their own responsibility for this situation. I would like to set matters right.

Nolan begins by recognizing that fourth-generation languages are one component of the new software technology; the other is the relational data base management system (DBMS). The important distinction here is between fourth-generation and relational: All relational products, DBMSs and language (there is only one relational language, IBM's SQL) are fourth generation, but most of the fourth-generation products are not relational.

In a relational environment, the DBMS provides data independence and the language, SQL, is nonprocedural, with the effect of minimizing, simplifying and disciplining the programming necessary to develop, maintain and use applications. By contrast, in fourth-generation environments that are not based on a relational architecture the DBMS provides only partial data independence and languages are procedural.

Edgar Codd recently described how vendors of nonrelational products take pride in the numerous methods they provide for data representation through other than field content. For this reason, while any fourth-generation language environment is a significant, and needed, improvement over its second- and third-generation counterparts (such as VSAM/COBOL), without a relational base it will fall short in disciplining design and programming techniques.

Thus, it is the relational component in the new technology that is critical. Yet Nolan keeps blurring the distinction between it and the fourth-generation language component.

Consider the following: "Fourth-generation language-based DBMSs offer more flexibility than their second-generation, nonrelational counterparts."

This formulation creates the impression that the main advantage of more modern relational DBMSs is that they support a fourth-generation language and that it is the fourth-generation language that provides flexibility.

Using fourth-generation language and relational terms interchangeably obscures the difference in impact the two components of technology have on design and programming techniques.

To understand that difference, consider some of Nolan's examples of poor techniques, such as overriding DBMS defaults for compression or field. Note that they pertain to the physical representation level. In a relational environment, this level is handled entirely by the system, insulating the programmer and user from data storage aspects.

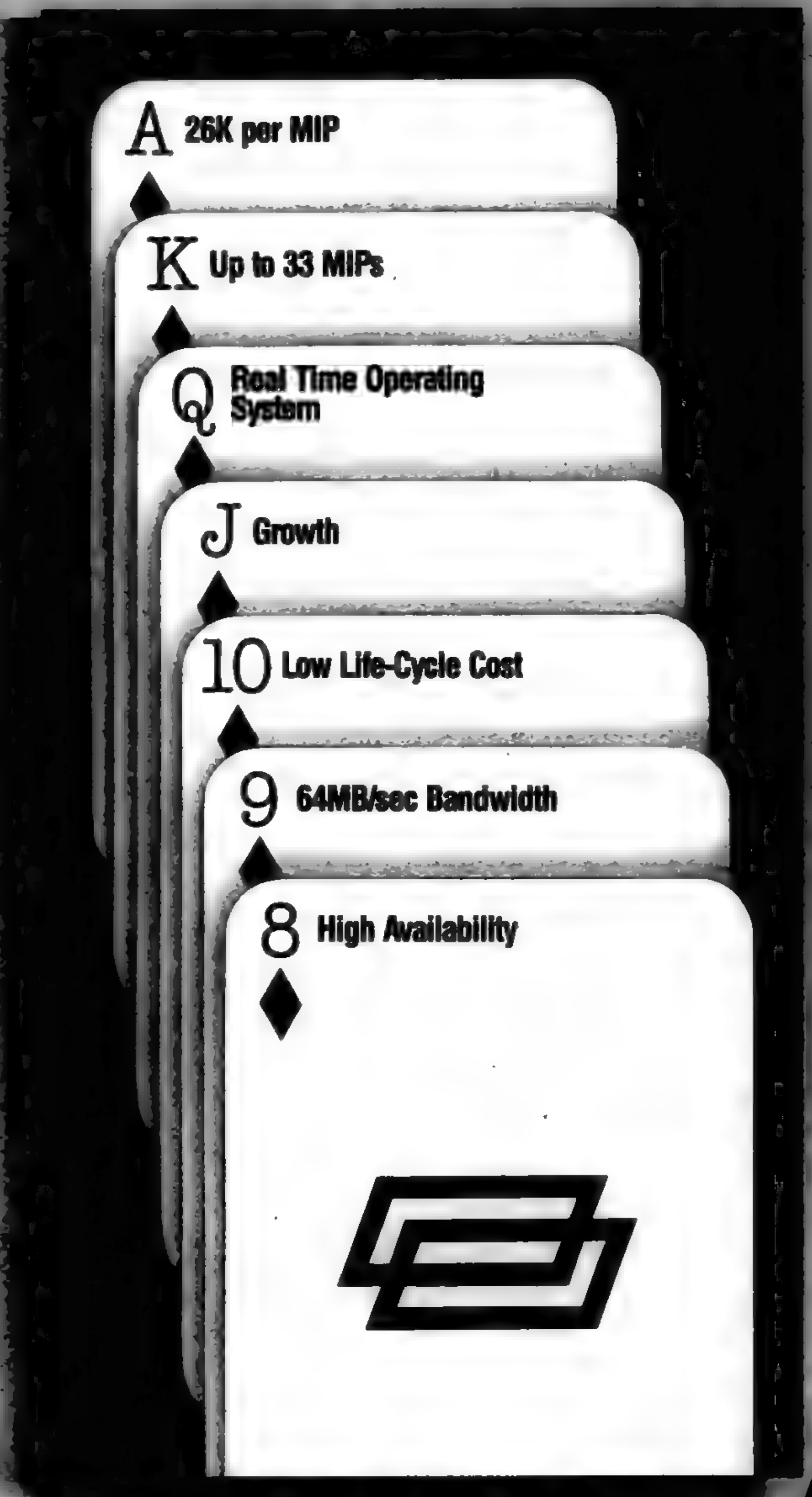
On the other hand, in nonrelational fourth-generation language environments, the incomplete separation between the logical and physical levels allows such techniques. If options for overriding defaults at the physical level are provided, programmers are sure to take advantage (or disadvantage) of them.

The subliminal blurring of the distinction between relational DBMSs and fourth-generation languages creates two negative implications.

First, it contributes to the "great deal of misunderstanding and misrepresentations" that exist in the relational data base management field, "one of the key technologies for the 1980s" (as C.J. Date has demonstrated).

Second, it obscures the responsibility that the (nonrelational) fourth-generation language products have for the persistence of obsolete programming techniques. Neither helps reduce inefficient programming.

Pascal is an information specialist for the District of Columbia.



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HARD TALK
James Connolly

Optics takes new direction

Don't expect miracles, and don't throw out all of those silicon chips. But a new way of computing continues to edge its way through the laboratory.

The new technology is optical computing — which probably sounds as likely as optical communications did only a few years ago. The technology is seen by some supporters as an ideal means to implement massive parallel processing, since it apparently would not be limited by the interference problems related to using electronic circuits in parallel computers.

The latest developments in the optical computing field include the announcement that physicist S. Desmond Smith and other researchers at Heriot-Watt University in Scotland have produced logic circuits using optics. The development was welcomed in the general news media as a breakthrough, but some experts in the optics field add a note of caution. They say a stand-alone, optics-based computer is at least a decade away and that Smith's project is only one of many taking different routes to similar goals.

But Smith's claims provide food for thought for MIS managers who should be aware that a new technology is likely to be available in a decade or so.

"Optical computing is more of a direction than a thing," observes John Caulfield, director of the Center for Applied Optics at the University of Alabama in Huntsville. "Some of the brightest people in the world are taking it very seriously."

Caulfield warns that the researchers

See OPTICS page 23

Connolly is Computerworld's *senior editor, systems & peripherals*.

DEC adds real-time tools

Products include VAX 8550-, 8700-based systems

By David Bright

MARLBORO, Mass. — Digital Equipment Corp. last week increased its commitment to real-time VAX computing with the introduction of new system, board-level, workstation and software products. The new products will help to integrate real-time functions with nonreal-time applications, DEC officials said.

"We are extending the capacity of our VAX systems across a broader range of performance spectrums," declared Ty Rabe, chairman of the real-time strategy committee.

Rabe stressed that DEC will not abandon its base of customers using the 16-bit PDP-11 minicomputer line for real-time applications and will continue to offer the systems. "We have no intention of moving people off of PDP-11s," he said. The VAX resources will be available for high-performance applications in which 32-bit power is called for, Rabe said.

The offerings include VAX 8550- and 8700-based systems for real-time applications, a version of the VAXELN real-time software environment for software development, a single-board computer and enhanced Vaxlab scientific workstations.

Designed to run the VAXELN software environment, the RTVAX 8550 and RTVax 8700 systems are targeted at such real-time applications as radar control and analysis, flight simulation and telemetry. They are said to provide up to six times the performance of the VAX-11/780.

Built around the VAXBI I/O bus, the systems feature a minimum of 8M bytes of error-correction code memory, a data acquisition rate reaching 5M byte/sec. on a single 32-bit channel and an overall system bandwidth of 60M byte/sec. The high bandwidth reportedly allows an application to have full use of the CPU and enables all I/O devices to operate simultaneously at maximum rates. Packaged with the VAXELN software, one VAXBI channel and an Ethernet controller, the RTVAX

See DEC page 23

Gulfstream Micro introduces series of Intel-based supermicros

By James Connolly

BOCA RATON, Fla. — Gulfstream Micro Systems has introduced a family of multiuser supermicrocomputers based on the Intel Corp. 80386 and 80286 chips and running AT&T Unix.

The company is targeting the products at small and medium-size installations, including those using personal computer-based local-area networks. Company officials claimed a 50% performance gain and a 30% to 50% cost savings in comparison withthose PC networks.

The low-end system is the SM 286/12, an 80286-based system designed for up to 12 users. It reportedly can support up to 15M bytes of random-access memory (RAM) and 256M bytes of hard-disk storage. This system runs Microsoft Corp. Xenix. A basic system with 1M byte of memory, five ports, one terminal, a floppy disk drive, a streaming tape drive and 36M bytes of storage costs $7,585.

The SM 386/20 is based on the 80386 and supports up to 20 users, according to the vendor. It supports 15M bytes of RAM and 600M bytes of disk storage. A system with 1M byte of RAM, an eight-port controller, a tape drive, one terminal and 72M bytes of disk storage costs $16,695.

The SM 286/34, built around the 80286 and Intel's Multibus, is said to support up to 34 users. It reportedly can run up to four processors to handle five million instructions per second. It also supports 15M bytes of RAM and 900M bytes of disk storage.

An entry-level configuration consists of one CPU, 1M byte of memory, a 16-port controller, a floppy disk drive, 72M bytes of disk storage and a streaming tape drive. It costs $24,995.

INSIDE

Texet and Wang team up to market electronic publishing systems/**22**

Integrated Solutions upgrades its technical computer and workstation lines/**22**

NEW THIS WEEK

- Philips and Signetics Microsystems adds to its VMEbus module line
- For more on this and other new products, see pp. 83-96.

INSTANT ANALYSIS

"They are going in multiple different directions, all of which look promising."

— John Caulfield, director of the Center for Applied Optics at the University of Alabama in Huntsville, regarding the varied research efforts in the optical computing field

Firm predicts explosive growth for departmental computing

End users, makers will fuel increase

By Stanley Gibson

MOUNTAIN VIEW, Calif. — Forces are converging to push departmental computing to an annual growth rate of 43%, according to a recent report by Input, a research firm based here.

Sandwiched between mainframe processing and microcomputing in a three-tiered arrangement, departmental computing will grow at more than twice the rate of either of the other two levels from now through 1991, the Input report states. Input estimates that departmental systems currently account for about 25% of all computing capacity, as measured in millions of instructions per second (MIPS).

From 1986 to 1991, departmental computing will increase sixfold, or 43% annually. This growth contrasts with a 12% annual increase predicted for stand-alone micro capacity and a 19% annual increase for dumb terminals connected to remote mainframes.

In the report, Input defines a department as an organizational entity that is headed by a full-time manager and is composed of one or more work groups that perform interrelated tasks. A work group consists of three or more people. Departmental systems include minicomputers, multiuser supermicros, personal computer-based local-area networks and micro-mainframe connections in which much local processing is done by the micro.

The growth in departmental computing is fueled by end users who demand more power and access to corporate computing resources and by computer makers able to satisfy those needs with price/performance improvements and communications advances, according to Input. Top corporate officers are also adding to the surge by demanding new departmental systems to gain a strategic edge, the report finds.

Departmental software use is also expected to increase, but at a slower rate than the growth of departmental MIPS. Fortune 1,000 companies will increase their use of departmental software products by 32% annually for the next five years, increasing expenditures from $2 billion annually to $7 billion annually, according to Input. This compares with a projected 19% growth rate in the software market overall during the same time period.

The increased use of departmental computing hardware and software goes hand in hand with increased use of communications to tie the department into the corporate fabric. Users will be able to migrate easily across the personal, departmental and corporate computing boundaries, the study predicts.

See EXPLOSIVE page 22

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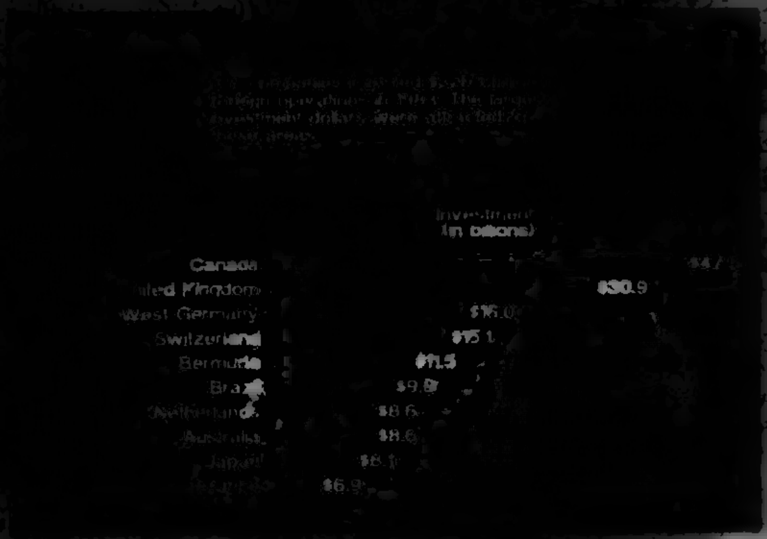

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Texet, Wang agree to integrate systems

Will market electronic publishing software

By Eddy Goldberg

ARLINGTON, Mass. — Texet Corp., a vendor of high-end electronic publishing systems, has announced an agreement with Wang Laboratories, Inc. under which the two companies will integrate their technologies and products.

Under the agreement, Wang will manufacture and market electronic publishing systems that integrate Texet software with the Wang VS family of computers and applications software.

Wang will also distribute the systems worldwide. Texet will continue to independently market its Live Page 3300 and Live Page 9000 publishing systems.

Wang VS users will continue to input text documents as before. Those documents will then be sent to a Sun Microsystems, Inc. workstation, which is supplied by Wang under an OEM agreement with Sun and runs Texet software, said Jean Gard, marketing director at Texet.

Format to be converted

The Wang VS format will be converted via a software module that will insert generic codes into the document to allow editing and formatting with the Texet software.

The revised documents will then be sent back to the Wang system for output.

Both vendors support the Postscript page-description language from Adobe Systems, Inc. This support allows output to a growing number of typesetting and laser printing devices.

The agreement is the fourth for Texet, which is seeking to broaden its distribution channels through such arrangements.

Business relationships have already been established with Compugraphic Corp., Sun Microsystems and the French company I3D/Framatome.

ISI upgrades technical tools, workstation line

By James Connolly

SAN JOSE, Calif. — Integrated Solutions, Inc. (ISI) has announced a series of technical computers and workstations designed to provide twice the performance of ISI's earlier Optimum V16 and V24 series.

The Optimum 400 series consists of three main processor models, all based on the VMEbus and a CPU board using Motorola, Inc.'s 25-MHz 68020 microprocessor.

A key feature of the 400 series is the integration of cache memory and the memory management unit, which ISI claimed allows translation of the virtual address and data collection within 60 nsec.

Eliminates redundancy

The series also features virtual direct-memory access, which reportedly eliminates redundant copying in the kernel's buffer area.

The three models are the 408, with eight slots; the 416, with 16 slots; and the 424, which features 24 slots. Memory ranges from 4M bytes to 56M bytes.

All models can be configured as clustered workstations, multiuser systems or diskless compute nodes on an Ethernet local-area network. They run the University of California at Berkeley Unix Version 4.2 operating system.

Configured as a system, the 408 costs $18,500 with two 5¼-in. disk drives and a tape backup; the 416 costs $20,500 with four 5¼-in. disk drives, an 8-in. drive and a tape backup; and the 424 costs $25,500.

Explosive growth predicted in study

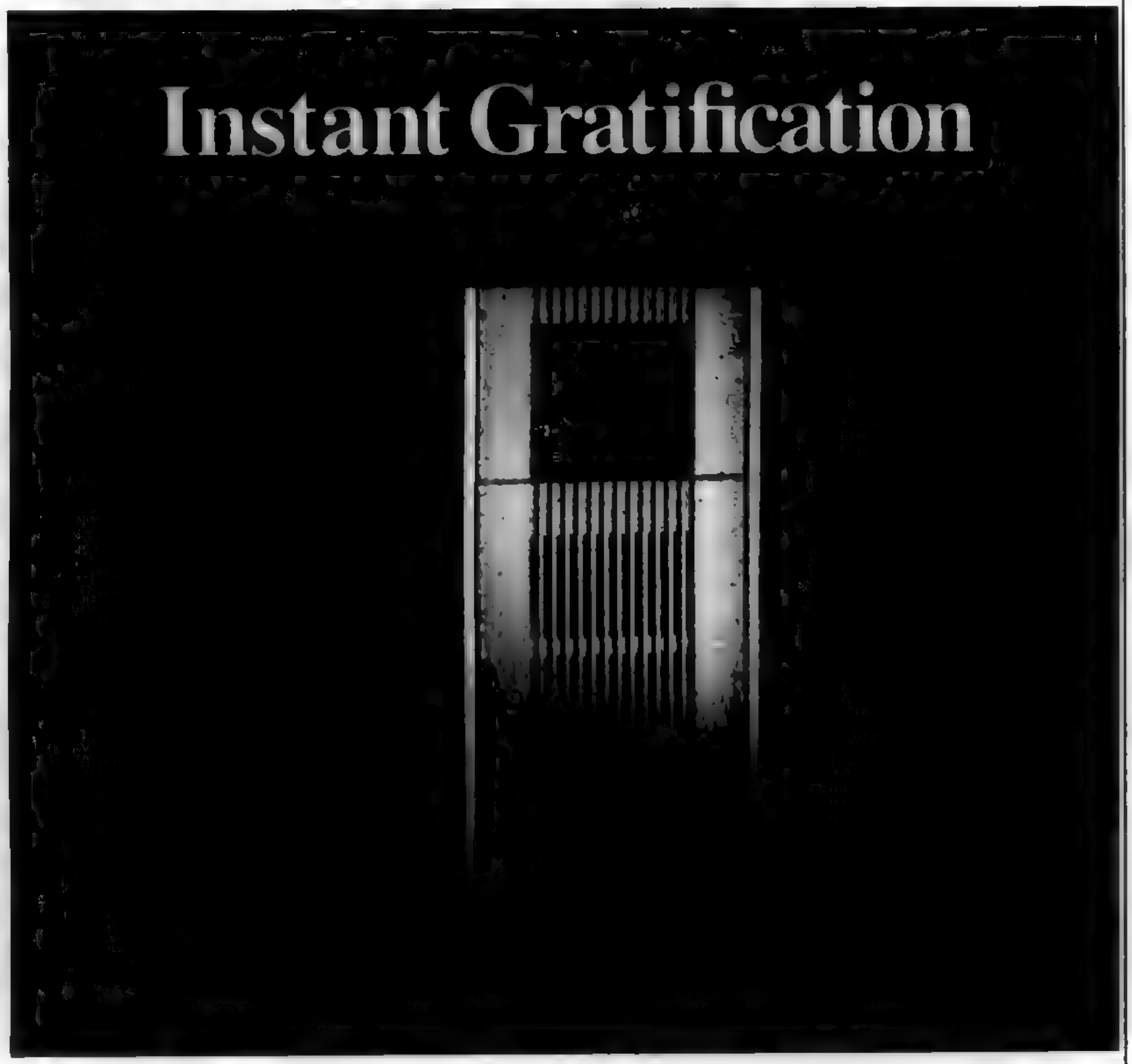
From page 19

In addition, departmental systems will serve as gateways to other departmental or corporate systems. This will be due to increased operating system sophistication that allows inquiry and file uploading and downloading while still serving local processing, according to Input.

"Departmental systems derive their strength from being able to handle the complexities involved in intertier exchanges while remaining close enough and responsive enough to the individual user to be an excellent central source of computing power," the report states.

Further, as more powerful interconnected nodes increase in number, the corporate host will shrink in significance to the status of an equal node on the network — it will no longer be necessary to go through the host to access other nodes.

The results were obtained by interviewing a representative sample of current and potential departmental computing users as well as vendors of departmental computing products, such as IBM, Digital Equipment Corp., Wang Laboratories, Inc. and Hewlett-Packard Co., according to an Input spokesman.



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Optics takes new direction

From page 19

in the U.S., Europe, Japan and the Soviet Union are approaching optical computing from a variety of angles, with none of those researchers having proven that their technology is the best way to proceed. According to Caulfield, "the most grandiose things" are 15 years away. But he also says specialized, hybrid systems will be available much sooner, perhaps moving out of the laboratory and ready to move into a production phase in a couple of years.

Optics industry watcher Drew Peck, a research analyst with the Stamford, Conn.-based market research firm Gartner Group, Inc., agrees that stand-alone optical systems are at least a decade away. "The way technology works today, it takes at least 10 years for something to move out of the laboratory," he says.

Peck observes that if Smith's circuits are entirely optical, with no electronic components, it is a true breakthrough. He says other researchers have developed logic circuits using optical-electronic hybrid technology.

But Peck and Caulfield warn that even if researchers can develop workable circuits, they still face roadblocks.

Caulfield says many researchers are overlooking what he calls nitty-gritty details such as fault tolerance that must be worked out before a technology can be considered for commercial production. Peck adds that development also depends on how easily and how inexpensively a technology can be moved into the manufacturing phase.

So, while progress appears to be continuing and optics appear to have a place in computing, the technology still is something for the MIS world to monitor. It is too early to worry about having to make a commitment.

DEC adds real-time tools

From page 19

8550 begins in price at $330,000; prices for the RTVAX 8700 begin at $398,000.

Running under the VMS operating system, VAXELN Version 2.3 gives programmers access to the range of VMS development tools. Version 2.3 is said to enable the development of efficient runtime programs for applications such as factory automation and dedicated computer-aided design and manufacturing as well as large-scale data collection and reduction.

The Version 2.3 tool kit includes an extended EPascal compiler, runtime libraries for EPascal, C and Fortran 77 and a menu-building utility. Because of Version 2.3's built-in Ethernet support, programs developed on host VAXs can be distributed among network real-time nodes.

VAXELN Version 2.3 is priced according to the processor. Prices start at $4,000 for Microvax II systems.

The KA620 single-board computer is designed for time-critical applications such as automatic test equipment, distributed factory automation and seismic data acquisition. It uses a modified Microvax II CPU with 1M byte of on-board parity dynamic random-access memory, a floating-point coprocessor and a Q-bus interface. Prices start at $4,495 for a KA620 with a VAXELN runtime license.

Hardware and software enhancements to the Vaxlab Scientific Workstation reportedly more than quintuple the system's data acquisition speed from 500K byte/sec. to 2.8M byte/sec. The system can also acquire analog data as quickly as 1 million sample/sec., DEC said. DEC added that environments needing to acquire data with the faster workstations include electronics testing laboratories, mechanical testing laboratories and physics research. Prices start at $33,455.

Xerox adds two 4045 versions

By James Connolly

ROCHESTER, N.Y. — Xerox Corp. last week introduced two additional versions of its 4045 Laser CP nonimpact printer, which was originally announced in April 1985.

One of the versions, the 4045 Model 50, features additional internal memory to support applications such as desktop publishing and printing complex graphics. The second version, the 4045 Model 20, has built-in circuitry allowing it to be attached to IBM cluster controllers for connection to IBM mainframes. Like the original 4045 model, the Model 50 and Model 20 can print up to 10 page/min.

The 4045 Model 50 supports a minimum of 512K bytes of memory and can be expanded to 1.5M bytes. The original 4045 was available with 128K to 512K bytes of memory. Xerox officials said the additional memory in the Model 50 is intended to support applications such as Xerox Desktop Publishing Series: Ventura Publisher Edition.

The built-in circuits in the Model 20 eliminate the need to use a $2,375 Xerox controller in situations in which users want to use a 4045 in IBM 3270 network environments. The Model 20 offers the same memory capacity as the Model 50.

The Model 20 costs $6,495 and will be available in February. The Model 50 costs $4,995 and is available now.

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SOFTWARE & SERVICES

SOFTALK
Marty Safirstein

Optimizing performance

Machine resource usage is one of the most overlooked issues of application development. Systems that process large volumes of data and are subject to tight processing constraints are particularly vulnerable to poor processing performance.

During 13 years as a business application consultant, I have frequently assisted clients in improving processing performance after their systems have been placed into production. The outcome has often been substantial redesign, reprogramming, additional cost and delayed implementation.

In most business applications, the bulk of processing time is spent accessing the data — finding, updating, creating and removing records. Far less time is spent manipulating the data within the CPU. Thus a primary performance objective is to minimize the data access. This translates into minimizing direct-access storage device (DASD) I/O, the more costly machine resource, and maximizing the CPU processing once the data has been accessed.

Achieving optimal application performance is an ongoing process during the life of the application. Performance optimization can continue throughout the system's life.

The application life cycle is generally viewed as having four primary stages: requirements definition; system design; programming, testing and implementation; and production processing and ongoing monitoring.

See **OPTIMIZING** page 27

Safirstein is a senior partner in the Chicago office of Computer Partners, Inc., a consulting firm.

Codd: Supra surpasses DB2

By Charles Babcock

SAN JOSE, Calif. — Edgar F. Codd, president of the Relational Institute here, has concluded that the next release of Cincom Systems, Inc.'s Supra is truer to the relational model than IBM's DB2, even though Supra still lacks a language comparable to IBM's SQL.

Codd reviewed the documentation for Cincom's Supra Release 1.3 and concluded that it adheres to 10 of the 12 rules with which he defined the relational model. Release 1.3 is being tested by Cincom and will not be available until June or July.

Codd compared Release 1.3 of Supra with Release 2 of DB2, which became available in March 1986. DB2 met seven of the 12 rules. IBM is widely anticipated to be preparing a new release of DB2 this year that might score higher if its documentation were available at this time.

"Supra's rating is the highest achieved of all those I have reviewed to date. Assuming that the product performs according to the documentation, IBM's DB2 Release 2 has less fidelity to the relational model than Cincom's Supra Release 1.3," Codd said in a letter to David A. Wood, Cincom's senior product manager for systems software. Cincom had requested the evaluation.

Despite its high rating, Codd said Supra falls short on two points of the relational model as defined by his original 12 rules [CW, Oct. 14 and 21, 1985]. It lacks the equivalent of IBM's SQL data sublanguage and offers only partial capability to use high-level insert, update and delete commands.

A data sublanguage in particular is needed for effective data base management system use, Codd stated in one article.

See **CODD** page 27

VM Software upgrades systems software utilities

By Rosemary Hamilton

RESTON, Va. — VM Software, Inc. recently introduced new versions of five software programs for the IBM VM/SP operating system, including its data center management system, the core of its product line.

With Release 3.0 of VMCenter, a system administrator can now send reports on disk usage directly to users. The software has also been enhanced to include the monetary value of an individual's usage of the system.

VMCenter can be purchased as a package with such programs as VMBackup, VMSecure and VMSchedule that the vendor also sells separately. As a complete package, VMCenter sells for $44,000, and the pricing is unchanged with the new release, the vendor said.

Pricing on individual packages also re-

See **VM** page 26

Software allows SQL use on PCs

By Charles Babcock

NAPERVILLE, Ill. — A software package that converts an IBM Personal Computer XT, AT or compatible into an IBM SQL training and development workstation is available for $995 from DBMS, Inc.

The PC version of SQL, the data access and manipulation language, is compatible with IBM's mainframe version of the language, which is used with IBM's DB2 and SQL/DS relational data base management systems, according to Susan Miller, product manager.

Called SQL Workstation, the product is intended to allow new users to experiment with SQL queries and processing without tying up mainframe time. With a command syntax and data types that are identical to mainframe SQL, the PC product can be used to train new SQL programmers, Miller said.

Programmers can duplicate existing DB2 and SQL/DS mainframe applications

See **SOFTWARE** page 26

INSIDE

Celanese creates software subsidiary/**26**

NEW THIS WEEK

- SDC Software adds Release 3.0 of its Customer Information System for IBM

■ For more on this and other new products, see pp. 83-98.

INSTANT ANALYSIS

"A number of acquired companies are being spun out of large, noncomputer service companies. Examples include Information Associates by Westinghouse, Software International by GE and Mathematica and Oxford by Martin Marietta. These transactions confirm our longstanding belief that these marriages are extremely difficult to make work."

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Celanese enters software market with PC-oriented system

By Charles Babcock

NEW YORK — The Celanese Corp., a fiber and chemicals producer, has created Corporate Class Software, Inc., a subsidiary through which it hopes to enter the software business.

At the moment, the subsidiary has one personal computer-oriented product and a five-member direct sales force, which will double during the first half of this year, according to President Richard J. Lyons.

The company also has a $1 million development budget that is being invested in contract work with MDBS, Inc. in Lafayette, Ind., the developer of Knowledgeman, a data base management system, and Guru, an expert system shell.

Celanese Chief Financial Officer C. Robert Tully, who saw a need to provide a standard financial information gathering and reporting system at the headquarters of his $3 billion-a-year-company, authorized a development team whose goal was to come up with one.

Consolidation a goal

One of the primary goals was to consolidate the information that was arriving at headquarters in multiple formats from the many divisions and subsidiaries of the company, Lyons said.

The in-house system, eventually to emerge as a PC product called the Financial Application Solution to Analysis and Reporting (Fastar), was initially designed as a mainframe system and converted to Microsoft Corp. MS-DOS in 1983.

Celanese then contracted with MDBS to create a commercial version of the product, which Corporate Class Software is scheduled to announce today.

Fastar is able to automatically load data from Lotus Development Corp.'s 1-2-3 or Ashton-Tate's Dbase into its files, where it can be analyzed and organized into reports.

Unlike a two-dimensional spreadsheet, it uses four categories used by accountants and other financial analysts for organizing data: Schedule, which includes income statements, cash-flow statements or balance sheets; Entity, which includes divisions and subsidiaries; Period, which includes quarterly, monthly and daily time frames; and Type, which includes actual, budget and forecast.

Lyons said Fastar makes use of the MDBS DBMS — MDBS III — and can handle any standard ASCII files. Future products will address the Digital Equipment Corp. VAX market and will seek to make Fastar function with mainframe accounting systems, Lyons said.

A department site license for Fastar, including up to 25 users and a version for a file server, costs $25,000, he added.

VM Software upgrades utilities

From page 25

mains unchanged with the new releases.

VMBackup was enhanced to include optional support of the IBM DOS/VSE operating system, which can run as a guest under VM/SP. VMBackup Release 4.2 allows a system manager to dump and restore DOS/VSE data sets. This optional support is priced at $3,000. VMBackup sells for $11,000, spokesmen said.

VMSchedule also has new support of DOS/VSE. This version provides for the scheduling and sending of jobs to the DOS/VSE environment. A license fee is $9,000.

The capabilities of VMSecure have been expanded to allow managers at individual sites to assign access to users. Release 3.0 is said to be priced at $19,000.

VMAccount now includes support of IBM's SQL/DS and Remote Spooling Communication Subsystems. It is priced at $12,500.

Software allows SQL use on PC

From page 25

on the SQL Workstation and run them there, DBMS spokesmen said.

The workstation includes a set of development tools, a forms management facility and forms and system catalog utilities. The development tools can be used to create screens, forms and reports for an application prototype. The tools extend SQL commands to make SQL more of a development language than a data access language that relies on Cobol or Pascal for many program routines, spokesmen said.

The applications can also make use of mainframe routines and data, the spokesmen added.

SQL Workstation recently became available for shipment to customers, Miller said.

DBMS has previously provided applications development environments on the IBM PC for IBM's CICS and Cullinet Software, Inc.'s IDMS.

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Codd: Supra surpasses DB2

From page 25

A language like SQL enables programmers to "debug their data base statements interactively, treating them separately from whatever non-data base statements occur in their programs," Codd wrote. He called such a capability "a significant contributor to productivity."

A data sublanguage also provides a single tool for defining relations derived from the data base, Codd noted.

Wood said Cincom is developing a version of SQL compatible with IBM's version and the proposed standard from the American National Standards Institute.

The Cincinnati-based firm started out developing a proprietary language, Spectra, that was going to be enhanced "to solve the shortcomings of SQL.

"But the marketplace doesn't want us to solve the shortcomings of SQL. It just wants SQL," Wood said.

Addressing failures

High-level insert, update and delete commands will be part of Cincom's SQL look-alike, addressing the second point Codd said Supra failed on the relational test.

One of the key points on which Supra surpassed DB2 was referential integrity, or the ability of a system to check and see whether an expected relationship between data exists prior to processing, Codd said.

One Supra user — Edward M. Peters, manager of data administration at Hershey Chocolate Co. in Hershey, Pa. — said Supra's referential integrity allows data base designers to "enforce the rules of the business right in the DBMS. . . . If you have it in the program control, it's hard to enforce across applications. If you have it in the DBMS, it's enforced all the time."

Using Supra in production

Hershey is using Supra in production systems, but Peters declined to specify what they are.

Codd noted that research has shown his rules on view updating and logical data independence cannot be demonstrated for every possible case.

"These rules will be rewritten in the near future," he wrote to Wood. DB2 failed both rules, while Supra received credit for meeting them.

Optimizing performance

From page 25

During requirements definition, a logical data model should be developed. First, the user should define the major components of data, how they are related and data volume statistics. The next step is to assign data attributes to these components via the rules of normalization.

In addition to the logical data model, user views of data should be prepared. These views describe by function how the components of the data model are to be accessed. Statistics defining how frequently the function will be performed and the function's time constraints should also be identified. For example, the function "find all orders for a specified customer" is expected to be processed on-line 5,000 times per hour between 8 a.m. and 4 p.m. with an average response time of three seconds.

During system design, performance estimating should occur to assess the technical feasibility of processing each critical business function.

This estimating process uses the logical data model, the user views, a set of I/O and CPU work units and the processing hardware environment to predict how long each function can be expected to take.

The work units represent I/O and CPU cost factors for various data types and are dependent on the data management software being used.

For example, the cost to "find customer by primary key" randomly in an IMS Hierarchical Direct Access Method (HDAM) data base can be predicted to require an average of 1.2 I/O and 5,000 CPU instructions. The number of I/O and CPU instructions can be factored to the processor and storage media speeds to predict elapsed time.

Estimations

Each function to be estimated is described in terms of its data access needs, the volume of records accessed and the probability of access. For example, the function, "create an invoice record for all customers that owe money," may be described with the data access steps of:

FIND ALL CUSTOMERS
FOR EACH CUSTOMER THAT OWES MONEY
CREATE NEW INVOICE RECORD
UPDATE CUSTOMER STATUS

Those functions exceeding the time constraints should be addressed before the system architecture is completed. The time constraint must be changed, the function must be modified to reduce its data access or the data model must be optimized.

Once all functions have been estimated to process within required time constraints, the data model optimization has been completed. After this step, the model is converted into the selected data management software.

During programming and implementation, the programmer should structure the data access commands to efficiently utilize the facilities of the data management software.

As real data and processing volumes come to bear in production, the system must be tuned to efficiently process the live volumes.

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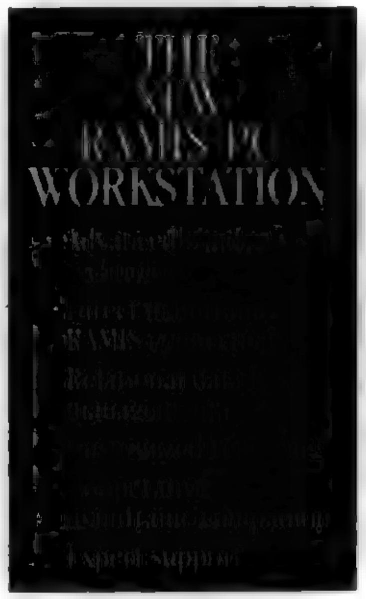

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COMMUNICATIONS

DATA STREAM
Elisabeth Horwitt

Ma Bell, we miss you

When divestiture dethroned AT&T as the dominant power in the telecommunications market, many rejoiced. The phone company's rivals looked forward to competing on a more level ground and customers hoped for a greater range of services and lower prices in a new era of free enterprise.

While some of this has come to pass, AT&T's semibenevolent dictatorship had at least a few advantages for customers and even competitors. Those are missing in today's more democratic market environment.

What customers miss is the guarantee of cooperation and compatibility between AT&T's long-distance services and its errant former progeny's regional offerings. In predivestiture days, Ma Bell could ensure each new long-distance tariff would have its counterpart on the regional side. As soon as the tie was cut, however, the regional carriers became far less eager to follow AT&T's lead. The lack of local support has stymied more than one AT&T tariff proposal.

To cite one example, AT&T's Accunet Switched 56 was introduced in 1985 but is only beginning to take off now that users can access it through local Switched 56 services. AT&T has been ready for years to unveil a secondary channel-support feature that would provide crucial diagnostic and management features for Dataphone Digital Service. However, the feature only works if it is offered locally and, until

See MA BELL page 33

Horwitt is Computerworld's *senior editor, communications.*

AT&T cuts rates further

Long-distance charges to drop an average of 11%

By Elisabeth Horwitt

WASHINGTON, D.C. — In compliance with a Federal Communications Commission order, AT&T has added another $650 million in rate cuts to the $1.2 billion reduction proposed last November.

Approximately $400 million of the latest cuts stem from further lowering of access charges to long-distance companies by the divested Bell operating companies, AT&T said. These latest access charge reductions were mandated by the FCC in December 1986.

The remainder of AT&T's rate reductions "relate to disallowances the FCC made to our estimated revenue needs in 1987," AT&T spokesman John Brooks said.

AT&T's current proposal, which supersedes reductions proposed by the company in November 1986, calls for a 14.5% rate cut for state-to-state long-distance calls during the day and a 9.3% reduction during evening hours. Overall, long-distance charges will drop by 11.2%, compared with the 8.1% average reduction proposed by AT&T in November 1986.

AT&T WATS and 800-service rates will be reduced by 4.6%. Megacom rates will be reduced 6.5% on the average; Megacom 800 rates by 3.9%.

The filing is the fourth major rate reduction that AT&T has made since divestiture. As a result of the cuts, the company's long-distance rates are 30% lower than they were three years ago, according to AT&T.

Netbios-TCP/IP standard coming

By Elisabeth Horwitt

MENLO PARK, Calif. — Standards for interfacing two popular networking protocols, Transmission Control Protocol/Internet Protocol (TCP/IP) and Netbios, should be finalized next month, according to the Netbios-over-TCP/IP Task Force. Networking products implementing the standards should become commercially available between two and six months after the specifications gain industry acceptance, industry spokesmen say.

Netbios-to-TCP/IP interfaces enable applications written for Netbios-based IBM Personal Computer networks to communicate with the growing number of computer systems that support TCP/IP, according to Daniel Lynch, president of the Cupertino, Calif.-based consulting firm Advanced Computing Environments and one of TCP/IP's developers. A standardized interface will enable different vendors' interfaces to communicate.

On Dec. 18, 1986, 25 task force members met at SRI International to "present, examine and initiate an agreement" on a proposed Netbios-to-TCP/IP standard. While "noting the remaining holes" in the 100-page document, the members decided to make the specifications available for comment from the general community of vendors, users and researchers.

On file at SRI, the document can be sent electronically upon request. "We expect to get all of the meaningful comments in the first month," Lynch says. The task force plans to convene in mid-February, review the feedback and finalize the agreement. The agreement will be officially presented to the industry at the TCP/IP Interoperability Conference in March, "but vendors can start implementing the standard as soon as the ink is dry," Lynch notes.

The task force includes representatives from Ungermann-Bass, Inc., Communications Machinery Corp. and Excelan, Inc., all of which already have Netbios-to-TCP/IP interfaces. "It should take us six months at a minimum to implement the standard in our product," says Communications Machinery President Steven Holmgren. "We think we're closer to it than Ungermann-Bass."

Communications Machinery plans to implement a subset of the interface standard

See STANDARD page 33

INSIDE

Social Security Administration unveils its first automated office/**32**

NEW THIS WEEK

- Quanta multiplexer family gives 3270 users options
- For more on this and other new products, see pp. 83-98.

INSTANT ANALYSIS

"Because of the task force's level of technical exhaustion, the [Netbios-to-TCP/IP interface standard] document should go through; but there's a 100% probability that the computers will find something wrong with it."

Bart Burstein,
manager,
product marketing,
Ungermann-Bass, Inc.

MAINFRAME

printf("Hello, ^ world\n");

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Social Security Administration opens first automated office

Service, accuracy should improve

By Donna Raimondi

MALDEN, Mass.— The Social Security Administration recently unveiled a fully automated office, the first of 1,340 that will convert from paper forms and typewriters to on-line terminal-to-host connections, the agency said.

The new on-line system eliminates all steps using paper, according to Dorcas Hardy, the agency's commissioner. It will handle claims, applications and status changes for Social Security's 37 million recipients.

In nonautomated offices, the staff writes new information on paper, transfers it by hand to a data sheet, and then sends it to a data entry person to be typed at a terminal into the system.

> ***'We are not as advanced as we should have been, but we are getting there. With government procurement processes, by the time you get it through, it's obsolete.'***
>
> **— Dorcas Hardy**
> **Social Security Administration**

After entry, the data is sent to the central IBM 3090 mainframe site in Baltimore.

The new offices include IBM 3179 color terminals, IBM 3268 Model 2 printers and an environment of furniture, sound-proofing and lighting that is shown to be conducive to productivity, Hardy said.

The conversion started in 1982 with the appropriation of $500 million for needs assessment and awarding of the contract. The IBM contract includes 22,000 dumb terminals.

Communications run back and forth to the Baltimore center, but according to Hardy, the administration is looking at distributed processing arrangements for a later date.

With the new system, Social Security recipients will be able to look up their own records rapidly and easily, Hardy said. The system will also shorten the time it takes to obtain a new Social Security number from the current 10 to 12 weeks to only 6 weeks, she added.

"We can now process 38,000 cards a night on the laser printer in Baltimore," Hardy said.

Going on-line should allow Social Security offices to handle client information with greater speed, Hardy said. Clients should get faster service and more accurate handling of their cases because of the elimination of transferring data from forms to terminals.

The system will also make it easier to take claims by telephone. Hardy said she hopes to have about one-third of all claims handled by phone by 1990. That rate is now about 14%, she said.

Increased employee productivity is another expected benefit of the system. Approximately 12,000 positions will be eliminated nationwide between now and 1990, most through attrition, according to Hardy.

The administration may go to intelligent terminals at a later date, Hardy said: "We are not as advanced as we should have been, but we are getting there. With government procurement processes, by the time you get it through, it's obsolete," she said.

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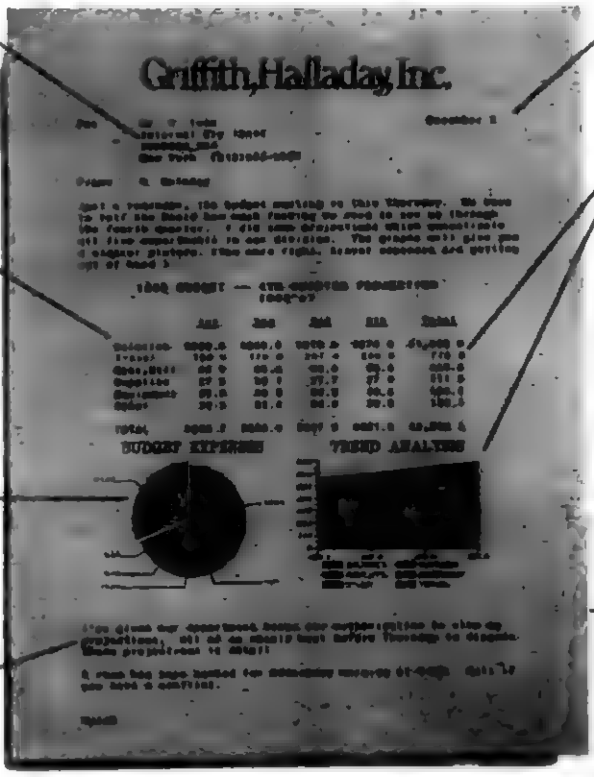
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Would your PC software

1. Does your software include programs for easy access to mainframe information?

2. Can your spreadsheet consolidate additional spreadsheets then retrace your steps so auditors can find what they're looking for?

3. Can you draw 12 different kinds of graphs, size and position them, put them side by side (4 to a page if you need to) and preview before printing?

4. If you have a mainframe connection, can you share information with those who should see it, and protect it from those who shouldn't?

5. Can you link a series of commands that will automatically update and assemble comprehensive reports month after month?

6. Can you personalize your document by redesigning the layout, or the look of the type, and adding color?

7. Can you access a mainframe, store and organize information with a database manager...

...analyze it with an auditable financial model or spreadsheet...

...present your numbers in lots of different kinds of charts and graphs...

...customize your document, write whatever text you need...

...then take all the work you've done and put it on the same page...

...without scissors, tape or a manual on computer programming?

The IBM Personal

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Ma Bell, we miss you

From page 29

recently, none of the regional carriers had it.

Telecommunications vendors and users are also suffering under predivestiture democracy because communications protocols are no longer dictated by AT&T.

"In the past, AT&T would introduce new protocols and everyone would plagiarize them, after which AT&T would go around telling everyone the way it really was done," says Vick Boersma, Northern Telecom, Inc.'s manager of technical requirements, technology and standards. Now, while telecommunications vendors are technically free to invent their own protocols, market pressure says otherwise.

Customers are clamoring for the standardized world of Integrated Services Digital Network (ISDN) that would allow them to integrate different vendors' offerings into a hybrid network with advanced management features.

In an attempt to meet this demand, telecommunications vendors are sending representatives to upwards of 70 committees, all of which are engaged in the "general intent to drive toward Open Systems Interconnect," according to Boersma.

But with AT&T no longer at the helm of the protocol development process, the push for standardization has repeatedly collided with solidly entrenched interests determined to make their particular protocols part of the standard.

Here again, the divested Bell operating companies are stretching their new muscles. They "do not like some of the compromises" incorporated into the existing protocols that define interfaces between carrier and customer premise equipment, according to Boersma.

These protocols were agreed to when AT&T represented all of the carriers; as soon as divestiture freed them from AT&T's sway, the divested companies became set on revision.

Concurrent with the struggle with existing protocols is a far fiercer industry battle over the specifications for future ISDN capabilities. Since many of these features "have never been tried before," according to Boersma, contending vendors have plenty of scope to claim that their pet protocols are the right way to do things. While we wait for the victors — and a few usable protocols — to emerge from the dust of battle, some of us may sigh for the good old days of predivestiture.

At least then we could depend on the forces of a good old-fashioned monopoly to push things through, instead of having to wait for dozens of warring competitors to reach a problematic consensus.

Standard coming

From page 29

that defines communications that exist within one local-area network, Holmgren explains.

The portions of the standard that deal with communications between two or more networks "still have serious problems," Holmgren adds.

A fully functional interface will have the effect of "allowing applications written for Netbios to operate in TCP/IP's internetworking environment," according to Lynch.

Single network

However, Netbios was originally designed to operate primarily within a single network.

This factor makes it difficult to coordinate Netbios's resource-naming scheme with the resource-naming scheme of TCP/IP, Lynch admits.

That job will probably be left to the vendors, Lynch adds.

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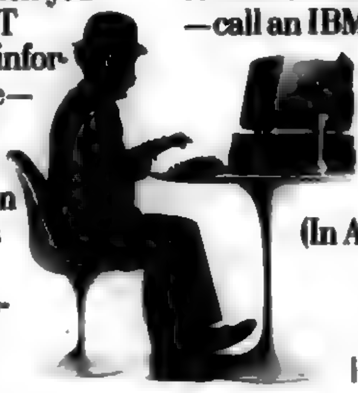

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Built-in Pop-up Firmware	Yes	No
Separate Numeric Keypad	Yes	No
Screen Type	S-Twist LCD	LCD
Keyboard Compatibility IBM PC/XT	Yes	No*
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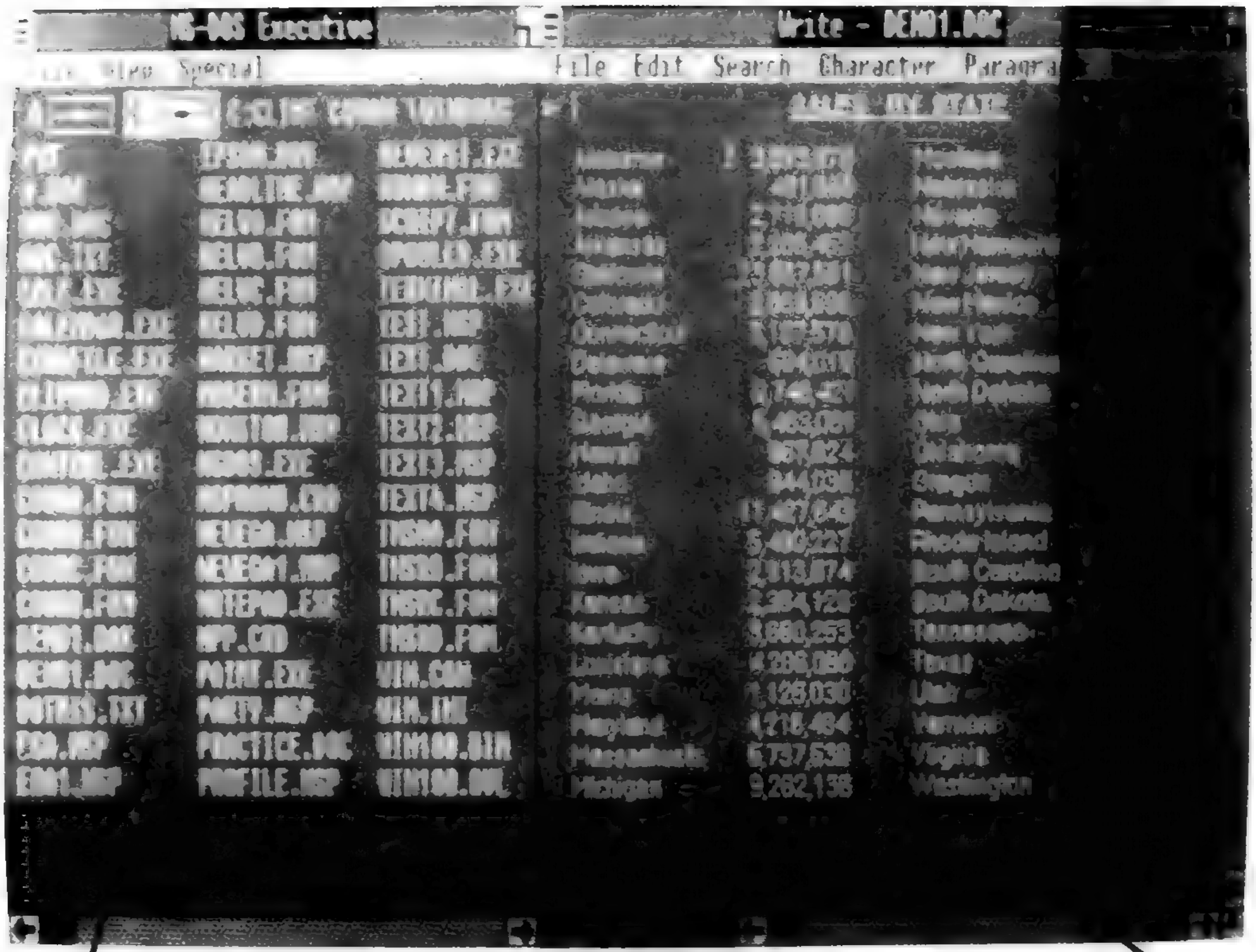

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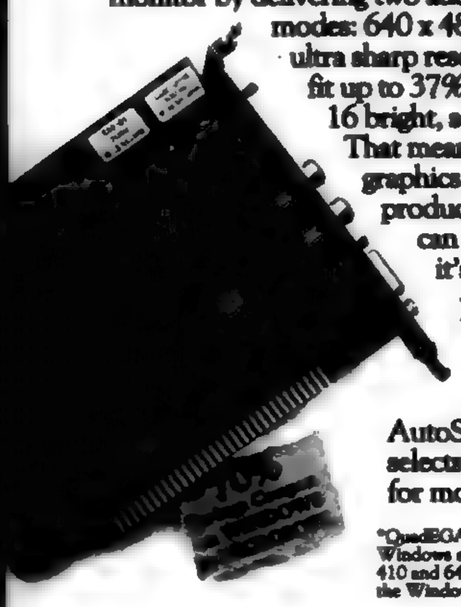

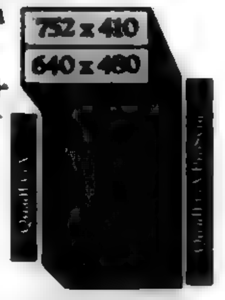

QuadEGA ProSync delivers a total of six graphics modes!

*QuadEGA ProSync includes drivers to run Microsoft Windows and software that runs under Windows in 752 x 410 and 640 x 480 modes, and a coupon good for 70% off the Windows package.

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MICROCOMPUTERS

MICRO BITS
William Zachmann

Macro mania

This is an era of personal computers driven by faster and more powerful microprocessors surrounded by more and more memory. As the capabilities of personal computers increase, software for them becomes more complex.

Many of the newer software products have required large investments for their development. Products like Ansa Software Co.'s Paradox, Javelin Software Corp.'s Javelin and Symantec Corp.'s Q&A are beyond the ability of one or two individuals to develop on their own.

Macropac's 101 Macros for Lotus Development Corp.'s 1-2-3, however, is a refreshing reminder that individuals with good ideas can still create useful and salable products. This $49.95, non-copy protected package is the result of one person recognizing a product opportunity.

E. Michael Lunsford, president of Cupertino, Calif.-based Macropac, was business manager for Eaton Corp. in nearby Sunnyvale. As a user of 1-2-3, Lunsford was surprised to find that no one had thought of putting together a collection of useful 1-2-3 macros and selling it as a software product. So he did it himself.

Macros in their simplest form are just collections of keystrokes that are saved in advance and can be invoked as input to a program with a simple two-key combination. More sophisticated macro facilities, such as that in 1-2-3, include symbolic parameter options and

See **MACRO** page 40

Zachmann is vice-president of research at International Data Corp.

Micro firms charge piracy

Ashton-Tate, Lotus, others sue Canadian company

By Douglas Barney

VANCOUVER, B.C. — An informal consortium of seven large microcomputer software vendors, including the three industry leaders, has filed suit against Softsave Information Services, Inc. for allegedly renting out pirated software to customers.

According to Ashton-Tate, a plaintiff in the case, Softsave illegally reproduced micro software and rented the programs to users for $15. Softsave specializes in software rentals.

But according to Softsave's lawyer, the copyright issue in Canada is still unresolved. "We are going to begin with the argument that there is no copyright in computer programs in Canada," said Robert MacFarlane, a partner with Fitzsimmon MacFarlane, a Toronto-based law firm.

Under current Canadian law, however, there are copyrights for computer programs. The copyright issue is being appealed, and the decision on the Softsave case may rest on that appeal.

Other plaintiffs include Microsoft Corp., Lotus Development Corp., Lifetree Software, Inc., Infocom, Inc., Activision, Inc. and Broderbund Software, Inc.

Ashton-Tate removed copy protection from its products last year, making it easier to copy and therefore to pirate the firm's software.

Ashton-Tate is seeking as much as $300,000 in damages from Softsave. The damages sought include those from copyright infringement, the profits of the operation, damages from conversion or the theft of the software and exemplary damages.

Softsave owners Eric Steven Sommer and Maureen Wilma Ribington were not available for comment.

Informix increases Lotus 1-2-3 users' access, storage ability with Datasheet

By Douglas Barney

MENLO PARK, Calif. — Informix Software, Inc. recently announced Informix Datasheet Add-In, a $150 product aimed at users of Lotus Development Corp.'s 1-2-3.

The package will be available in the second quarter of this year and is expected to allow 1-2-3 users to store work sheet data in an Informix data base. "What the product is going to let users of 1-2-3 do is use that 1-2-3 environment they know so well to access data in a minicomputer-class data base system," said Laura King, vice-president of marketing for Informix.

According to Informix, Datasheet Add-In is the first in a series of relational data base products that will allow users to maintain a single source of data that can be extracted and manipulated by 1-2-3 work sheets.

"They can sit there looking at their Lotus work sheet and use the query form that they are used to and access data in the data base, manipulate it, retrieve it and so forth," King added.

A key advantage of the product is that it allows Lotus users to work with larger files. "Users can operate on data files that are larger than they could have previously because they were constrained by the limits of what they could store in a work sheet," King said.

"Now they can store it in as big a file as they want on their hard disk," he added. With the product, users can store all work sheet data in one source.

Informix developed the product using the Developers Tool Kit from Lotus, a set of tools that allows developers to more tightly integrate applications with 1-2-3. Datasheet Add-In runs on IBM Personal Computers and compatibles that have at least 640K bytes of random-access memory and a hard disk drive. The package also requires Lotus 1-2-3. The product will be available directly from Informix.

INSIDE

Pecan broadens language offerings/38

Product offers risk-free software demonstration/38

NEW THIS WEEK

- Granite Systems unveils PC-based personnel scheduling system
- For more on this and other new products, see pp. 83-98.

INSTANT ANALYSIS

"Many of the applications that you are involved with will be subject to cannibalization by the PC revolution because of the PC's horsepower, local-area networking and increasing software sophistication. What we don't have yet is a way to market and sell it."

— Fred Gibbons, president of Software Publishing Corp., speaking to a group consisting largely of mainframe software vendors

Oracle's SQL★Calc makes a relational DBMS as easy as 1-2-3.

Oracle Corporation has developed a Lotus 1-2-3 compatible spreadsheet and integrated it with its ORACLE® relational database management system (DBMS). The new product, SQL★Calc,® is the first to combine a mainframe-class relational DBMS with an easy-to-learn and familiar PC spreadsheet user interface.

SQL★Calc is designed for 1-2-3 users who've run out of memory, flexibility and patience. SQL★Calc allows you to put SQL database commands into spreadsheet cells… just like formulas. This permits you to access large amounts of data directly from your spreadsheet.

Like all Oracle Corporation products, SQL★Calc runs identically on mainframes, minicomputers and PCs.

SQL★Calc's foundation is the ORACLE relational DBMS, which provides users with a complete set of SQL commands through which they can create, retrieve, modify and otherwise control their data. SQL is the industry standard database command language for large computers. The SQL commands available in ORACLE are identical to the SQL commands in IBM's premier mainframe relational DBMS products, SQL/DS and DB2.

Built on this powerful DBMS foundation is a Lotus 1-2-3 compatible spreadsheet that allows users to put SQL commands into spreadsheet cells in the same way as they enter formulas. When a SQL command for data retrieval is entered into a spreadsheet cell, information is automatically retrieved from the database and placed into the spreadsheet. SQL★Calc also permits users to modify the database – and even create new database tables – directly from the spreadsheet.

Spreadsheet

Relational DBMS

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SQL★Calc is easy to learn because its menu and command structure are compatible with those of Lotus 1-2-3. And SQL★Calc's ORACLE DBMS requires no supplement: It is vastly more powerful than the database components of 1-2-3, Symphony, Framework, dBase II, dBase III, or any other PC DBMS.

SQL★Calc is available immediately for IBM PC/XTs and ATs for $995.* SQL★Calc will soon be available on a wide variety of systems, including IBM mainframes, DEC, DG, and other superminis, and most UNIX systems.

For further information, or to order your copy of SQL★Calc, call 1-800-345-DBMS. Or write Oracle Corporation, Dept. CS, 20 Davis Drive, Belmont, CA 94002.

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Firm bolsters development line with integrated software

Language products key to Pecan strategy

By Douglas Barney

BROOKLYN, N.Y. — Pecan Software Systems, Inc. recently introduced several new products, including a version of the Modula-2 language, and reintroduced Jack2, an integrated software package.

The new products, along with a rash of product upgrades, give Pecan a wide variety of language offerings, the firm claimed.

"The key thing is that we now have a program development environment with an integrated family of development tools and languages that is machine independent," said Eli Willner, vice-president of research and development for Pecan.

According to Willner, integration of the firm's language products is a key part of Pecan's strategy. "Each compiler knows about the others. You can write part of your application in Fortran and call it from Pascal," he said.

Pecan's Modula-2 was acquired when the firm purchased the assets of San Diego-based Volition Systems. "We took their compiler, which is one of the first Modula-2 compilers for micros, made it compatible with our current release of the Power System and brought it up to date with the latest standard for the language," Willner said.

Pecan now offers Modula-2 for $99 when purchased as part of the Power System, Pecan's integrated family of development tools. "When you buy a language, you get a text editor, file-handler utilities and graphics utilities," Willner said.

Pecan also recently announced PDQ Pascal, a $69 version of USCD Pascal aimed at novice programmers. "It is an almost full implementation of the language which is designed for the beginning programmer. It comes with one disk instead of three and a tutorial manual," Willner said. "If a corporation is starting a training program in Pascal, this is an ideal thing to use because the course ware is actually part of the product."

According to Willner, a full 32-bit Power System will be released in mid-1987 and will be targeted at Motorola, Inc. 68000-based and Intel Corp. 80386-based machines.

The firm also upgraded its Fortran 77 and its implementation of USCD Pascal for Apple Computer, Inc.'s Macintosh.

Jack2 was written in USCD Pascal and includes word processing, spreadsheet, data base and graphics. Jack2 will sell for a introductory price of $49. Pecan acquired the package from the now-defunct Business Solutions, Inc. in Kings Park, N.Y.

Demo service takes risk out of purchases

By Douglas Barney

A service called Previeware, designed to eliminate the costly purchase of the wrong software package, was recently unveiled by Winston & Winston, Inc., a Fort Worth, Texas-based publicity and marketing communications consulting firm.

"From the end-user perspective, the only way to find out if a particular software package was right was to buy it and try it," said Marty Winston, president of Winston & Winston. "At that point, you are at the point of no return."

Winston encountered this problem and had to give away his first word processing package when it did not satisfy his needs. "There has got to be a way to get a flavor for software without the risk," he contended.

The service, which is available through The Source under the IBM SIG, provides demonstrations of software packages that users can download. "These are not just slide shows, but functioning demos that are distributed free," Winston explained. Vendors can participate in Previeware free of charge. Winston is hoping to spread the service to both Compuserve, Inc. and Telenet, Inc.

There are several criteria vendors must meet in order to participate in Previeware. "The demo in and of itself must be of value to the guy who gets it whether or not he decides to buy the full program. Before we compress it for uploading, it has to be under 400K bytes. And the last stipulation is there must be an incentive to purchase the full package and continue using the Previeware vehicle," Winston said.

Such incentives include cash discounts directly from the vendor, a coupon the user can print out to receive a discount from a computer dealer or a rebate, he added.

Tools available on Previeware include 1st Class from Programs in Motion, Professional Tax Consultant from Stallion Software, Inc., Save Our Spreadsheet and Goldata Base from Goldata Computer Services, Inc. and eventually TKSolver from Universal Technical Systems.

Generator eliminates coding, compiling

By Douglas Barney

IRVINE, Calif. — Aker Corp., a software start-up with roots in Israel, recently announced a data base and applications generator that does not use a programming language.

Called Magic PC, the $695 product allows users to develop applications by filling in information banks and execution tables. Instead of using a language specific to a data base product, the developer highlights selections from pop-up menus. The package then puts this information into one file that includes both the program library and the data base.

According to the company, the major burden for users is system analysis rather than programming. "The major thrust of the product is to save a considerable amount of time in developing applications. You don't write code or compile," according to A. Miko Hasson, president of Aker and an author of Magic PC.

The User Exit feature allows the user to integrate spreadsheet, accounting or word processing applications into the firm's data base environment.

Magic PC was developed in Israel, and has been used extensively by the Israeli Air Force and a number of commercial companies.

The product was written using Microsoft Corp.'s Pascal.

Magic PC can handle up to 20 open data base files simultaneously, with a maximum record size of 2K bytes. Maximum keys per file is 24, the maximum segments per key is 10 and the maximum key size is 250 bytes.

Magic PC's file and record locking features support Novell, Inc.'s Netware networking software.

The package runs on the IBM Personal Computer and compatibles and requires 512K bytes of random-access memory and a hard disk drive.

A demo version of the product, limited to 100 records, is available for $19.95, and Magic Run runtime modules sell for $95 each. The product is available either through value-added resellers or directly from Aker. The $695 version includes a local-area networking feature.

Package adds AI technology to applications

By David Bright

NORWELL, Mass. — Solution Systems has introduced a Common LISP package that allows the integration of LISP and C code on a personal computer. With the package's interface to Microsoft Corp.'s C language, programmers can customize LISP or combine C functions with LISP programs.

Called Translisp Plus, the $195 package is "geared to adding artificial intelligence technology/techniques into existing applications or for creating new applications," according to product manager Tristan Knapp. The company claims its new package is the only Common LISP-compatible package that integrates Common LISP and C.

The package includes more than 400 Common LISP primitives. Programs carefully written with the interpreter can reportedly be ported to any other Common LISP system on a microcomputer, minicomputer or mainframe. Users can create their own built-in primitives and also integrate code from third-party C libraries, the company said. The package comes with 30 sample programs intended to give novice users an understanding of LISP programming techniques. Additional features such as debugging tools, an integrated editor and cross-reference facility are aimed at experienced programmers.

A runtime interpreter that enables consultants or managers to distribute executable versions of programs is available for $150.

Translisp requires an IBM Personal Computer or compatible system with at least 320K bytes of random-access memory.

Multitasking PC tool out

By Douglas Barney

TARRYTOWN, N.Y. — Lifeboat Associates recently unveiled a development tool that provides multitasking and real-time event processing for applications.

Timeslicer is a $295 package for IBM Personal Computers and compatibles that works with Lattice, Inc.'s C Compiler and Lifeboat's Advantage C++ preprocessor/translator that supports object-oriented programming.

"There are a lot of applications where people would like to be doing some background task. Most of the world is waiting for ADOS [a name given to Microsoft Corp.'s unannounced multitasking operating system for Intel Corp. 80286 and 80386 machines], but there is an enormous base of PC XT-class machines. The world is not going to immediately convert to 286/386 machines," said Edward H. Currie, chairman of Lifeboat.

The real-time event processing capability allows C functions within the application to complement or replace any interrupt service routine.

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…WHATEVER IT TAKES.

Spooler reduces Mac terminal tie-up time

By David Bright

Supermac Software in Mountain View, Calif., has introduced the Superlaserspool utility for quickly returning control of an Apple Computer, Inc. Macintosh system to the user after information is sent to a printer.

"Users want to minimize the time they spend waiting for their printers," said Supermac General Manager John Duhring. "Unfortunately, the Laserwriter can take three minutes or more to print a new page, and if someone else on the network is printing when you want to, you have to wait until it's free. This shortcoming has become the weak link in the whole system."

After a six-page spreadsheet document is sent to a printer, Superlaserspool returns control of the Macintosh to the user in 10 seconds.

According to the company, the new spooler achieves its speed via an intelligent background processing program that manages the entire printing process.

The spooler also includes a feature that allows spooled files to be printed out at any time and an accessory for showing print file status and providing help.

Single-user copies of the program cost $149.95; the multiuser version is priced at $395.

In other Macintosh news, Meta Software in Cambridge, Mass., plans to introduce at the Macworld Expo this week a module that extends the functionality of its design graphics and text processor.

With Design+DA, users can write Macintosh desk accessories that directly interact with Design. Design is used for describing complicated ideas in forms such as flow charts, organizational charts or information networks.

Assembly and C language interfaces and instructions on how to generate interfaces for other languages are also included in the $1,000 package. An updated version of Design with features such as user-controllable palettes, object layering and extended hypertext search capabilities will be available for $200.

Macro mania

From page 37

logic control commands.

The effect of these is to create what amounts to a powerful programming language.

Lotus's 1-2-3's macro facility makes it easy to automate frequently used commands, enter commonly used label sequences and simplify complex or repetitive procedures using long command sequences.

It also can be useful in customizing a work sheet for use by someone who is not familiar with 1-2-3.

The macro facility in 1-2-3 is one of its most valued features for experienced users.

Most users, however, make little or no use of Lotus macros. Learning to use the macro facility is a bit more complicated than learning basic work sheet operations.

Macropac's 101 Macros is exactly what its name implies. It is a collection of 101 prewritten macros that are of general use. With 101 macros, users of 1-2-3 or compatible programs like Paperback Software International, Inc.'s VP Planner or Lifetree Software, Inc.'s Words and Figures who have not yet learned the macro facility gain the advantage of some useful macros.

Best of all, however, 101 Macros for 1-2-3 also provides an excellent introduction and tutorial on the use of macros. A nicely written manual includes an introduction to macros, what they are and how they are created. The macros themselves provide examples ranging from simple to complex.

Macropac's 101 Macros also offers considerable utility and significant value for its price.

It will be a welcome addition to the software library of Lotus 1-2-3 work sheet users. Its greatest value may ultimately be enabling less experienced users to learn to use their own macros.

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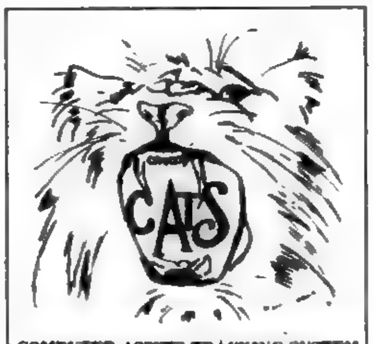

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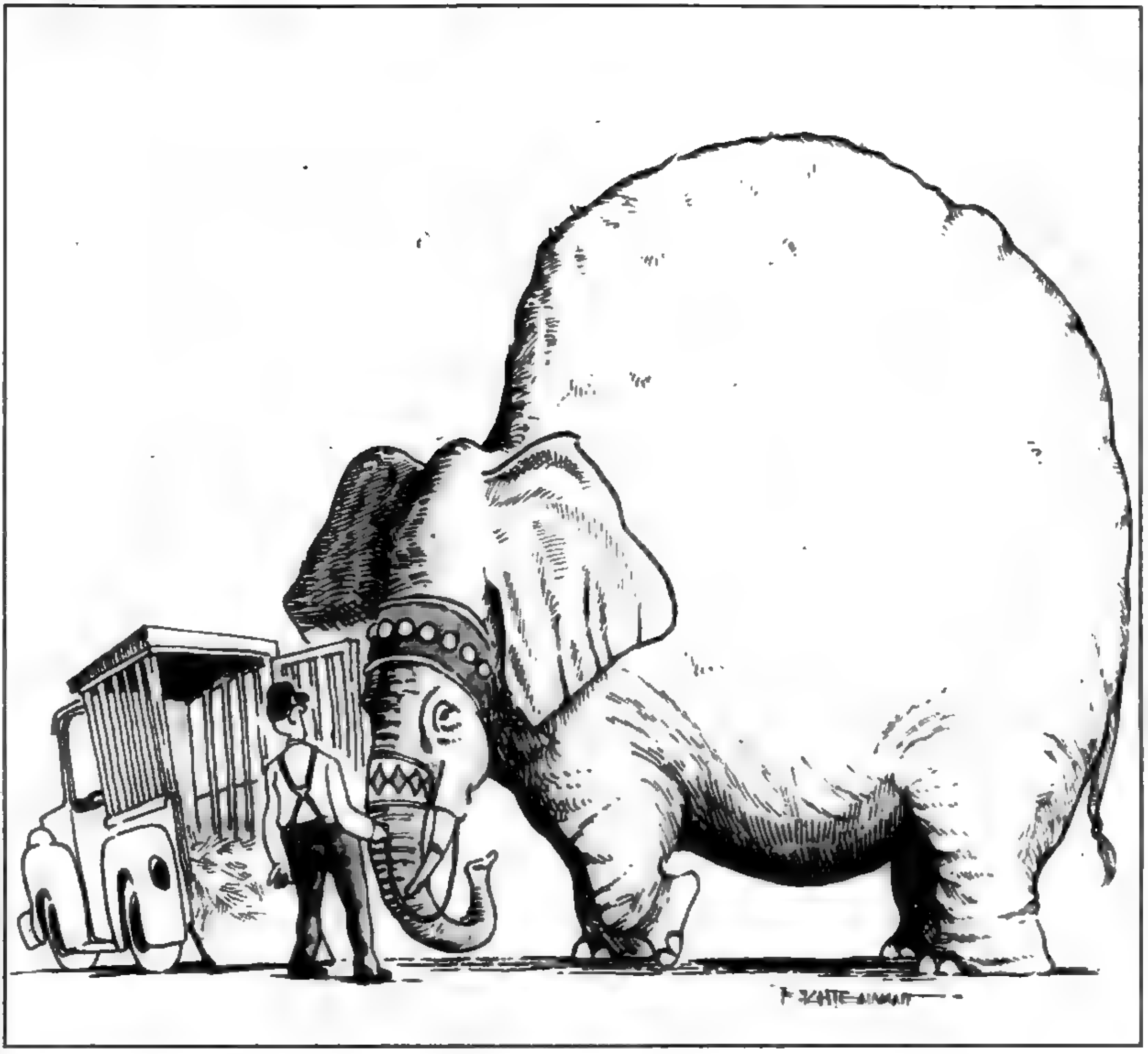

ILLUSTRATION BY RICH TENNANT

INSIDE

Market survey — The leading capacity planning software vendors/42

IBM's customized solution/46

Holding company skips 3090 family through advanced planning/47

The challenge of tracking network capacity/52

Capacity planning

Senior management is finally paying attention

By MICHAEL SULLIVAN-TRAINOR

Before capacity planning became a permanent part of the DP department at Reader's Digest Association, Inc., the company often ran the risk of not being able to obtain the processor it needed in time to avoid capacity shortages.

On many occasions, because the needed computer was not available, the data center had to spread out the load among available processors by having users work overtime and on weekends. The expense of this stopgap measure soon caused company executives to establish a long-term capacity planning program.

"Everybody was dissatisfied — from the top; down," says Paul Zimmermann, the company's manager of capacity planning.

While Reader's Digest changed its approach to capacity planning about five years ago, executives at other companies are only now deciding it is time for a permanent planning effort.

For example, Coldwell Banker Co. in Laguna Hills, Calif., recently hired capacity planning troubleshooter Jason Shane to establish a program from the ground up. Shane was hired four months ago, fresh from developing a capacity planning program for the Auto Club of Southern California.

The fact that these companies chose to develop a permanent program rather than a quick-fix solution is evidence of the change that is taking place in capacity planning.

Once viewed as an isolated technical function to be engaged in only when absolutely necessary, capacity planning is now being seen as a permanent part of MIS strategy.

Capacity planning is also becoming important to managers of departmental systems. By and large, the focus has been on IBM host-based environments, but distributed processing and relational data base systems are broadening the responsibilities of the planners.

> ***New software is changing the way capacity planning is done. It allows planners to focus more on business strategy, rather than on analyzing data strictly on a technical level.***

Managers of Digital Equipment Corp. VAX and Microsoft Corp. MS-DOS systems are finding they need to become involved in capacity planning as well.

As a result of these trends, planners are being required to work more closely with non-MIS departments of the corporation to provide the vital link between the computer systems and the business strategy the systems support.

This is not an easy transition for planners who

Sullivan-Trainor is a Computerworld *senior writer.*

Paying attention to capacity planning

Continued from previous page

have been raised in a technical world and who, until recently, have not had adequate software at their disposal to accurately analyze capacity problems. But now, new technologies, including expert systems, allow planners to more accurately track resource problems and respond to management directives quickly.

"New software systems are allowing old capacity planning functions to be done more efficiently. The overall function has changed drastically. Planners are getting more involved with the business side, rather than analyzing data strictly on a technical level," says George Febish, sales and marketing manager of International Systems Services Corp. (ISS), a New York-based capacity planning consulting and software company.

"They're still doing that, analyzing data on a technical level," Febish contends, "but it is not taking 100% of their time anymore. Now they can look at which business units are driving the increased resource usage."

Boole & Babbage, Inc.'s direct access storage device (DASD) performance management expert system released in December; ISS's modeling expert system, which was recently enhanced by the addition of a network module; expert system tools by VM Software, Inc. and by other hardware monitor and network management vendors are all signs of the trend toward making capacity planning and performance management products easier to use.

In addition, well-established products from Boole & Babbage, BGS Systems, Inc., Candle Corp. and Morino Associates, Inc. are also allowing planners to move away from the technical demands of their profession and devote more time to analysis.

More releases in the expert systems, networking and VM areas are expected to come from these vendors this year.

Also, large vendors such as Uccel Corp. and Computer Associates International, Inc. are offering comprehensive data center management products, such as Uccel's Synova series and Computer Associates' CA-Unicenter.

Capacity planning and performance management are encompassed by these packages, merging the planner's responsibilities with the rest of the data center.

COMMON CAPACITY PLANNING MISTAKES

MITCHELL J. HAYES

Treating capacity planning as a special study. Often a company has a staff member develop a capacity plan as a justification for a new processor. As a result, there is no way the staff member can say a new computer is not needed because his assignment is to justify the purchase. Also, the plan is ignored after the purchase, and there is no consistency between planning efforts.

Making unrealistic assignments of useful life to minimize current day costs. Probably one out of every 10 shops has some piece of equipment over in a corner wrapped in plastic waiting for the lease to expire. It is there because it is cheaper not to maintain it than to return it and pay the outstanding balance. Capacity planning can predict the realistic useful life of a system and prevent wasting a company's investment.

Perceiving capacity planning as a totally technical problem and not a communication problem within the organization. Many people are surrounded by capacity planning data, but because they can't present it in a way management finds easy to understand, it is useless. By looking at how to market the information to decision makers, planners can be more effective.

Failing to understand the underlying business and interact with the user community. Planners send out forms that say: "How many CPU hours are you going to use next month?" Most of the time, the people who send the forms can't answer that question for their own operations. To make the connection between business plans and resource usage, planners have to understand the nature of the business.

Not becoming part of the budget cycle. Often planners ignore the company budget cycle, even though their plan will not be effective unless it is coordinated with the availability of funds to invest in an additional processor when necessary. Overlooking this issue may result in a serious setback to capacity planning efforts.

Acquiring more capacity planning tools than the company needs. Some planners become fascinated with the sophisticated technology at their disposal, but these tools amount to expensive toys when they are not needed to create an effective capacity plan to meet the company's long-term goals.

CW Chart

The desire of senior management to establish an effective in-house capacity planning effort has been hampered by a shortage of qualified personnel.

Providing the kind of analysis that allows a company to determine which applications are likely to consume the most CPU time has in the past been a job for a highly skilled professional, whose background included mathematics theory, as well as systems engineering.

Because of a shortage of these kinds of technical professionals, managers are instead implementing vendor packages. The continued development of capacity planning software is allowing less-skilled professionals to accomplish the analysis and forecasting functions.

"A few years ago, we had various kinds of analytical models that took someone of a highly educated background to understand," Coldwell Banker's Shane says.

"It almost required a Ph.D.-level person who knew queuing theory. There are simply not that many people in the world that are practitioners in our field that have that kind of background."

One of the newer products that addresses this situation is ISS Three, marketed by ISS, one of the first expert systems for capacity planning. Released in December 1985, ISS Three is the combination of an expert system front end and a modeling package.

"It includes high-level screens so that users who do not have technical experience don't have to adjust numbers that they don't know anything about," ISS's Febish says. "A novice can run it and get reasonable results, while at the same time experts can change any of the fields that they want."

The system recommends changes to both performance parameters and hardware to solve response time problems. ISS Two, an expert system in change and problem management, is also being developed by ISS for release late this year.

Transforming capacity planning from a technical function to a liaison between the technical group and the business elements is requiring a new attitude within MIS, as well as within the corporation as a whole, according to H. Pat Artis, who is a capacity planning consultant and also president of the Computer Measurement Group, Inc., the national society for capacity management professionals.

"The one ace that MIS has always had in its pocket is the user community," Artis says. "It's been possible to use that as leverage because as soon as the users get lousy service, they start complaining. But with effective capacity planning you never inconvenience the user, and you don't use the users' dissatisfaction as a foil to carry your needs," Artis says.

Allowing user concerns to determine equipment policies often results in a haphazard approach to systems planning. This approach places management in the position of purchasing whatever the vendor of a particular system recommends, because the need is at a crisis point.

Budget limitations and increased scrutiny of MIS by senior executives are making the traditional method of justifying new purchases with user anguish less acceptable.

"If nobody had a budget problem, there wouldn't be as much improvement in computer performance as

Continued on page 43

Market survey: Vendors battle for leadership

By LARRY STEVENS

Intense competition and rapid growth among software vendors are giving users plenty of choices in the capacity management market.

But the complexity of the field and the tendency of vendors to exploit even the smallest market niches make it hard to find a comprehensive group of products that meet all a company's needs.

However, current technology and market trends may quickly change this situation. Expert systems together with a strategy implemented by some of the major vendors that offers a single data center management solution are combining to integrate capacity management functions.

In addition, the largest companies are consolidating, and they are bent on acquisition strategies that place more and more products within a single vendor's control.

As the fastest growing segment of the data center management software market, capacity management software garnered $228 million in revenue in 1986, up 18% from the year before. Revenue is expected to rise to $484 million in 1990, according to a recent report by International Data Corp. (IDC), a Framingham, Mass.-based consulting firm.

According to the IDC report, the following trends will continue to fuel the growth of the market:

- As users implement relational data base systems for both production and end-user work loads, host systems will be placed under tremendous stress.

System optimization and work load forecasting will be essential to coping with performance bottlenecks.

- Distributed processing is also expected to increase the demand for capacity management products, particularly in the network management area, where some of the vendors have already developed niches.
- Changes in the IBM environment, such as the recent introduction of the IBM 9370 as well as the popularity of Digital Equipment Corp.'s VAX processors, are creating additional opportunities for many capacity management vendors.

The largest of more than 150 vendors in the market fall into three general categories: full-line vendors, capacity management specialists and niche vendors.

Computer Associates International, Inc., based in Garden City, N.Y., is the leader among full-line vendors, with estimated revenue totaling $81.9 million. Dallas-based Uccel Corp. is the next largest company in this category and moving up quickly with an estimated $60.1 million in revenue. Both companies, which have grown largely through the acquisition of other vendors and their product lines, are not

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Stevens is a free-lance writer based in Springfield, Mass.

primarily capacity management vendors, but they do offer comprehensive data center management solution products, such as Computer Associates' CA-Unicenter and Uccel's Synova line.

While these two large companies battle for leadership of the data center management market — particularly in the non-VM operating systems area — VM Software, Inc., based in Vienna, Va., with $18 million in revenue, has carved out a strong lead in the VM area. Other companies, however, are starting to move to challenge that company's products. VM Software offers VMCenter, a comprehensive data center management product.

There are numerous niche vendors whose products come under the framework of capacity management as well as data center management software. They include Duquesne Systems, Inc., based in Pittsburgh, with revenue of $6.3 million for what IDC defines as data center management products; and Cambridge Systems Group, Inc., based in Santa Clara, Calif., with estimated revenue of $11.7 million.

In the capacity management specialists' field, the four market leaders are BGS Systems, Inc. in Waltham, Mass.; Boole & Babbage, Inc. in Sunnyvale, Calif.; Candle Corp. in Los Angeles; and Morino Associates, Inc. in Vienna, Va. According to revenue figures collected by IDC, Candle leads this group with $65 million, followed by Boole & Babbage with $25.4 million, Morino Associates with $22.7 million and BGS with $13.3 million.

Having focused largely on research and development rather than acquisition, these companies have had rapid product releases and are expected to continue a fast pace of announcements.

IDC predicts that Boole & Babbage will be introducing more expert systems in the near future, such as the direct access storage device (DASD) package announced in December 1986, as a logical extension of its performance management products, as well as offering more products for VM. Candle is also expected to extend its line further into VM and network management and introduce expert systems to reduce the complexity of performance management.

In addition, BGS Systems will likely expand its product line and concentrate on network management, especially in the IBM environment, according to IDC. Morino is expected to add to its MVS Integrated Control System (MICS) products, particulary in the data base management area.

Current capacity management products can be broken into two major categories. First, there are the simulation and modeling packages that directly assist the planner in creating a new system and in forecasting the results of various configurations.

Second, there are the performance evaluation products. These tools measure the system's performance and provide the data that fuels the capacity planning function. Performance evaluation tools can be further separated into data management, job accounting, software monitors and program optimizers.

Simulation and modeling packages are designed to project response time, CPU and device utilization, throughput and other factors. Most of them also allow users to ask "what-if" questions to experiment with different variables.

The oldest modeling and simulation system is Best/1 from BGS Systems, which is sold as a package with Capture, a software monitor.

International Systems Services Corp. (ISS), based in New York, has mounted a challenge to BGS Systems with its ISS Three product, a modeling package, incorporating an expert system. ISS also announced in December an integrated network support module for its product to help planners identify bottlenecks in the network as well as in the CPU.

Boole & Babbage's Capacity Management Facilities are composed of an integrated family of capacity planning and performance measurement products that are used on IBM MVS-configured data centers.

SCERT II by Performance Systems, Inc. in Rockville, Md., is a performance management tool and capacity planner that can either run on an IBM mainframe or as a standalone unit on the IBM Personal Computer AT. MICS from Morino Associates is an integrated system for managing MVS and MVS/XA installations.

Data management tools in this area are used to configure data bases and optimize DASD storage. Most of these tools analyze existing DASD environments either by examining the directory or monitoring DASD performance during execution of the program.

Job accounting software reads the data base statistics on computer internal operations that most operating systems maintain. The information is normally gathered primarily to charge back resources to customers, but it can also be used to provide performance reports and fuel capacity planning systems. Three of the major job accounting software packages are Capture from BGS Systems, Control/SMF from Boole & Babbage, and CA-Jars/OS-Job Accounting Systems from Computer Associates.

Software monitors perform similar functions to job accounting systems, except that they collect their data directly from the operating system rather than from a data base. Therefore, software monitors generally provide more accurate measurement data and more detailed information of the operating system.

Resolve/MVS and Resolve/CICS, both from Boole & Babbage, are leading products in this area. Another, ADR/Look from Applied Data Research, Inc. in Princeton, N.J., is a software monitor that is also a performance management and control system. Candle also has a number of real-time software monitors.

Program optimizers are used to evaluate application code to determine which sections account for the heaviest use of processing time. Three leading products are Strobe Application Tuning Product from Programart in Cambridge, Mass.; Optimization Instrumenters from Softool Corp. in Goleta, Calif.; and Scan/Cobol from Group Operations, Inc. in Washington, D.C. ■

Continued from page 42

there is today," Artis says.

"In the late '60s, early '70s, performance evaluation first became important because we were in an economic downturn.

"For the first time since the IBM 360s were introduced in the mid-'60s, people had limited money, and they had to go back and ask the question, 'Could we get more out of what we have rather than buying more?' Economics have provided the motivation to go out and use what we have better," he adds.

As a result, management is looking to the managers of performance and capacity planning for the answers. Ironically, the planners thought they were providing answers to improved performance all along. Unfortunately, they were not providing the data in a form that business executives could understand.

"Over the past several years, there has been a re-examination of why the capacity planning message isn't getting through to the top levels. For a long time, that has been perceived as a technological problem," Artis says.

"Today, more and more capacity planners are realizing that they have to be able to relate to the information systems business and the corporate priorities as a whole.

"As a result, they are seeking to write the kind of reports that, rather than being well-suited for *Scientific American*, provide a glimmer of understanding and a reasonable business case to the people who make the decisions," he says.

"It's not a compromise. We're not going to take any of the chief executives back to the shop and teach them to interpret Resource Management Facility data.

"Instead we're realizing that what they really need is business justification for their information systems organization," Artis adds.

Senior management needs to realize that an effective, long-term capacity planning effort requires a significant commitment on their part, Coldwell Banker's Shane says.

"I told the Coldwell Banker executives that it is an expensive function that requires a large investment of money and time before they'll ever see any results.

"I also insisted on meeting with the vice-president level of the company to make sure that I would have access to high-level business plans, even, at times, confidential business plans. Only if I have access to those plans can I do the forecasting that they expect of me," he says.

In addition, Shane obtained access to speak to the heads of other business units so that he could learn about their functions and future plans.

"Not all companies are structured or run in a way that capacity planning can be successful. Some companies don't have the commitment up front, or they've seen capacity fail before and there's no more credibility," he says.

Fortunately, Shane's current job involves installing a capacity planning effort in a fairly new data center where there has been little long-term experience.

To introduce his capacity planning philosophy into the company, Shane has developed a plan that will lay the groundwork for the future The major points include the following.

- Implement a performance tracking data base, containing measurement information.
- Implement the technical capacity and performance functions, while at the same time develop the lines of communications with other departments of the business to review the business structure.
- Develop financial analysts of the cost of ownership of hardware over a five-year period.
- Synchronize the annual capacity plan with the corporate budget cycle

Obtaining commitment from senior management for capacity planning is only half the battle. The other half is working closely with the end users. Recognizing this need, Reader's Digest has placed the goal of effective communication with end users above that of technical perfection in the development of the capacity plan.

"We would rather have a technically mediocre plan and good communication with our top users than a technically superior plan that is lost because of lack of communication. The users are the people who really make the decision. They're the ones who raise their hands at a meeting and say, 'Yeah, we need a new computer,' " Zimmermann says.

The magazine's capacity planning department is responsible for the data center budget and a charge-out system, as well as capacity planning, performance management and application tuning.

Zimmermann and his staff of five work with an IBM 3090 and a 4381. The mainframes are accessed by about 450 IBM terminals through a Systems Network Architecture (SNA) network.

Every department of the company has applications running on the mainframes, including systems for production, marketing and editorial.

A key to the capacity planning effort at the company is establishing long-term relationships with other departments.

This is done through the drafting of a revised capacity plan every six months. The plan is developed in consultation with more than 50 people throughout the company

"We talk to people at all levels, from vice-president down to programmer. We talk to just about anybody who's willing to talk to us," Zimmermann says.

Feedback from these discussions is used to build a work load forecast that represents the views of the entire company, rather than just the planning department

In each interview, the planning staff will present historical trends of resource usage as well as discuss budget limitations.

Since the data center operates on a charge-out basis, the other departments are especially interested in the amounts that they are paying for service

"We build a forecast based on their business trends. We don't try to talk DP at all. We just ask about promotions and other business changes, and we come back and translate that into the appropriate

Continued on page 46

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Continued from page 43

data processing terminology, such as CPU hours," Zimmermann says.

For example, when the marketing department invested in laser printers to improve the quality of its promotional material, it saved money because less work had to be produced by outside vendors. But it also had an impact on usage.

"Even though there was no increase in the amount of business they were doing, the usage went up fairly sharply because the operation of a laser printer requires more time on the computer.

"It's been a long-term project to get everybody to understand that and accept that the laser has a lot of benefits, but there's a cost at the other end," Zimmermann says.

People within the marketing department were upset at first because they had not foreseen the effect the printers would have on computing costs.

But because a long-term relationship was already in place and because the planning department knew the business reasoning behind the purchase, the planners were eventually able to get the users to understand the reason for the increased costs.

> ***'It's important to understand the background or the politics behind many of these decisions so that when you talk to people and they become critical of the increased charges, you can point out the savings being made in other areas.'***
>
> — Paul Zimmermann
> Reader's Digest

"It's important to understand the background or the politics behind many of these decisions so that when you talk to people and they become critical of the increased charges, you can point out the savings being made in other areas.

"If you don't understand that and you can't give them a balanced idea, people think that costs are going up for no reason," he says.

In another example, which took place about three years ago, the data center at Reader's Digest was planning an upgrade from an IBM 3081 to a 3090. Zimmermann's department had forecast the need for a new processor for at least two years, but when the time came to make the purchase, the company decided it could not afford to spend the money.

Because the capacity planning effort was in place, the company was able to hold off making an upgrade for a year.

On the technical side, the planners used an application tuning package called Strobe, made by Programart in Cambridge, Mass., to discover inefficiencies in the IBM CICS system code.

The problem was that a number of the housekeeping chores were being repeated unnecessarily. On the end-user side, because the planners had given them advanced warning, the user departments were able to work together to rearrange systems usage

Continued on page 50

Snap/Shot applies simulation modeling to capacity planning

IBM offers a wide range of operations control and data management products, as well as a customized approach to capacity planning, which it calls Snap/Shot.

The Snap/Shot program allows customers to work with IBM staff members in the application of a discrete simulation model for IBM systems at IBM's Marketing Support Center in Raleigh, N.C.

The model "can represent a company's entire data processing operation from terminal input through network to processor and I/O and back," according to IBM spokesmen.

More than 2,000 customers have spent week-long sessions at the Raleigh site developing and analyzing models for their operations.

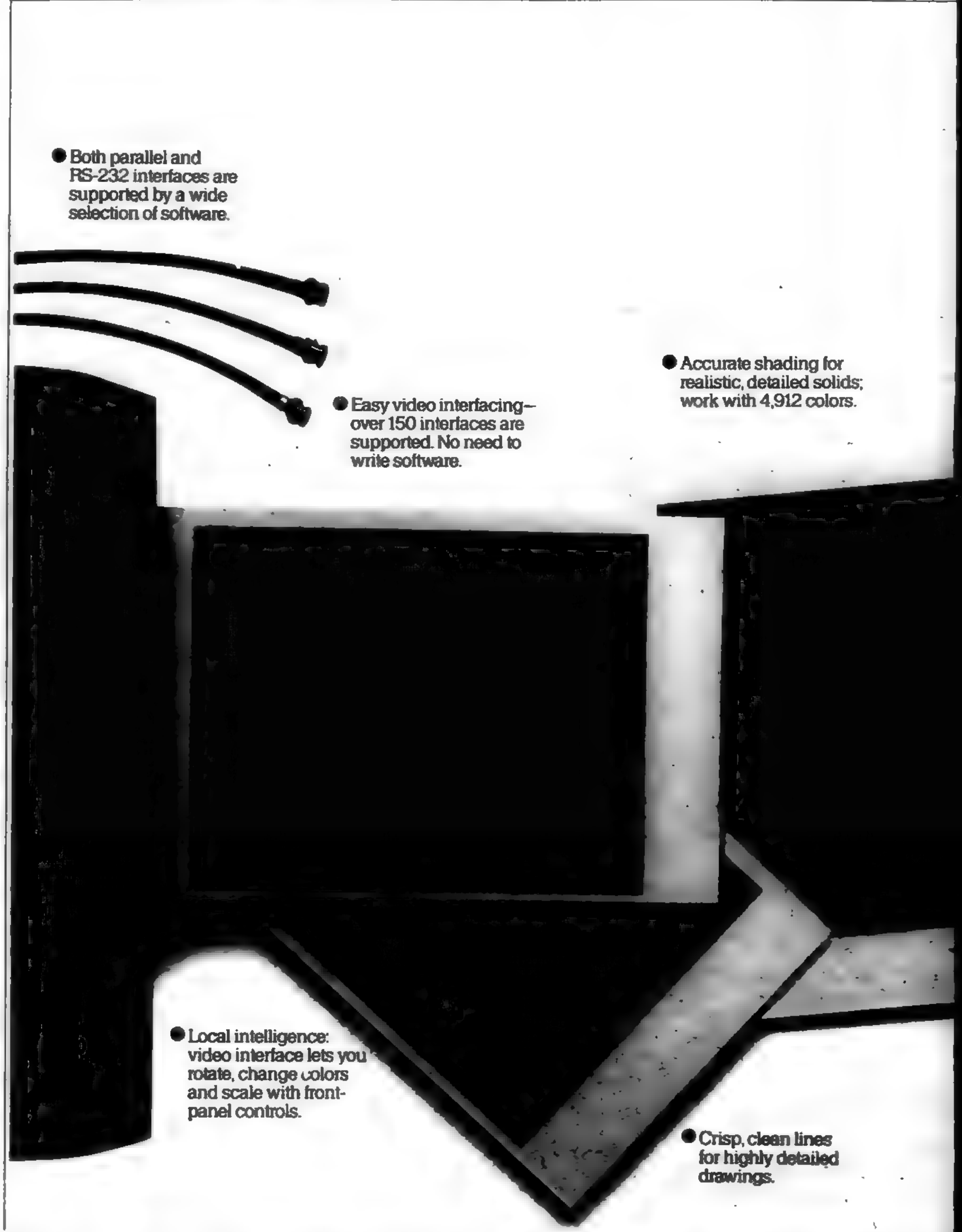
The sessions are preceded by closely coordinated planning efforts involving IBM and customer staff members.

Typical user questions are, "How soon do I need a new CPU?" "What will happen to response time if a new application is added?" or "How can I best use new technology in my network?"

In use since 1975, Snap/Shot has helped companies as diverse as the Marine Midland Bank N.A., Virginia Electric and Power Co. and Cigna Corp. to plan their data processing operations.

While some users prefer to travel to IBM to resolve capacity planning issues on a periodic basis, many others are placing their resources behind in-house efforts.

— Michael Sullivan-Trainor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Reconfiguration proves a thrifty alternative to buying

Capacity planning saved Combined International Corp., a Chicago-based holding company, from investing $9 million in an IBM 3090 that it really didn't need.

In fact, the effort was so successful that the corporation may skip purchasing any of the 3090 series processors and await the next generation of mainframes, according to Paul Keller, manager of capacity planning for the past year.

"Before the capacity planning work was initiated, management worked on the gut feeling that they would run out of capacity by the end of 1986," Keller says. "With doing some reconfiguring and moving of work loads, which we determined by finding out who is using what, we were able to see that it was too early to purchase a 3090."

One of the major difficulties in making accurate assessments of Combined International's systems needs is the size of the corporation. Combined International is made up of five independent companies that offer six major insurance product lines. Each company has applications running under IBM CICS on two 3084s and an IBM 3081.

The processors are housed in three data centers. The western center, located in Chicago, has a 3084 Model Q and a 3081 Model K. An eastern center, near Philadelphia, has a 3084 Model Q and two 3033s. A newly acquired data center, also in the East, has a 3081 Model GX.

Although Keller's group uses a number of capacity planning and performance management packages, it cannot obtain the answers management needs without the aid of homegrown applications and conceptual techniques independent of the analysis or modeling software.

"We're running six regions of CICS. If you look at the way the vendor packages allow you to build work loads, they are really based on performance group breakdown," Keller says. "Management's questions are always, 'What is this company doing?' " Keller claims, "and I can't really get to that information unless I restructure the whole operating system and say that one particular company has to work in this set of CICS regions and another has to work in different regions."

To solve this problem, Keller runs a separate set of processes that takes all of the data from the operating system or CICS and breaks it down. The system then assigns the data to the different user departments, which can then be combined to represent the particular companies.

"It allows me to see transaction volumes, consumption and I/O usage for the different departments, not in a chargeback way, but in a realistic utilization way," Keller says.

These processes are divided into three groups. One is the homegrown application that the planners developed using SAS, a statistical analysis package from SAS Institute, Inc. The system works off the System Management Facility data and the CICS monitoring data, breaking it down to represent the business units using the system.

Another is based on ISS Three,an expert system made by International Systems Services Corp. (ISS) in New York. The package allows peak periods of utilization to be isolated, allowing planners to get some feel for what is going on during peak periods and how many hours during the day in which peak conditions exist.

The third uses Capture MVS, made by BGS Systems, Inc. in Waltham, Mass., to distribute a month's worth of data into a form that represents usage based on each application.

Each process provides Keller with a different look at what is happening within the operating system and applications. But even the expert system does not provide the data in the appropriate form.

"I have to make some kind of conversion in my head to go from one set of processing to what I'm able to do in ISS Three, because all the package can come back with is production CICS as a work load. There's no real way for me to tell if it's one company doing it or another company," Keller says.

Another matter that the packages do not address is the differences between day and night work loads. "We have two distinct work loads: daytime, in which you size the machine in one way, and then we have this tremendous night work load, in which you size the machine and the peripherals in another way. I haven't found anything out there that lets me do both of those. I can look at both, but I can't understand the problems of relating one to the other," Keller says.

While struggling with the deficiencies of software packages, Keller must also find ways to respond to requests from senior management.

"I have so much data," Keller says, "that upper management can't absorb it quickly enough to understand it. I keep trying to keep my report on capacity down to a few pages. But I can't get under 100."

— Michael Sullivan-Trainor

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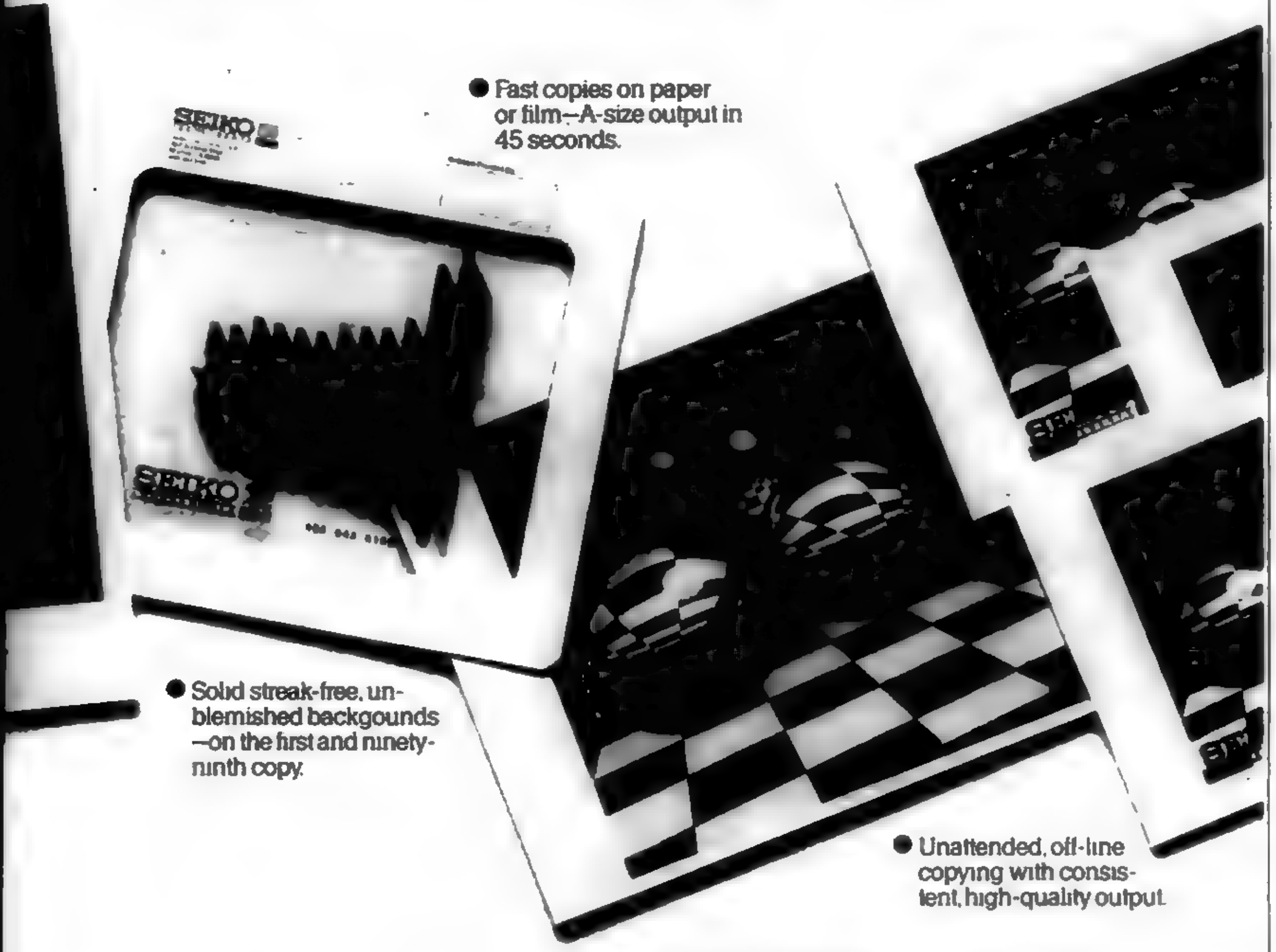
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"What we used to call competition, we're now calling prey."

Continued from page 46

by taking some applications off the processor and trimming back the work load on others.

Things have not always gone so smoothly. Before the capacity planning department was formed, the function was implemented only when a crisis approached.

"At that time when we started to run out of capacity, someone would be assigned to do the plan, which was really just a justification for a new machine," Zimmermann says.

End-user contact was limited prior to the formation of the department. Planners typically met the users only when they were looking to justify a new machine.

Because this did not happen often, contact between the two groups was rare.

This type of relationship, Zimmermann says, is a poor one because each time a planner came into contact with a user, the planner was typically looking for money.

In the Reader's Digest's current environment, Zimmermann says, "only once have we looked for a new machine, and everybody knew about it in advance."

According to Zimmermann, when the actual proposal went forward, he heard no arguments.

"In the past, it was a screaming match until you got to the point where they agreed you needed a machine," he says.

Even when all the pieces are there — an ability to deal with senior management on business terms, effective communication with the end users and the technology to provide accurate performance and forecasting data — managing all of these aspects to form a comprehensive capacity planning effort can still be difficult.

For instance, Kermit Doelling, manager of computer performance at McDonnell Douglas Aerospace Information Services Co. in St. Louis, has his hands full matching management's budget limitations with the end users' expectations for computer resources.

"There's a broad disparity between our customer requirements and the limitations on the financial side. We can't afford to do everything the customer wants to do," Doelling says.

The current difficulty at the St. Louis data center has been caused by some rapid growth spurts in the office automation environment.

"It's proven very difficult to justify the investments we've made in office automation," he says.

The data center is responsible for supplying shared processors, while the end-user or customer departments purchase their own terminals, personal computers or departmental computers that they can run on their own or tie into the shared mainframes.

The St. Louis data center currently has two IBM 3084s running MVS-based work loads, two 3090 Model 180s — one running MVS and serving as a global processor and the other running VMXA supporting work loads in MVS — as well as a 3090 Model 200, running VM and carrying primarily office automation applications.

Currently, the problem rests with end-user access to IBM's Professional

Continued on page 54

KEY COMPONENTS IN CAPACITY PLANNING

☑ **Defining management's role in establishing service levels** — All levels of management should participate in negotiating reasonable service contracts with user departments.

☑ **Data collection** — An inventory of all hardware, software and applications should be compiled, including a description of the models or versions currently installed, their rated capacity or performance, cost, migration paths, product planning cycles, configurations and alternatives.

☑ **Work load characterization** — An analysis of work schedule patterns should be conducted for various work loads and subsystems to the computing configuration.

☑ **Work load forecasting** — An accurate forecast requires a combination of business forecasts, installation work load history, statistical analysis and common sense. Communication between the computer installation and business community is vital to the success of this process.

☑ **Simulation, modeling** — Achieving a reasonable model presenting an accurate picture of current and proposed configurations requires a high level of expertise. Data collected from previous processes should be applied to the modeling system.

☑ **Reporting and presentation** — The entire capacity planning process is meaningless unless the results are communicated to the technical staff, the vendors and senior management in terms that they can understand.

☑ **Evaluation** — Viewed as an audit check on a planner's ability to predict the future, the final phase involves an ongoing comparison of actual capacity information and projected forecasts.

Information provided by International Data Corp.

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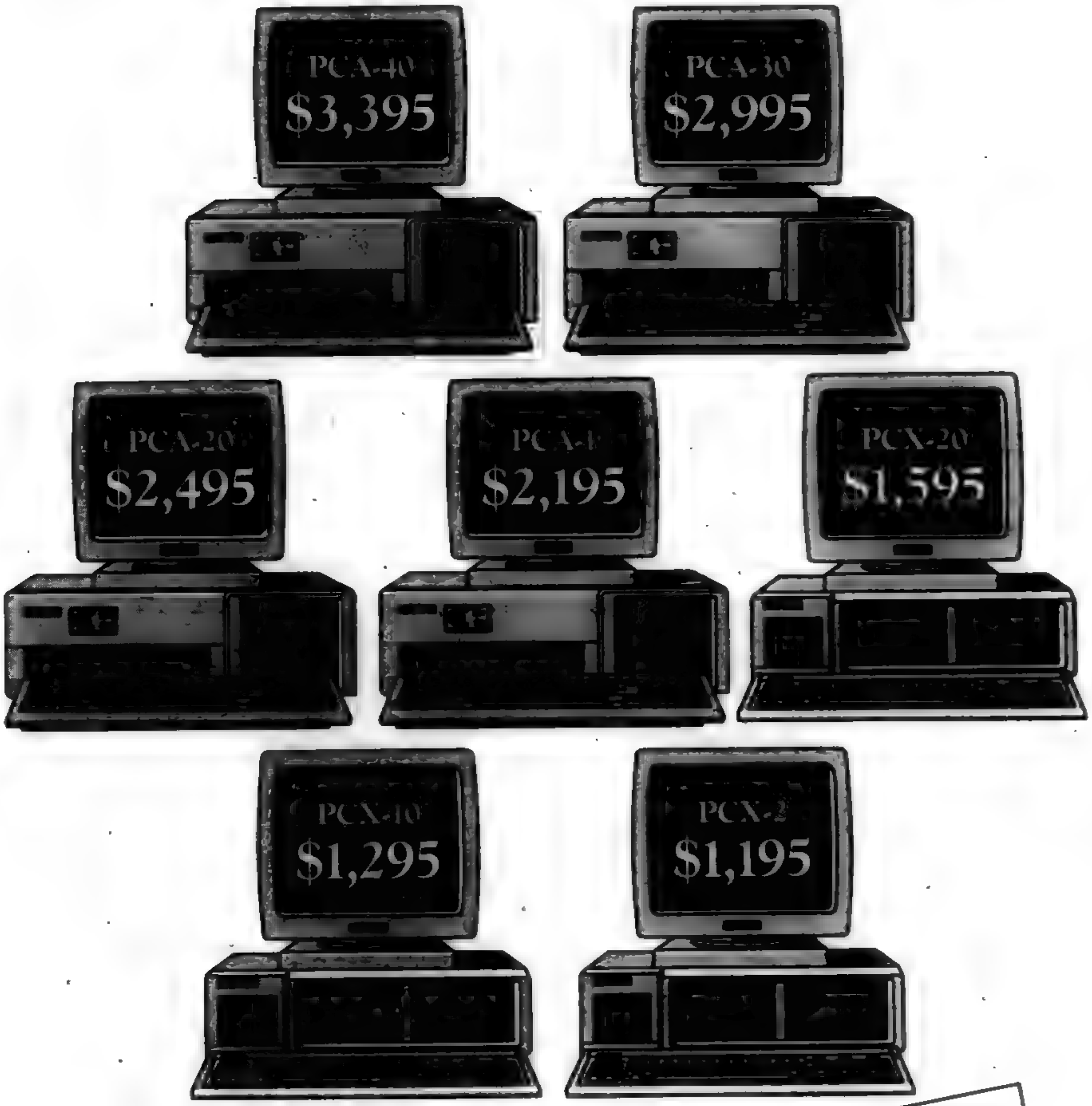

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Network management: Keeping supply in line with demand

By JOSH BRACKETT

At 7:30 a.m. on Monday, Oct. 27, 1986, the London Stock Exchange's new Stock Exchange Automated Quotations system was up and running. By 8:30, it was down, its communications network overwhelmed by inquiries.

The crash of the network, which dampened some of the enthusiasm for the automation of the stock exchange or the Big Bang, is a dramatic example of what can happen when users demand more service from a network than it can supply.

Ordinarily the consequences of poor network capacity planning — or no planning at all — are less spectacular, but they can be just as serious.

At the very least, slow response means lost productivity. Under a departmental chargeback scheme, users often have the right to pay less for poor service.

If users are customers, patrons of automated teller machines at bank branches or purchasing agents with terminals on their desks that are tied into a vendor's order entry system, they may get tired of waiting and go elsewhere. If a financial network is slow, the institution using it may miss out on a deal worth millions.

Although a network and its host mainframe are physically distinct, to the user they are one system. While the problem of host capacity planning is by no means trivial, network capacity planning is more difficult for several reasons.

According to Alan Sarasohn, vice-president of network systems at BGS Systems, Inc. in Waltham, Mass., a developer of network capacity planning software, one reason for the difficulty is lack of expertise: There are just not that many people around who have network management experience. Another is corporate politics.

Often, a network and its host mainframe are managed by different people, sometimes even in different buildings. Good capacity planning requires integration.

"Otherwise you may plan a very cost-effective, very well-performing host system, but if you can't get the network work done, you've neglected to meet the end users' needs," Sarasohn says.

Furthermore, network capacity planners have to plan in an environment that is changing rapidly and often unpredictably.

For example, Chris Schuttger, a technical planner for Texas Utilities Co., which supplies electric power to 10 million customers, provides support for customer service representatives and corporate staff using 5,000 terminals located all across Texas. The terminals are connected to seven front-end processors, which in turn are linked to three IBM 3090 mainframes.

"The problem is not just the current network plus the growth of current traffic on already existing terminals," Schuttger says. "It's also those new departments that are continually coming on; it's putting more cities on the network, increasing the line speeds to major locations and trunk lines and how that affects our front end and backup into the host."

Not only do user firms want to do more with their equipment to reduce costs, increase productivity and gain a competitive edge, but IBM has also been a constant source of change in both hardware and software and will continue to be as far into the future as any one can see.

"The trouble is," says Tom McDonald, a consultant who specializes in IBM Systems Network Architecture (SNA) performance management and capacity planning, "just when MIS and data processing managers are coming to understand network management and products are being developed to deal with this issue, IBM is changing the rules by continually unveiling new network strategies. IBM is rewriting the way that SNA does business."

In particular, McDonald cites IBM's new Advanced Peer-to-Peer Communication (APPC), especially when used with Advanced Peer-to-Peer Networking (APPN).

"Before, whenever I wanted to talk to anyone on an SNA network, I had to establish a conversation with a mainframe computer. Now, with this new approach, I'm allowed to talk to people connected to the same minicomputer or another minicomputer or another personal computer, without having to go through a mainframe. It's great, but we've just barely gotten a handle on managing the larger network."

Tom Parker, a senior technical specialist at the Bank of Boston Corp., works with two 3090s, each at a separate data center, and a network of approximately 90 lines going out to 40 branches, each with its own branch staff terminals and ATMs. The bank has been growing quickly recently, opening up new branches and taking over smaller banks, all of

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Brackett is a free-lance writer who lives in Rockport, Mass.

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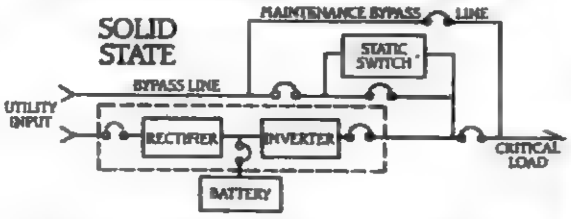

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which have to be added to the network.

Parker has been modeling network capacity using Best/1-SNA, a software package developed for the purpose by BGS Systems. Until he started doing that, Parker recalls, "most of it was just by gut feel. When I came into this — I used to be an operator — there wasn't really anything done in network planning. It's still a new field. They really had no idea what was going on in the lines. As long as the people didn't complain, the response time was acceptable."

According to Jeffrey P. Buzen of BGS Systems, a mathematician who has developed much of the queuing theory that is the basis of BGS's network modeling software, network capacity planning based on intuition and experience is often wrong. Not only is relevant experience scarce, but network behavior can be startlingly counterintuitive. For example, even in simple systems, as utilization approaches 100% of capacity, response time increases not linearly but exponentially.

"Corporate management thinks the network is like this big parking lot," McDonald says. "If you run out of parking spaces, no problem. We'll just bring in the hot top, roll out some more tar and paint some more spaces. The way the network really functions is when you're three-quarters full, you don't really have a quarter left. These things do not degrade gracefully. They go right down the tubes. Although upper management is evolving in the way they think about things, they still don't have a good understanding."

According to Sarashon, some companies try to avoid planning by overspending. "They say, 'We don't do that function; we just buy more than we need' — which is kind of a contradiction because if you haven't analyzed it, you don't know how much you need. So how can you buy more?"

Sometimes you need less capacity than you think. Network planners at Centel Corp., a small telephone company headquartered in Lincoln, Neb., noticed that because of changes in business activity, data traffic had meandered away from some of its multidrop lines toward others, threatening to degrade service at the busier clusters.

One solution would have been to buy more lines and modems. By modeling the network using Best/1-SNA, though, Centel found that it could achieve the same result simply by changing the network control program's service order table, making the front-end processor poll the less busy clusters less frequently and favor the busier ones.

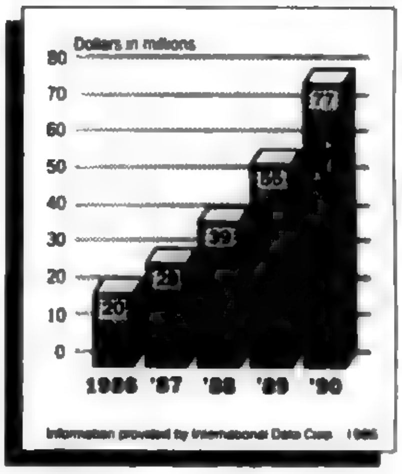
Jerry Vidlak, senior telecommunications analyst for Centel, says that network modeling has "helped us break the habit of dealing with problems by overreacting or making arbitrary changes to our system."

According to Parker, although modeling the network using the Best/1-SNA system is much better than seat-of-the-pants or trial-and-error methods, it is not the final answer. The Bank of Boston is not yet involved in APPC, but there are things going on out in the branches that affect response time at terminals that cannot be measured from the host.

"We only see as far as the control unit and back," Parker says. "We don't see what goes on in the control unit and out to the terminals. The only thing we could do, which we did, is go out there with a stopwatch and measure what was going on. There's a place in Best/1, a blank field, where you can put that measured response time into the model."

Parker would also like help with "the geographic setup, the topological optimization of the lines. There's no way with Best/1 to figure that. If I have a line out there or a network where the lines are overutilized, there's no way that I can go out with the BGS product and say, 'What's the best way to configure this network?' " Parker says.

NETWORK MANAGEMENT REVENUE FORECAST



Information provided by International Data Corp. 1986

Difficulties in accumulating the data needed to do good network capacity planning is a common problem. Sarashon says, "The information is there in multiple files across multiple data centers in the large shops. The person who would use our products may not be the person who has ready access to that data. It's mostly a political problem.

"Ten years ago people used to say the same things about mainframes — 'Gee the measurement data is all over the place!' — but the industry overcame them. And the industry is beginning to overcome them in the network area as well." ■

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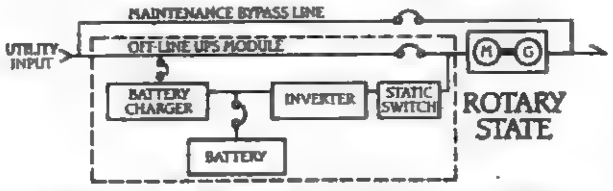

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>
> — Kermit Doelling
> McDonnell Douglas Aerospace
> Information Services Co.

Continued from page 50

Office System (Profs), which is being utilized by about 1,100 logged-on users.

"It's getting pretty close to the limit. IBM has advised us not to depend on pushing that number beyond 1,200 in our environment without potentially exposing ourselves to system outages," Doelling says.

If the data center had the money, the problem could be solved with the purchase of another processor.

But because management has said that the money is not available, Doelling says he is attempting to control Profs usage.

As a first step, the data center staff has restricted its hours of use of the system to avoid periods of peak utilization.

By using the system early in the morning and later in the day and allowing customers to use the system during regular business hours, the staff has reduced the pressure on the system by about 200 users during peak periods.

Doelling is also using performance management software packages to bring efficiencies where possible, but the tools that are available for the VM environment do not match the capabilities of what can be done in MVS.

For example, a product like TSO/MON by Morino Associates allows a very specific look into the TSO application, and there is nothing comparable on the VM side that would allow the examination of unique functions within Profs to determine which areas are causing the most pressure on capacity.

"We've achieved a lot of tuning efficiencies, but there's not much the products can do to control the rapid growth we've been seeing," Doelling says.

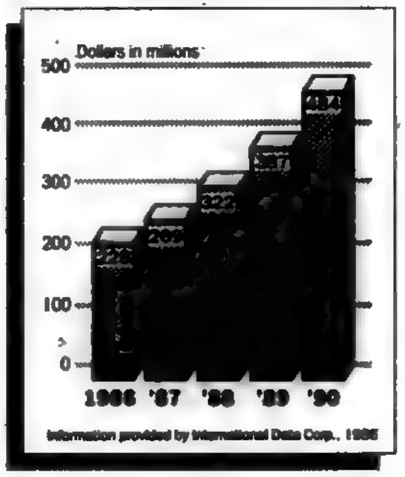
This is the third time the Profs/VM system has required an upgrade. Since January 1985, the load has been passed to increasingly larger processors, from an IBM 3033 to a 3081 that was acquired in late 1985 and now to the 3090, which was installed in mid-1986.

Another major problem is that the end users are not aware of how the financial part of the business affects the kind of computer support MIS can provide.

"They just haven't heard the financial people telling them what the budget limits are going to be for the 1987 operating year. We're more in tune with what their upper management is saying regarding the financial constraints than they may be down at the project level," Doelling says.

Despite the need to cut back, the customers are consuming more resources on the Profs system than they were before the data center went to staggered hours, because of the continued growth of their departments.

CAPACITY MANAGEMENT REVENUE FORECAST



Information provided by International Data Corp., 1986

So Doelling's department is in the position of holding off the flood until another processor can be purchased, but until then there's not much that can be done.

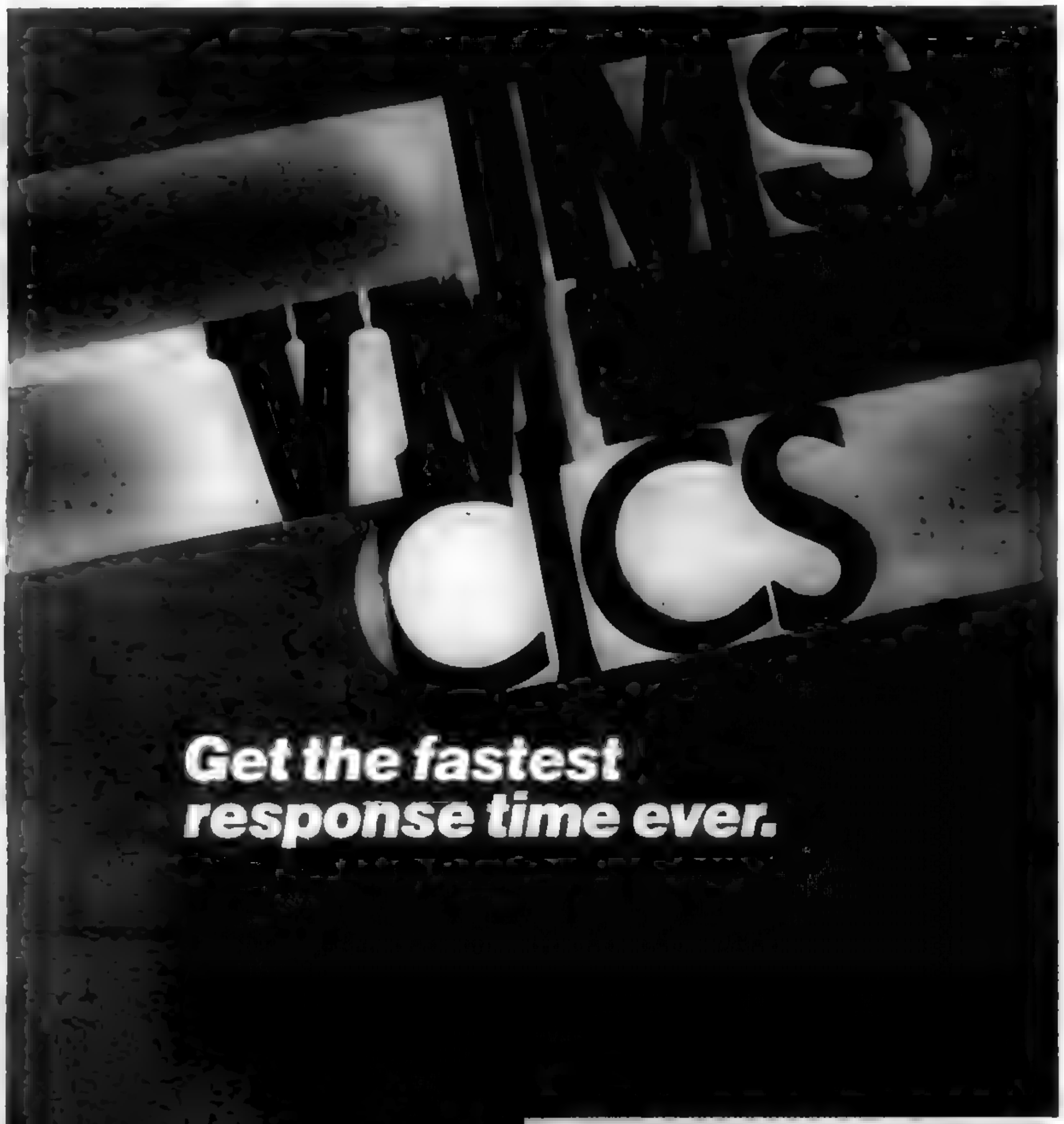
The major step this year will be distributing what limited capacity there is among the needs of the growing departments.

"Someone will have to sit down and prioritize these projects," Doelling says.

"They will have to look at each project based on the contribution it makes to the corporation and decide which ones get done in 1987."

To Doelling, this task, the responsibility for which rests with the customer base, will be the more difficult process to go through.

When it is done "we will be asked to size these projects and say how many of them can fit into the capacity we have," he says. ■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An index of 1986 feature articles

In Depth presented 95 stories in 1986, covering both technical and managerial topics. In the technical arena, Capers Jones wrote on programmer productivity, Bill Inmon rated DBMS performance and Stephen Gerrard discussed SQL's merits as a language. For managers, John Rockart analyzed end-user computing tactics, Gerald Weinberg disclosed the secrets of consulting, Peter Keen outlined new career paths and Alan Paller described MIS' role in PC graphics. Industry topics covered were Leonard Kleinrock on IBM vs. AT&T, Jay BloomBecker on computer crime laws and Sanford Sherizen on privacy.

Product Spotlights offered readers a buyer's guide to 17 specific product categories, including 2,400 bit/sec. modems, page printers and expert system shells. A full-length product chart accompanied each one.

Executive Reports helped readers answer the question: Is now the time for this technique or technology? Thirty-one reports covered information centers, voice/data networks, executive information systems, in-house publishing and much more.

Special issues included two *Computerworld Extras*, on DEC and IBM, plus *Computerworld's* 1,000th issue celebrating 40 years of computing.

This index is intended to help readers locate articles on particular subjects of interest from last year. To order a back issue, call or write: Back Issues Department, *Computerworld*, P.O. Box 9171, Framingham, Mass. 01701-9171 or (617) 879-0700 x371. Each issue costs $2, prepaid by check made out to *Computerworld*. Issues published on April 21; July 7, 14; and Sept. 1, 8 are not available. For multiple reprints of individual articles, call Nancy Shannon, Rights and Permissions Manager, at (617) 879-0700 x304. Reprints are available on 8½- by 11-in. paper in quantities of 100 or more.

In Depth articles

Jan. 13		An index of 1985 feature articles
	T. Capers Jones	How *not* to measure programming productivity (Part 1)
Jan. 20	Leonard Kleinrock	IBM and AT&T slug it out over networks
	T. Capers Jones	How *not* to measure programming quality (Part 2)
Jan. 27	Stephen Gerrard	A pragmatic response to relational rules
	Ed Dugan	Disaster recovery planning: Crisis doesn't equal catastrophe
	Al Passori	Contingency planning options protect corporate assets

□

Feb. 3	Bob Stahl	Friendly mainframe software guides users toward productivity
Feb. 10	Richard Koffler	A scientific approach to human engineering
	Charles Varga, Vicki Brooks	Merger mania strikes at the heart of the information economy
Feb. 17	Gerald Weinberg	The secrets of consulting
	Thomas Miller	Telecommuting benefits business with DP's help (Part 1)
Feb. 24	Eric Bender	Symbolics, Inc.: Pushing AI into the mainstream
	Thomas Miller	High-performance telework helps companies compete (Part 2)

□

March 3	John Dounis, Sharon Efroymson, Lyle Anderson	Multiuser system vs. local-area networks: There is a right choice
	Rick Martin	Lawsuits may choke U.S. software industry
March 10	F. Arnold Romberg, Gary Durbin	Should I buy applications software or develop it in-house?
March 17	Robert Meagher	Videotex plus mainframe equals distributed information delivery
	Bryan Wilkins	AT&T progeny offer customers a single place to buy
March 24	John Connell	Quo vadis, MIS? (or, Where are you going?)
	Philip Gill	Pick operating system makes converts of users
March 31	Girish Parikh	Cobol restructuring engine cleans up spaghetti code
	James Johnson	Users fine-tune 4GL strategies

□

April 7	John Maier	When the sun goes down, so do China's computers
April 7	Kenneth Lantz	The prototyping methodology: Designing right the first time
April 14	George Harrar	Interview: Ed Landry of John Hancock
	Marvin Goldstein	Live file conversions: One chance to succeed
April 21	Alan Paller	Million dollar graphics
	David Andrews, Frederick Manteghian	System/38 grows up
April 28	Neal Margolis	High user overhead mars interface design
	Robert Halper	Haste makes wasted space: A tale of data center design gone awry

□

May 5	T. A. Elkins	Upgrading proves cost-effective for immediate PC expansion
	Robert Fisher	Emulation optimizes desktop computing
May 12	Gil Gordon	Managing from the bottom up: Tips on becoming a more effective subordinate
	Robert Moskowitz	Strategic planning shifts to data-oriented approach
	Richard Lefkon	Speeding software delivery
May 19	Edith Holmes	Will GSA's massive procurement sway private telecom strategies?
	Steve Piggott	Users tame CICS
May 26	Diana Bander	Building a better project manager
	Donald Marchand, Forrest Horton	Existing information resources can give you the competitive edge

□

June 2	Mark Duncan	Revival of the fittest: New vigor for your development life cycle
	Reginald Weller, Shelley Wall	Source code under lock and key
June 16	Bo Sanden	Programming masters break the managerial mold
	Jonathan Epstein	Voice recognition: Six users pioneer cost-saving applications
	Samuel Bleecker	Taking the factory out of the office
June 23	Connie Moore	Image processing offers MIS a new view of information
June 30	Roger Sobkowiak	Anatomy of a master programmer
	Eric Neikrug	Struggling for harmony in writing applications

□

July 7	Robert Maher, Constance Alexander	In charge of change: How to provide a happy ending for your systems project
July 14	Colin McKinlay	Automating Glitter Gulch
	John Clarke	Review your annual reviews
July 21	Edward Yourdon	Paper chase: Keeping up with office productivity
	Leilani Allen	The cost of an expert
July 28	Sanford Sherizen, Gary Marx	Technology: Invader or protector of privacy?
	Ashley Grayson	Do your automated reports report on you?

□

Aug. 4	J.J. BloomBecker	Lobbying for protection: Corporate users can defend their own rights
Aug. 11	Alan Alper	E. F. Hutton: MIS, users unite to take on Wall Street
Aug. 18	Peter G. W. Keen	Telecom and DP: Making skills meet
Aug. 25	Henry Eric Firdman	MIS can stimulate change in corporate view of AI

□

Sept. 1	Michael Sullivan-Trainor	U.S. Navy: Knowledge base harvests expertise of budgeters
	Amy Fiore	Expert shell captures U.S. Army regulations
Sept. 8	William Inmon	A new measure of software speed narrows DBMS buyers' choices
	Thomas Gerrity, John Rockart	Wanted: Effective leaders to manage end-user computing
	Victor Janulaitis	Are you poised to compete?
Sept. 15	Bob Stahl	Principle of 'least astonishment' can polish up interface design

In Depth/1986 Features Index

In Depth articles (cont.)

Sept. 15	Amy Fiore	Companies fund interface projects
	Howard Miller	When 'new' is not 'improved': Maintain, renovate or augment your system rather than risk starting over from scratch
Sept. 22	Stephen Gerrard	Structured Query Language: It's a standard, but is it a language?
	Don Kazemzadeh	American Bankers Association: Low-cost messaging links members instantly
Sept. 29	W.W.D. Dowdell	What MIS professionals need from their 4GLs

□

Oct. 6	Tracy Licklider	Multitasking software shatters users' hopes
	J. Robert Riggs	Twelve DP myths that just won't die
	Robert Moskowitz	AARP: DP's move in-house pays as nonprofit group grows
Oct. 13	William Kimmerly	Managing the risks of installing CIM
	William Bracker	CIM project: Are you in trouble?
	James Emery	New goal for chargeback: Shift from cost accounting to positive balance
	Dean Halstead	FAA sets pace for federal chargeback
	Daniel Nolan	The first two years, four months, two weeks and seven minutes of a new system's life
Oct. 20	Lemuel Skidmore	Cobol 85: Living in the shadow of 4GLs
	Gerald Weinberg	Becoming a technical leader
	Jean Bozman	Chrysler Motors: Using 30 Cybers to bounce back
Oct. 27	J. J. BloomBecker	New federal law bolsters computer security efforts
	August Bequai	Invisible safecrackers: Today's thieves work through wires

□

Nov. 10	Mark Duncan	The 'good idea' pool: Staff suggestions reap productivity gains
Nov. 10	Raymond Panko	Teleconferencing outlasts skepticism
	Kate Hedges	A vendor's view: How you can avoid meetings forever
Nov. 17	Daniel Nolan	Stone Age programming cripples 4GL environment
	J. Robert Riggs	Cost control: Where has all the money gone?
Nov. 24	R. T. DeLamarter	Telecom: The new pawn in the IBM empire?

□

Dec. 1	Gopal Kapur	Productivity tolls betray promises of MIS nirvana
Dec. 8	Trevor Eddolls	Users mold VM in their systems' image
	Brian McGrath	Corporate graphics: Take a look at the big picture
	Joan-Carol Brigham	Graphics' best use: Decision support
Dec. 15	Merv Adrian	Beyond monitoring — MIS can actively manage system performance
Dec. 22	Michael Sullivan-Trainor	Jacks of all trades: Four veterans recall DP's salad days

Computerworld Extra

Sept. 24	The Year of DEC
Dec. 3	Dealing with IBM

Special Issues

Jan. 6	Forecast 1986 Issue
June 9	NCC Preview Section
Nov. 3	40th Anniversary of the Computer/ *Computerworld's* 1,000th Issue
Dec. 29	Forecast 1987 Issue

Product Spotlight

Jan. 27	MRP II Software
Feb. 17	2,400 bit/sec. Modems
March 10	32-bit Workstations
March 31	Mini/Mainframe DBMS
April 21	Page Printers
May 12	Disaster Recovery
June 2	Word Processing Software
June 23	Presentation Graphics
July 14	Expert Systems Shells
Aug. 4	Applications Generators
Aug. 25	Image/Document Processing
Sept. 15	PC Modeling Programs: More Than Spreadsheets
Oct. 6	Hardware Roundup: Large and Medium-Scale Systems
Oct. 13	Hardware Roundup: Small Systems
Oct. 20	Hardware Roundup: Microcomputers
Nov. 10	PC Graphics Hardware: EGA Standard
Dec. 8	Project Management Software

Executive Report

Jan. 13	Expert Systems
Jan. 20	Integrating the Office
Feb. 3	Corporate Unix
Feb. 10	DP as a Profit Center
Feb. 24	Applications Development
March 3	Managing Data Storage
March 17	Managing Voice and Data Communications
March 24	Microcomputer Networking
April 7	Master Programmers
April 14	New Semiconductor Technologies
April 28	Software Maintenance
May 5	Managing End-User Training
May 19	Electronic and Voice Mail
May 26	In-House Publishing
June 16	Executive Roundtable: Managing Competitive Advantage
June 30	Integrated Office Automation Systems
July 7	Safeguarding Privacy
July 21	Voice/Data PBXs
July 28	Training for MIS
Aug. 11	Information Centers
Aug. 18	Executive Roundtable: End-User Computing
Sept. 1	Moving Toward MAP
Sept. 8	Computer Leasing
Sept. 22	Electronic Data Interchange
Sept. 29	On-Line Transaction Processing
Oct. 27	Executive Information Systems
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In Depth

CPU history repeats itself

Will a return to CISC follow the return to RISC?

RISC's impact on cost/performance goes back to the '60s • DP managers can anticipate future peaks and plateaus in CPU power • RISC architecture: A serious alternative?

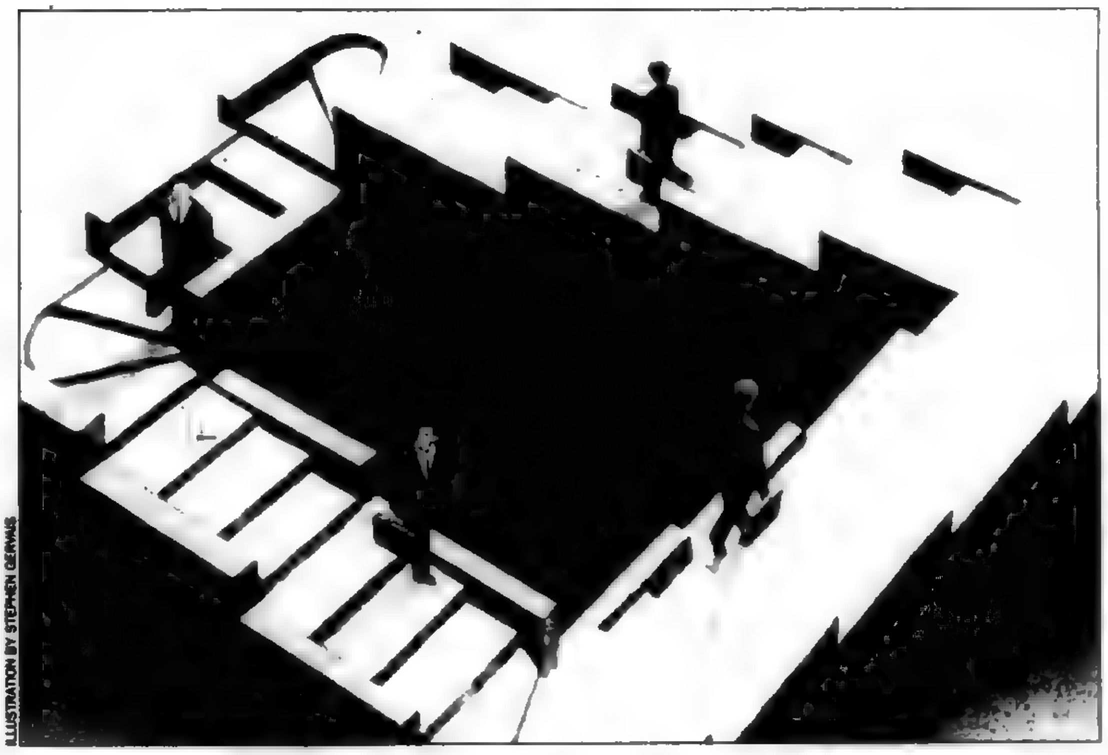

ILLUSTRATION BY STEPHEN GERVAIS

By KARL REED

The architecture and organization of a computer, its instruction set and internal implementation — all are matters that data processing executives frequently prefer to ignore. To these executives, the most important factor in design consideration is compatibility: A computer is either clearly compatible with an existing collection of software or it is not. The next most important factor is cost per unit of performance. Any factor beyond these, even ease of use, tends to pale in significance.

Yet a small number of computer manufacturers have spent considerable effort pursuing an incompatible architecture — the reduced instruction set computer (RISC). IBM has been designing RISCs since 1975, when John Cocke and George Radin began the 801 project, which is believed to have yielded the RT Personal Computer, a high-performance RISC-based workstation. Pyramid Technology Corp. claims to have a RISC machine, and several Silicon Valley start-up companies have gone in the RISC direction rather than utilize the Motorola, Inc. M68000.

Hewlett-Packard Co.'s recently announced RISC-based Spectrum series utilizes programmer-accessible caches, which, while not a RISC concept, may lead to some interesting low-level programming.

The problem is that any supplier adopting the RISC approach guarantees that programs already running on existing product lines will have to be recompiled.

Most DP managers tend to react badly to such a prospect. Why then would an existing supplier choose such a product development path?

By exploring the history of the RISC concept, its advantages and disadvantages, we believe the reason will become clear.

Why RISC?

The RISC concept, in its modern form, is the result of a conscious attempt to exploit a particular technological development — the custom-designed very large-scale integration (VLSI) chip capable of holding more than 60,000 logic elements, or gates. Theoretically, single-chip CPUs present very significant price/performance advantages by simplifying printed-circuit boards and reducing chip counts.

All new design philosophies generate their share of controversy. The major design approach from the mid-1960s to the late 1970s was to increase functional power of individual instructions, encoding complete high-level operations in single instructions.

These designs, made economical by microprogramming and cheap, high-speed medium- and large-scale integrated circuitry, have been called complex instruction set computers (CISC). Their designers and manufacturers naturally question the value of the RISC concept; the RISC supporters attack the CISC concept for exactly the opposite reasons.

If a company has an extensive DP

About the author

Reed, consulting editor to Computerworld Australia, *is currently a visiting faculty research associate in the Department of Computer Science at the University of Maryland in College Park. He is on leave from Australia's Royal Melbourne Institute of Technology, where he is senior lecturer and area leader for software engineering in the institute's Department of Computing.*

operation, then it will have compatibility as its main criteria when purchasing a system; if the company is about to embark upon a new phase of DP activity that invalidates previous investments, then compatibility may not be an issue. Service, ease of use and price/performance issues will predominate.

At the same time, however, computing technology is evolving, and the cost of a unit of performance decreases at 30% per annum compound. DP managers committed to a particular product line see this price/performance decline as a smooth, continuous process.

> "
>
> ***Time and space in computers are interchangeable to some extent. One could use more logic — take up more space — to achieve a particular result in a shorter time. But the design complexity would increase significantly, and you would reduce your chances of fitting a complete CPU onto one chip.***

Price/performance discontinuities

Reality is different. History has shown that technological developments can yield improvements of several factors in price/performance, although usually not from one manufacturer and almost never from a single product line. DP managers, the people with acquisition responsibility, must be able to predict or anticipate price/performance shifts and discontinuities and exploit these to their organizations' economic advantage.

One of the most important discontinuities in price/performance occurred when minicomputer design principles were applied to the implementation of so-called mainframe computers. The characteristics of a minicomputer were small words (12 to 16 bits), modular I/O (I/O facilities were not integrated into the mini's CPU in the same manner as for mainframes), simple bus architecture and a limited instruction set.

By the time the Digital Equipment Corp. PDP-11 appeared, design philosophies were clearly more important to cost per unit of performance than was small word size. The result of this was the DEC 2020, a low-priced, 36-bit word version of the DEC PDP-10 mainframe. This was followed by the DEC VAX-11/780, the first of the so-called superminis — minicomputers with genuine mainframe performance. DP managers who anticipated these changes were able to achieve savings for their companies. Those who could not had to wait.

Early trends in computer design

The first digital computer designers took typical computational processes and asked the question, "What is the simplest way of performing the operations?"

For example, A = 125 + 126 + 5 + 3 could be handled in two different ways. One way was to write the computations down in columnar form and add each digit position together, taking care of any carrying.

An alternative approach was to add the first two numbers and add the next to that result, accumulating the sum until no more numbers are present.

Mechanical calculating machines already worked this way, and the early computer designers in the late 1940s found they could build electronic devices that would emulate this model. Programs for these computers were built of instructions that combined the value of an operand with an accumulator, putting the result in that accumulator. Very few instructions were provided.

Designers' experience with computing was limited; concepts such as subroutines or procedures had not been invented in 1948, nor had virtual memory, I/O channels and complex addressing modes to simplify access to data. The first computers were genuinely reduced instruction set computers — no one knew any better.

Experience in programming and problem solving accumulated quickly, however, and designers sought to improve machine performance in a number of different ways. Instruction speed could be improved by using faster basic components, but this approach is always limited by currently available technology.

Speed could also be improved by introducing a wider range of instructions, particularly by introducing single instructions that can replace a frequently used sequence of instructions. Designers found that these sequences could be implemented to execute in the same amount of time as single instructions.

CPU designers did not stop at that point. By the mid-1950s, it had become clear that computing speed could not be improved easily because basic component technology was advancing slowly. Improvements in performance could be achieved easily only by seeking even larger instruction sequences to convert into single instructions.

An excellent example of this trend was the introduction of floating-point arithmetic hardware. Floating-point operations enable scientific calculations to be performed; they require a fairly lengthy sequence of instructions. They also contain operations that can be performed simultaneously in hardware but must be

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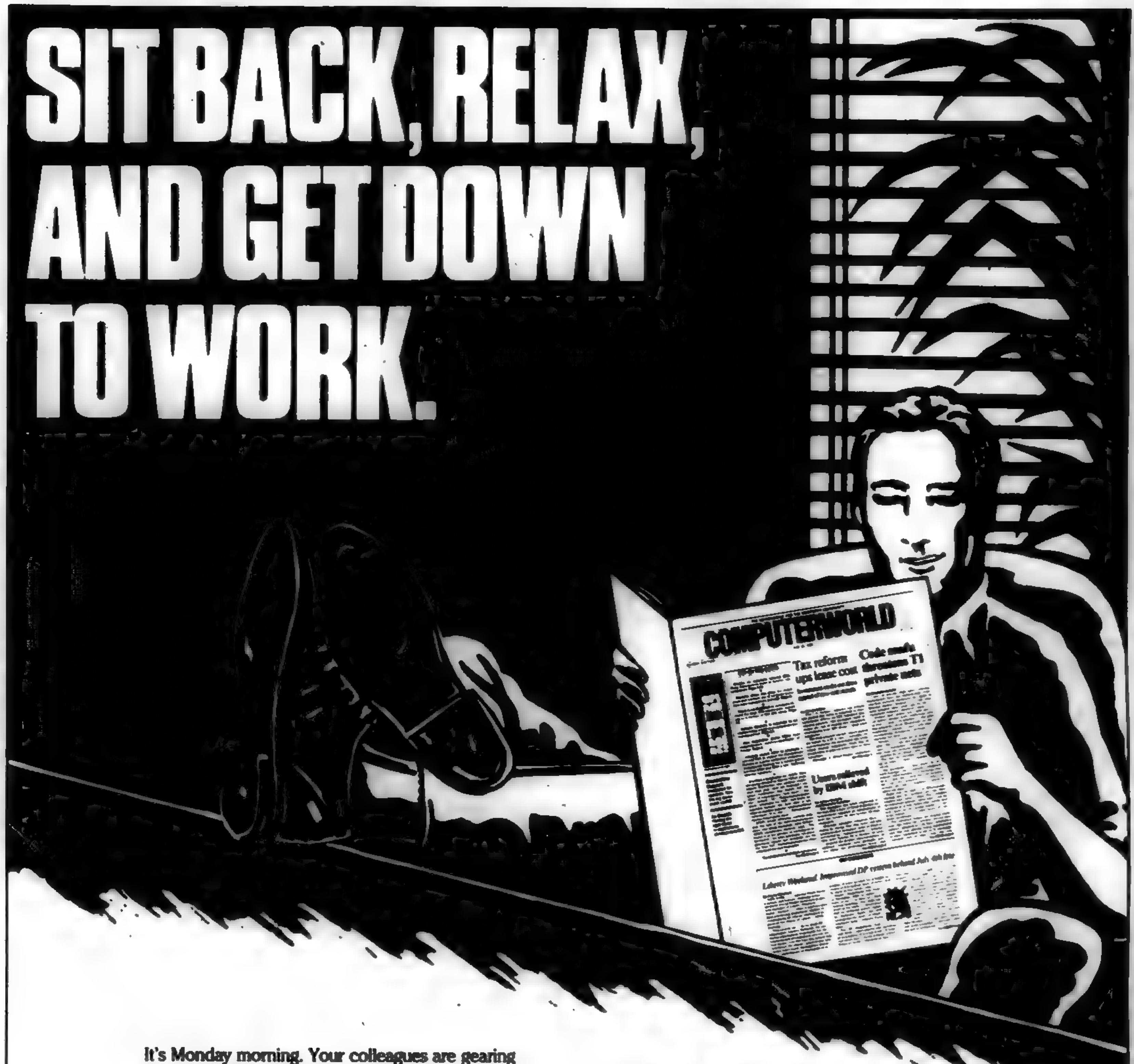
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Methods of speeding up a computer

Method	Comments	Effect on Hardware Volume
Use faster components	Limited by available components; definitely bound	Not increased
Use more complex instructions	Very promising if commonly executed sequences can be found; saves instruction fetches and increases speed	Will be increased depending on the instructions and design approach; hardware complexity also increases but not excessively
Use "overlapping" complex instructions with existing instruction sequences	Maximum speed gain; a complex instruction may appear to take only one instruction-fetch-and-operate cycle	Significantly increases hardware complexity by amount depending on the extent of the overlap sought

CW chart

Since the 1950s, hardware engineers have sought to improve CPU performance by varying basic components, chip size and instruction sets.

performed serially in software. Floating-point hardware performs these functions roughly 200 times faster than equivalent subroutines.

Other operations were built into hardware. For example, the Control Data Corp. 3200, released in 1963, included the following as single instructions:

- Instructions to move strings of characters around.
- Instructions to search a list of characters to find a particular value.
- Instructions to search a list of words.
- Instructions to perform arithmetic on strings of binary-encoded decimal digits (BCD).
- Floating-point operations.

These operations could be performed simultaneously with the execution of other instructions if the programmer desired, while the floating-point and BCD arithmetic always executed in parallel with the main instruction stream.

Performing operations in parallel with the remainder of the program is one method of obtaining speed increases without using faster circuitry (see chart at left). Machines exploiting the last two types of operations became very complex, used vast amounts of hardware and were occasionally unreliable.

The limits of CPU performance

It is important to understand that the smallest amount of functionality could be added to an existing design relatively easily. Computers were being built from single components — resistors, transistors and capacitors. Printed-circuit board technology was very primitive, and wiring technology was fairly simple, allowing what is in effect three-dimensional wiring, again allowing very complex interconnections.

Designers could not easily improve basic component speed, nor had they the knowledge of computer design necessary to improve speed. They could, however, add more components with relative ease — and they did.

The basic factor that limits the performance of a computer's central processor is the gate delay, the time it takes for a signal to travel through a logic element. The inverse of the gate delay of the fastest common logic components provides an interesting hypothetical upper limit to the speed of a CPU to be used to execute a single instruction stream.

Producing a single result each time a gate operates would seem to be a reasonable upper limit for such a CPU's performance. Achieving execution speeds that approach the switching speed for a single CPU requires vast amounts of parallelism of various kinds and is usually associated with simple instruction sets.

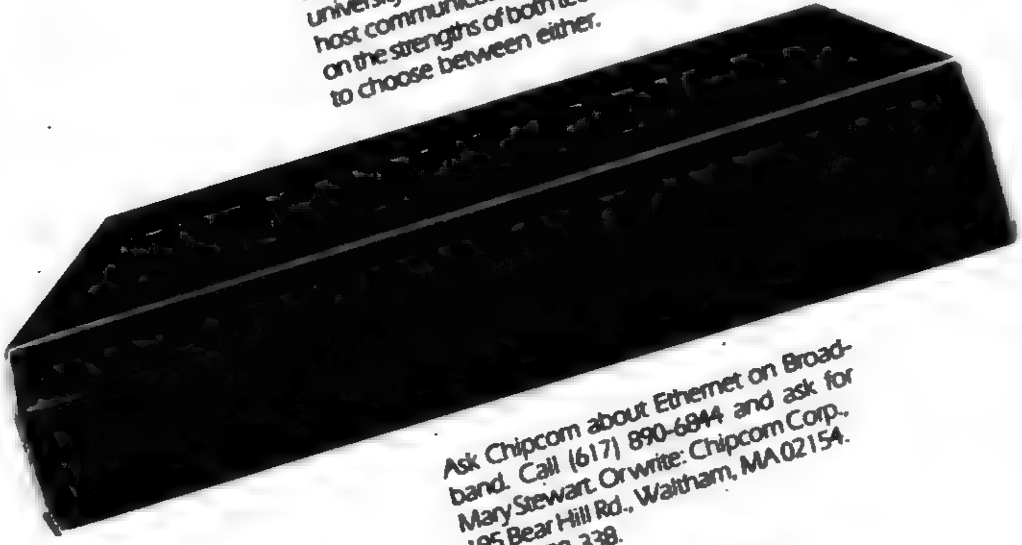
Language-oriented CPUs

The limitations or component speeds that were experienced by designers in the late 1950s and early 1960s, coupled with the development and widespread use of high-level languages, provided significant incentive for the development of special instruction sets capable of efficiently executing high-level languages.

Burroughs Corp. designed the B5000 and B5500 in the early 1960s with this in mind, following the development of Algol 60. The B5500 was designed to execute Algol efficiently and to support virtual memory. It had special instructions for allowing parts of Algol's complex procedure call operation to occur efficiently and had genuine stack operations as well as very sophisticated character-handling instructions.

The B5500's successor, the B6700, went even further, providing a complete runtime support environment for Algol. The B6700 employed an extremely complex architecture by any standard and was difficult to speed up. However, it proved to be a very effective data processing system, partly because of its sophisticated I/O subsystems.

Language-oriented architectures — the high-level language (HLL) machine concept — attracted considerable attention in this period. The reasons for this were summarized in 1980 in a paper by D. R. Ditzel and D. A. Patterson of Bell Laboratories called "Retrospective on High-Level



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Language Computer Architecture." The reasons are as follows:

- Reduced difficulty in writing compilers.
- Reduced total systems costs.
- Reduced total software costs.
- Drastic reduction in system software.
- Reduced semantic gap between programming and machine language.
- Improved code compaction.
- Easier debugging.
- Interesting research.

Machines were built to execute Cobol, Fortran, Euler and Pascal; machines were also produced that were capable of supporting more than one high-level language — a necessity for commercial machines.

The IBM System/38 and the NCR Corp. Criterion were designed to support multiple virtual machines tailored to various languages. Burroughs designed the B1700, a microprogrammed machine, to address this issue. However, the machine was not a commercial success.

In practice, the logic complexity of the language-oriented approach and the resultant complexity of the computers produced has meant that the method has been temporarily discarded as an approach to CPU design.

Other factors, such as emphasis on sheer speed and the difficulty of achieving multiple-language environments, have also altered the economics of machine design.

But by the same token, it is too early to write off this approach. IBM, for one, is still committed to this approach; the System/38 is an example of this.

Microprogramming

Reduction in cost of a given unit of performance dominates computer design and is more important than either cost or performance. The total amount of hardware needed to implement a CPU determines the processor's manufacturing cost and, to some extent, the difficulty of its design.

Microprogramming recognizes that a computer instruction can be broken down in much the same way as a data processing procedure. The result is a set of microinstructions that can be put together to form a computer instruction. It is necessary to provide a microprogram instruction address register to control sequencing, much like an ordinary computer. The main gains are reduced component count and ease of design; the cost is reduced speed.

CPU designers did not see microprogramming as a serious option until the advent of integrated circuits in the mid-1960s. Integrated circuits offered low-cost, medium-speed components that could have been used to increase computer speed for given CPU costs. However, designers opted for moderate increases in speed and moderate decreases in cost — the improvements in circuit speed being used to reduce component count.

Microprogramming led to the impressive price/performance reductions associated with minicomputers and eventually to the single-chip microprocessor. Most microprogrammed machines need several microcycles — the time needed to execute a single microinstruction — to execute a single instruction using logic that, employing earlier design approaches, might have executed a single instruction in the same time.

By the late 1970s, only the fastest machines were not microprogrammed, and microcycle times of the order of 50 nsec were common on high-performance mainframes.

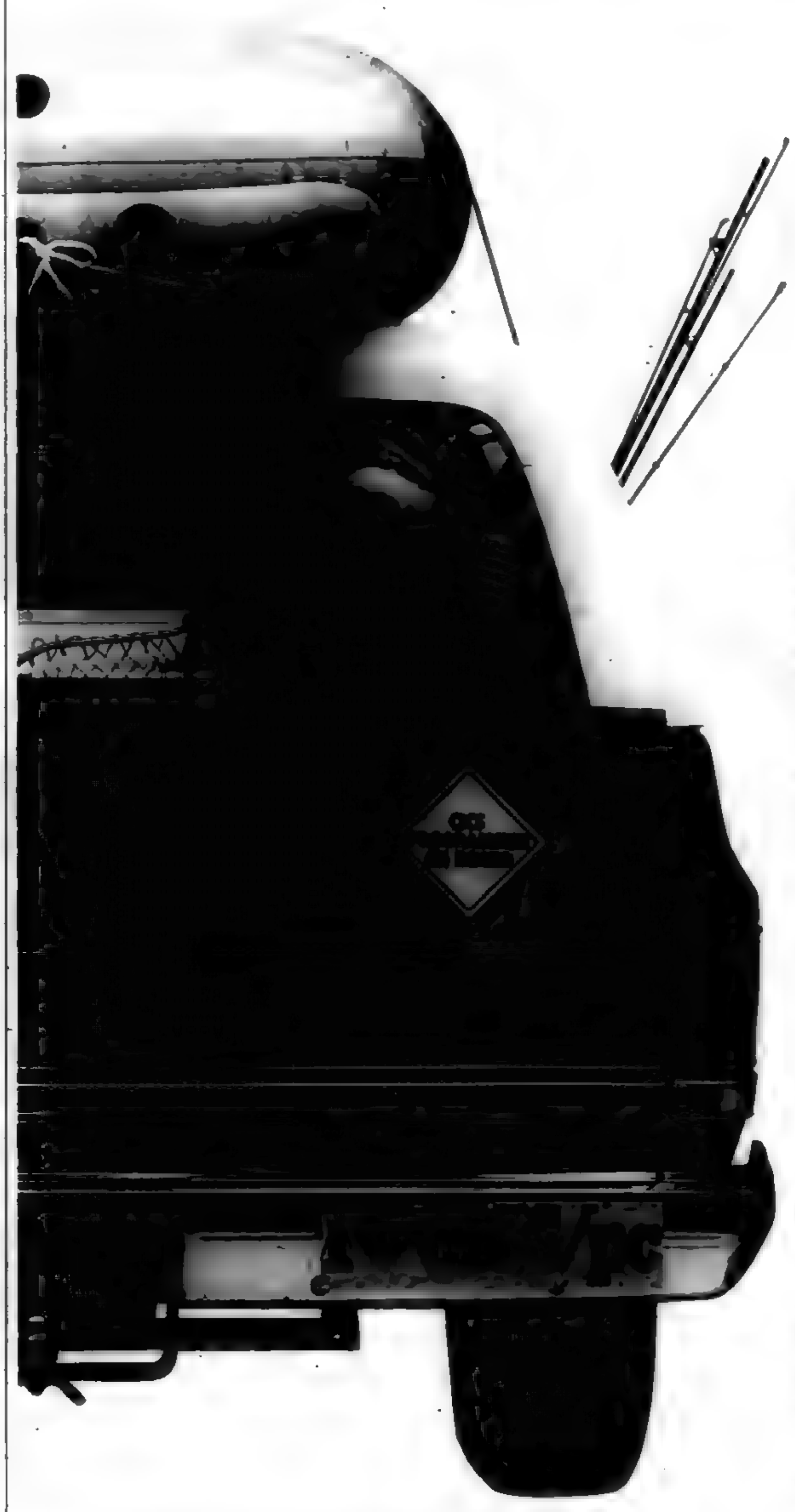
Most computers are capable of handling a wide variety of programming problems effectively; they do not aim to be efficient processors for a single class of problem.

Universal instruction set

The approach taken in designing these computers is to regard instructions as primitive building blocks that can be put together to achieve various functions.

Designers became rather good at this by the mid-1960s, and some machines — for example the PDP-10 — proved to have well-chosen instructions in the sense that quite complex operations could be formed from a few instructions.

Attempts were made to include some frequently used operations as single instructions, but the HLL approach did not prevail. Instead, an intermediate level of instruc-



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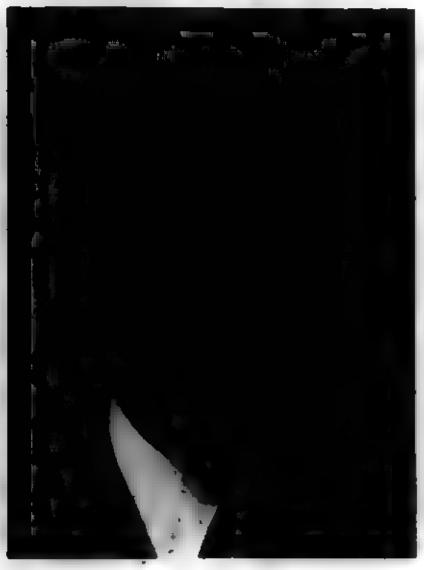

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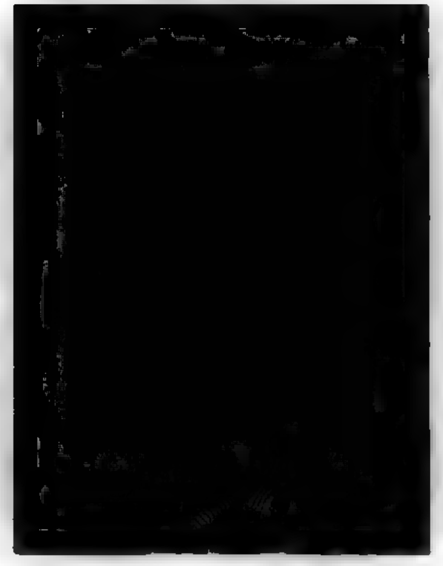

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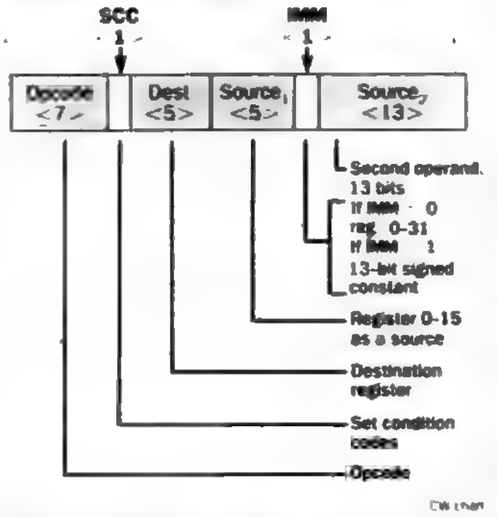
Berkeley RISC instruction set



The Berkeley implementation of RISC is based on several tenets: Each instruction should take only one cycle to perform, all instructions should be the same size and the only memory or register transfer instructions should be loads and stores.

tion functionality, which we now call complex instruction sets, succeeded. These could be implemented in a few microcycles.

So, we identify a hierarchy of instructions, varying from the ultracomplex, HLL-oriented machines such as on the Burroughs B6700, to the very complex, such as those on the VAX-11/780, to the complex IBM 370.

Enter the RISC

In the evolution of instruction set design, complexity gradually increased as time went by. At the same time, a third design philosophy gradually arose as an alternative to the HLL and CISC approaches. It seems to have begun with the CDC 6600, designed by Seymour Cray.

The 6600 was a complex machine in terms of its implementation but very primitive in terms of its architecture and instruction set. The fastest machine available for many years, it was a barebones machine in which the programmer was, in some senses, given access to basic machine components.

The machine's instruction set was fairly simple by the standards of the day. Few instructions could trigger more than one arithmetic operation at a time when most CPU designs allowed for at least two — one an operand arithmetic, and the other to support indexed addressing. There were no operations between memory and registers; it was possible to move data between memory and registers by writing an address to an appropriate register.

A similar design approach was taken with the early minicomputers. The designers relied upon the raw speed of the computer to compensate for the need for powerful instructions.

Integration and the single chip

While computer designers pressed ahead with their various approaches, the pressure of technology was increasing. The development of integrated circuits proceeded rapidly, and in the early 1970s, the first single-chip computer appeared.

The design philosophies used in the single-chip microprocessors, however, had little impact on the mainstream of CPU design until they had moved from the 8-bit microprocessor to the 16-bit to the single-chip 32-bit computer. Mainframe CPU designers were forced to reconsider their approaches by the time the Motorola 68020, a full 32-bit CPU, appeared on a single chip.

VLSI circuit techniques had allowed around 20,000 to 60,000 gates to be fabricated on a single chip by the early 1980s, posing both an opportunity and a serious challenge to mainframe designers. Machines such as the 68000 rapidly overtook the large-scale minicomputers in raw performance, making a reduction in cost per unit of performance essential.

Other factors began to interest CPU designers. Compiler writing technology began to improve in the late 1970s and 1980s, and experimental work on a wide range of programming languages led to an improved conception of the instruction set as a building block.

Simple sets, fast machines

The microcycle became an obsessive parameter in designers' minds; and the question began to be asked: "Why not execute one high-level instruction per microcycle?"

As should be reasonably clear, time and space in computers are interchangeable to some extent. One could use more logic — take up more space — to achieve a particular result in a shorter time. However, the design complexity would increase significantly, and the possibility of fitting a complete CPU on a single chip would be reduced.

By the mid-1970s, a real counterpressure had developed. This was backed by experimental work that led to high-performance microprogrammed CPUs of a special kind — those developed at Xerox Corp.'s Palo Alto Research Center (PARC) to support the Alto and Darado workstations. These workstations were precursors to such machines as the Apple Computer, Inc. Macintosh and the Commodore Business Machines, Inc. Amiga. The Xerox PARC machines were very fast and were designed with the object that each microinstruction could be a single instruction for a variety of high-level languages.

Finally, designers looked at Seymour Cray's machines, the CDC 6600 and 7600 and the Cray I, and the answer seemed clear: Simple instruction sets lead to faster machines.

All the pieces were now in place. What was needed was a clearer statement of concept and objectives and, above all, a champion — someone to promote the idea.

The Berkeley RISC

RISC literally burst onto the international stage during 1982, when Patterson, then a University of California at Berkeley associate professor, announced the results of a truly massive research and development project to produce a high-performance CPU on a single chip.

The design concepts for RISC I, which came out of this project, evolved from the various observations made earlier (see chart at left). The following summary is based on Patterson's and fellow Berkeley professor C. A. Sequin's papers:

- Instructions should take only one cycle. RISC I instructions should be about as fast and no more complicated than microinstructions in current machines, such as the PDP-11 or VAX. However, they should be meaningful machine instructions — microinstructions usually are not.
- All instructions should be the same size. This simplifies implementation but leads to larger programs.
- The only memory and register transfer instructions should be loads and stores.
- High-level languages should be supported not by complex instructions but by a serious attempt to recognize and provide solutions to problems common to all languages.
- The machine should be simple to design and implement.

One immediate decision was that the machine need not be microprogrammed, allowing maximum use of available logic speed and space. In addition, programs implemented on RISC I would likely be larger than those on other machines. Finally, given a reduced number of instructions, the complete CPU could fit easily on a single chip.

Members of the Berkeley team studied existing programs to identify fundamental issues to be addressed in the design of instruction sets. The results supported those obtained from other studies:

- Integer constants and array elements were accessed with roughly equal frequency.
- Eighty percent of scalar references were to local variables.
- Ninety percent of array or structure references were global.
- Procedure call/return operations were the most expensive in terms of time.

The machine developed by Patterson and his Berkeley colleagues — RISC I — runs with a 1.5 MHz clock speed and executes one instruction in 2 msec.

The Berkeley RISC performs all instructions in a single cycle, except those referencing memory, which take two cycles. It supports 8-, 16- and 32-bit data items and has index-plus-displacement on the only address mode.

Making use of Mark I

RISC I follows the convention used in the Ferranti Mark I in 1951, followed by Seymour Cray in the CDC 6600 and in subsequent machines, of making the contents of register "zero" equal to zero.

This, coupled with the interpretation of the Source2 field and the IMM instruction fields allows a full range of address modes to be achieved from an indexed address mode.

However, all instructions do not support all address modes. Arithmetic instructions are register to register, and that R_1+S_2 behaves as an immediate address mode, while appearing as an indirect address mode for memory references.

Register windows

Procedure call/return is one of the costliest actions on most computers. One reason for this is that some programming languages have complex requirements for handling local and global references, requirements that can only be met by executing a moderate number of instructions.

This situation can only be ameliorated by transferring the work associated with each nonlocal reference to the reference itself instead of attempting to build an environment at each call.

Another reason for the costliness is that special steps must be taken to ensure that parameters can be passed through from one procedure to another. This problem is alleviated by the use of caches (associative memory buffers). Parameters can be passed on a stack; if their reference pattern is suitable, they stay in the cache, accelerating access.

Caches were too complex for the Berkeley RISC team; the chip did not

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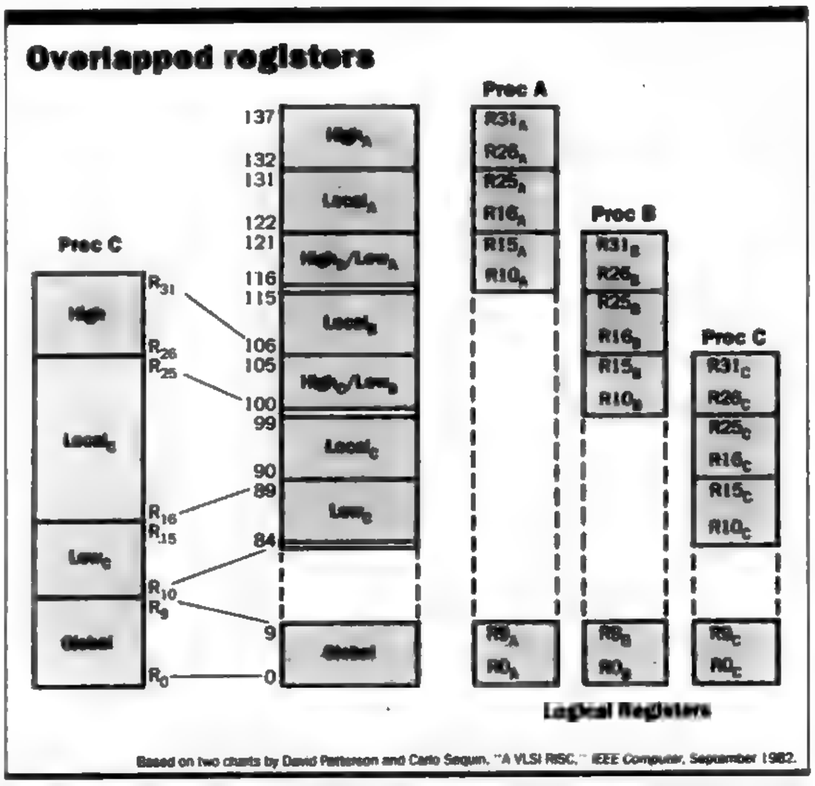

Based on two charts by David Patterson and Carlo Sequin, "A VLSI RISC," IEEE Computer, September 1982.

The Berkeley version of RISC sets up registers as overlapping windows, which reduces memory references and boosts performance.

contain enough space for the additional components. In any case, caches are really only registers that are made to run slowly because of their associative addressing.

The Berkeley team invented an overlapping window approach to registers (see chart at right). A large number of physical registers are provided, in this case, 139. Each procedure uses 32 registers; however, these are regarded as four groups: global, low, local and high.

Parameters to be passed between procedures are placed in the caller's low-register window. This becomes the called procedure's high-register window so that parameters can be passed without being moved. Clearly, any parameter to be passed must be moved if it is to be passed to another called procedure, but it is moved only between registers.

While not central to the RISC concept, the register windows are a significant architectural feature of RISC I and contribute substantially to its performance by reducing memory references. However, this feature occasionally undergoes one major difficulty: All register windows will be used if the calling depth is sufficiently great. Some method must then be found for storing additional windows in memory. RISC I handles this problem by using a trap that invokes a software routine to handle the overflow.

Pipelining

Pipelining, a technique used in some RISC designs, is one of the simplest and most effective means of increasing machine throughput. Pipelining occurs when the instruction execution cycle is broken into desirable phases, and logic is built to perform each phase. An instruction is executed by passing it, stage by stage, "down the pipe."

As soon as the instruction leaves the first stage of the pipe, a new instruction enters. So if an instruction can be broken into four phases, four instructions can be executing simultaneously, and, given ideal conditions, one completed instruction from the pipe can be obtained in the time it takes to execute one phase. This yields a fourfold increase in speed if the phases can be made of roughly equal duration.

The Berkeley RISC I uses instruction prefetch, a simplified form of pipelining in which the next instruction is retrieved in parallel with the current one's execution.

Instruction prefetch is fine unless the current instruction is a conditional jump, in which case one has no idea what the next instruction should be. Larger machines have very sophisticated and complex hardware for ensuring the correct branch is taken. Some machines prefetch both branches and begin their execution, discarding the one that was not necessary.

RISC I solutions

RISC I solves this problem by not actually performing the jump until after the execution of the prefetched instruction, that is, the one following the jump. This avoids a need for complex hardware and is simple to handle at compiler level.

A problem similar to that found with prefetch occurs with pipelining. Suppose one instruction alters the variable B, and the next instruction needs the value of B as an input. Altering B — writing the result of the operation to memory — will be the last operation in the pipe; fetching a value will be one of the first. This means that the second instruction will see the unchanged value of B, since it enters the pipe before the first alters B in memory. Again, large machines have complex logic to detect this write-back problem.

The RISC approach is simple. Let the compiler put dummy instructions between the two so that the one altering B leaves the pipe before the other enters. Considerable hardware is saved as a result.

Improvements, drawbacks

RISC I demonstrated several important points:

- It showed that simple CPUs could be reasonably powerful.
- It showed that CPU design could be simplified if some of the work is

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transferred to the compilers.

- It showed that single-chip CPUs could compete, in broad terms, with a VAX-11/780.

A number of questions were left unanswered, however, and the debate on RISC degenerated into a mudslinging match with Patterson and his supporters on one side and CISC designers on the other.

Fundamentally, however, many of the CISC brigade have developed selective blindness and ignored the fact that RISC architecture offers advantages in situations where one expects to squeeze complete CPUs onto a single chip with a limited gate count.

Interestingly enough, the point has not been lost on several commercial CPU designers, who have adopted the RISC architecture.

The RISC machines do offer one significant drawback: They require a larger volume of instructions for a given task. This means that the traffic directed to memory as a result of program execution is significantly heavier than, for example, that of a VAX-11/780. The use of the window register system, however, reduces memory traffic, and the use of caches and multiple instruction prefetch can solve the instruction traffic problem.

CISC microprocessors

CISC microprocessor design has not stood still. The Motorola 68000 has been expanded to a full 32-bit machine with 32 bits off-chip memory address and data paths. Its instruction set extends to almost twice its previous size, coprocessor capability has been added and performance has been enhanced. A complex instruction cache is included to reduce memory references, and 11 addressing modes have been added.

Internal complexity has been enlarged, however, using a two-level microcode scheme to achieve high performance from the limited amount of logic available. The resultant CPU, the 68020, is capable of very high performance but is claimed to be slower than commercial RISC machines such as the HP series.

It should be clear by now that RISC is a design approach intended to maximize the performance of a single-chip CPU by having microinstructions powerful enough to serve as real instructions. The approach constitutes recognition that there is a limit to the amount of parallelism that can be achieved easily on a single chip because of wiring constraints and component counts.

I do not regard the multiple overlapping registers as unique to RISC: They could be applied to any general-purpose register machine with useful effect. Nor do I regard a small instruction set to be a criteria central to the RISC concept. The fundamental objective is to get high performance onto a single chip.

The RISC debate

The current debate on the merits of RISC, like any technical argument with commercial implications, is riddled with misconceptions and badly presented cases. RISC designers — particularly those at IBM — assume that many tasks performed in hardware can be performed by optimizing compilers, allowing the pipelining problem discussed earlier to be solved without hardware.

In addition, RISC supporters argue that complex machines like the VAX could not fit onto a single chip. DEC was forced to leave a number of very complex instructions out of its single-chip Microvax and to emulate them in software. The RISC proponents leapt on this fact and used it to justify their approach.

Motorola experienced difficulties in testing the 68010 and in debugging its logic, and National Semiconductor Corp. was late in delivering the NS 16000 series 32-bit single-chip machines, adding fuel to the RISC camp's fire.

The RISC supporters argue that CISC-based machines are hard to design and debug and that they are slow; the superficial evidence seemed to support this. Quite possibly, RISC's simplicity of design and its short product development cycle prompted HP and several others to adopt RISC designs.

However, there is one very serious factor limiting RISC CPU performance — memory bandwidth.

A memory bandwidth problem

The discussion so far has pointed out that a CISC-based machine executes many microcycles to achieve what may take several instructions on a RISC-based machine — this is the price paid for organizational simplicity.

As a result, the RISC machine has a higher demand for memory accesses than a CISC-based one. The reason for this is that a complex instruction will be fetched once from memory and then generate a number of references to internal microcode store, while RISC must make several memory references to achieve the same result.

The increase in memory access demand can be further aggravated because many CISC machines have variable-length instructions, further reducing memory accesses created by instruction execution. Memory may be significantly slower than the CPU, and the performance of a RISC architecture will suffer badly.

RISC designers will actually be forced to copy DEC's software-emulation approach. But they will need to come from the other direction to reduce the memory traffic created by instruction execution. They will be forced to send complex functions such as floating-point operations to another chip that can either execute them in parallel or simply run faster because of the use of microcode.

Ultimately, the ratio between clock cycle time and instruction execution time must be made as low as

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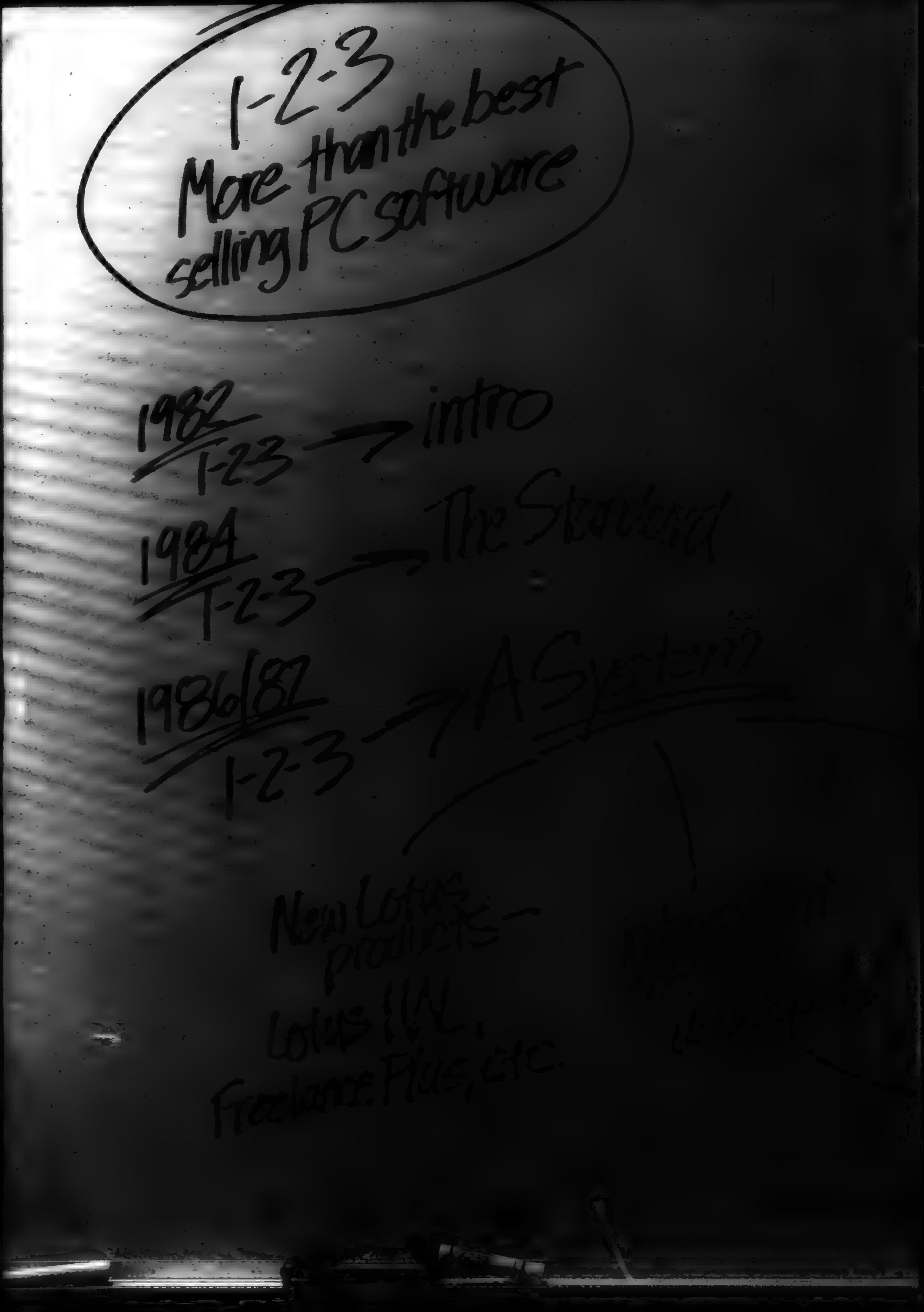

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possible, and parallelism is the only way. In fact, HP is already doing this, producing slightly incompatible Unix and commercial machines as a result.

In addition, RISC designers will move toward a form of microinstruction called "extracodes." These frequently used instruction sequences invoked by an extracode call were introduced in the 1950s at Manchester University in the UK by the designers of the Atlas high-performance machine. Atlas had a small quantity of very high-speed memory that was used to hold these sequences.

Modern miniprocessor chips will possess significant amounts of on-chip read-only memory (ROM) that could be used in this manner without the introduction of microcode. RISC designers will use this ROM for extracodes to achieve improved performance when executing HLL programs.

The argument about RISC and CISC may become irrelevant for machines implemented in silicon as the design capability of major semiconductor and CPU designers increases. NEC Corp. has recently announced the V60, a 375,000-transistor, 32-bit CPU on a single chip. This is microcoded and has floating-point, instruction prefetch and memory management on a single chip. It is a CISC of moderate complexity and has 273 instructions.

I am not convinced that RISC is a viable alternative to CISC, and the NEC example would seem to prove this. One should not assume, however, that RISC is totally irrelevant.

Design limitations have a habit of repeating themselves, forming a fugue-like cycle in which a theme reappears in a different domain, only slightly modified.

Technology cycle: Gallium arsenide

The restrictions that the RISC concept was to solve are rapidly disappearing for today's designers of VLSI computers, as shown by the NEC V60. However, they have reappeared as design limitations for a new semiconductor technology, gallium arsenide, which offers a factor of 5 to 10 increase in switching speed, with clock speeds of around 5 nsec being appropriate for a CPU.

Gallium arsenide technology does not currently allow scales of integration exceeding 25,000 transistors per chip, so the only architecture capable of being implemented is RISC. Gallium arsenide's performance payoff is relatively greater because the performance losses from signals being taken off-chip are more severe then for silicon.

Suitable pipelined architecture makes it possible to design a single-chip CPU capable of a realistic speed around 90 MIPS. It should be kept in mind, however, that the raw speed of the machine is 200 MIPS. These losses result from two details that RISC proponents dismiss as insignificant. Thirty-two percent performance is lost because of the nonoperation instructions needed to avoid the pipeline contention problem, while a further 32% reduction occurs because of memory bandwidth limits.

The pure RISC concept is not likely to be the basis of future machines implemented in silicon. RISC-based designs will, however, be important where it is necessary to squeeze a high-speed CPU onto a single chip with low yield. This challenge continues in working with gallium arsenide, where chip designers can fit only 15,000 to 20,000 gates on a chip, compared with approximately 250,000 per chip for silicon. As levels of integration increase, however, CISC architecture will reassert itself in gallium arsenide.

Judge by merits

If DP managers must become seers, oracles capable of optimizing the contribution that information makes to their employers' organizations, then a thorough study must be made of the RISC vs. CISC argument, including the history of instruction set development and the factors that influence CPU design.

One conclusion is that the RISC design philosophy is unlikely to become the real key to future price/performance improvements in large-scale data processing systems.

The market demands upward compatibility — preferably a guarantee of total software compatibility — across machine ranges. Those suppliers with large customer bases committed to a current architecture, be it RISC or CISC, will continue to move their CPU designs downward rather than develop new architectures for small systems.

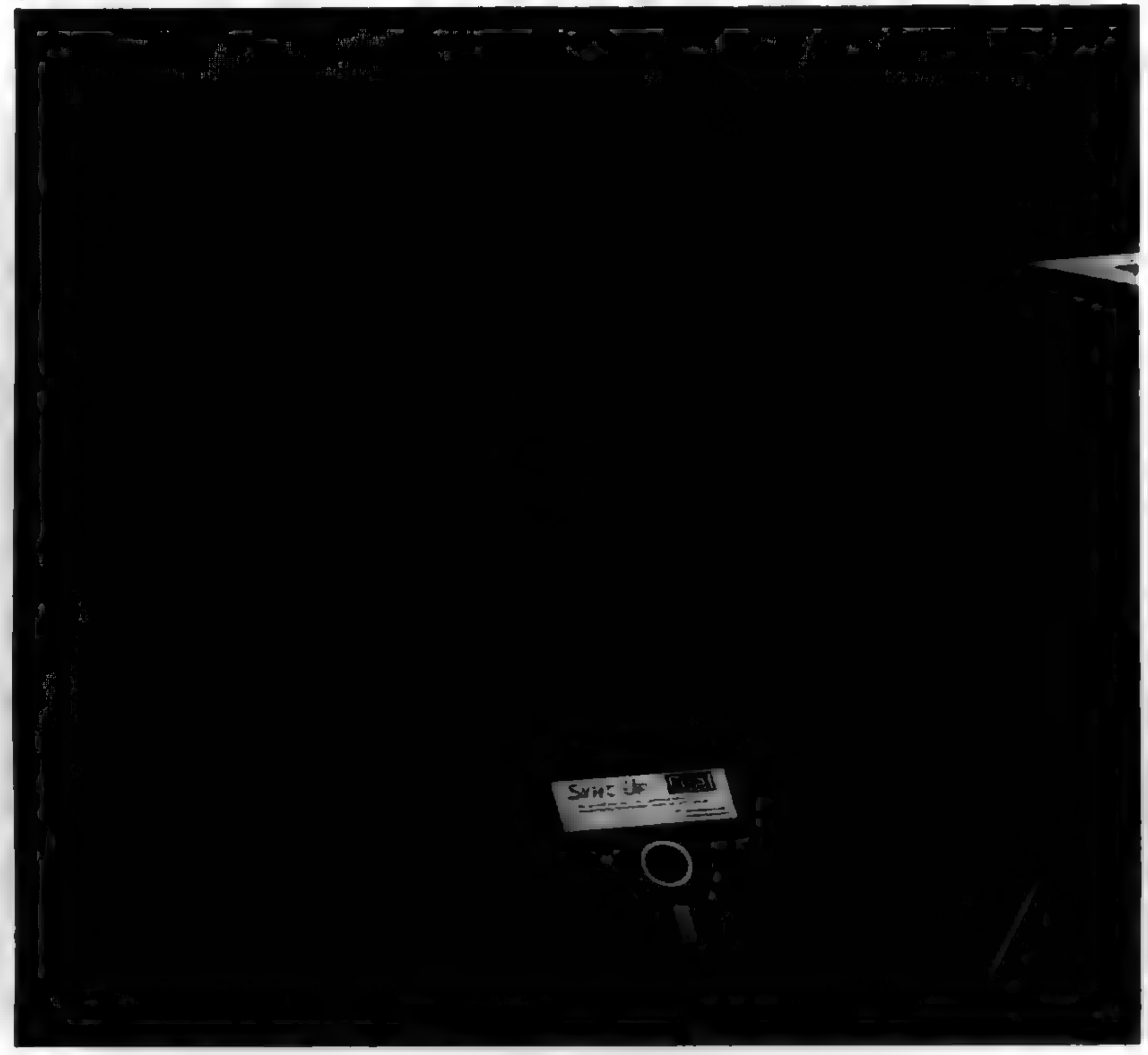
Current developments in VLSI technology will make these downward moves possible, removing much of the technical motivation for RISC, which is the need to implement a high-speed CPU with a limited gate count.

In addition, the RISC concept has some disadvantages; in particular, memory bandwidth is a problem, although it can be solved by the use of caches or extracodes as mentioned above.

The fact that a machine is RISC-based should not, however, be seen as a disadvantage, since the CPU itself is only one factor determining a computer system's performance. Software and the I/O structure are equally important.

It is not possible, therefore, to argue that RISC is an absolute good or an absolute evil; it is just another design concept with some particular advantages and disadvantages.

Those systems that are RISC-based should be assessed on their own merits, such as price per unit of performance, not on the novelty of the architecture. In this context, some suppliers may be able to offer relative price/performance improvements that are related to the use of RISC — for the time being. ■



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MANAGEMENT

TAKING CHARGE
Richard L. Bernacchi
and Peter B. Frank

Tax reform: Looking ahead

The Internal Revenue Code of 1986 is the most significant and comprehensive tax legislation adopted in the past 30 years. The primary objective of the legislation is to provide greater fairness in a tax code that, over the years, has evolved into a patchwork of purported tax incentive cures for a wide variety of social and economic problems.

Fairness, however, cannot always be accompanied by simplicity. This restructured tax law is complex, and its far-reaching effects on computer users cannot be fully analyzed here. Nevertheless, there are certain provisions of the legislation that are sure to have an impact on all computer users. Among these provisions are:

- Reduction of the corporate tax rate.
- Repeal of the investment tax credit.
- Modification of the equipment depreciation or cost recovery rules.
- Modification of the credit allowed for research expenditures.

Maximum corporate tax rates for calendar-year corporations will be reduced from 46% to 40% for 1987 and to 34% for 1988, thereby reducing the value of depreciation and amortization deductions and increasing the net after-tax cost of capital investments such as purchases of computer systems to many businesses.

The investment tax credit (ITC) has

See TAX page 80

Bernacchi is a partner with the Los Angeles law firm Irell & Manella. Frank is a partner with the Los Angeles office of Price Waterhouse & Co.

DP trainers air frustrations

Some act to enhance their services, image

By Mitch Betts

WASHINGTON, D.C. — Data processing trainers, the people who train end users, programmers and managers in computer skills, just do not get any respect, according to speakers at the Data Training Conference held here recently.

Whether they use classroom courses or computer-based training (CBT), trainers are viewed by some executives, including some MIS managers, as running academic, self-serving programs irrelevant to their companies' actual business, several speakers said.

One of the major reasons cited for this lack of respect is failure by top managers to appreciate the value of training, which has prompted a variety of tactics for enhancing the value or visibility of training programs.

Surveys by Brandon Systems Institute of Maryland, Inc., a Rockville, Md.-based DP training firm, support the position that trainers feel ignored. "Communications with management have been poor and training needs have not been communicated, students have been diverted or pulled out of class and training budgets have been miserly," the company's 1986 report states.

Training woes
The most serious problems faced by DP trainers

1. Freeing students from work.
2. Low priority in daily management decision making.
3. Budget constraints.
4. Poor communication with managers.
5. Facilities not available.
6. Difficulty getting experienced instructors.

Information provided by Brandon Systems Institute of Maryland, Inc. 1986 survey of 275 DP trainers.

"Our profession is in its infancy and has yet to make an impact on the overall business community," said Michael Hoisch, a former DP trainer and now a career specialist at the Compusearch division of Management Recruiters International, Inc. in Omaha. "Whether this is because training is considered a luxury or because trainers have not been able to establish credibility is only part of the answer. The major responsibility may lie in the lack of visible return on investment that training provides," he said.

Consequently, the training department is often the first to be hit with budget cuts, despite the productivity improvements that trainers claim their work generates.

Connie Perren, DP education coordinator for the University of Texas Medical Branch at Galveston, said she combats the problem by interviewing programmers and DP managers to find specific DP problems that could be solved through additional training.

Likewise, Karen Cruse, manager of planning and training at the Federal National Mortgage Association in Washington, said her workers began to market themselves not only as trainers but as consultants. "We wanted to help with problems and be, first and foremost, a service unit to the DP organization," she said.

In order to get more respect for training programs, Robert D. Hargrove, assistant to the DP director at the University of Texas Health Science Center at Houston, said it is important for training managers to have access to top management.

Hargrove said he resorts to "guerrilla tactics" to get that access. "I know that our executive vice-president wants to proofread any articles that are submitted from our organization. So I submit training articles — some not for publication but just for him to review — because I know that way I'll have an audience with him," he explained.

For some projects it works best to use technical managers instead of professional trainers for classroom instruction, according to Pat Baxter, former office automation manager at the Clevepak Corp. in Purchase, N.Y.

When the firm's payroll system was converted from an IBM System/38 to a

See TRAINERS page 77

INSIDE

Calendar: Selected conferences, exhibitions, seminars/**74**

Managers on the Move/**77**

INSTANT ANALYSIS

"Vendors in general do not understand user needs. They arrive at conclusions about hardware and software needs based on internal views rather than by interfacing with the user community."

— Brian R. Blackmarr, president, B. R. Blackmarr & Associates

MANAGEMENT MEMO

Growth in DP hiring, rise in entry jobs seen in future

Data processing hiring will grow in the first half of this year from the last six months of 1986, according to a survey by the Compusearch division of Management Recruiters International, Inc. in Cleveland.

Of 534 companies surveyed, 38% said they would increase DP staffs in the first half of this year — an increase of 4.8% from the second half of 1986. Only 9.4% said they would reduce staffs — a decrease of 4.3% from last year.

In some industries, reports of employment growth were more predominant. They included primary metals, with 66.7% increasing staffs; furniture and fixtures, with 58.3% showing an increase; data processing, with 57.5% adding staff members; and chemicals, with 53.6% increasing staffs.

■

Looking further into the future, Rochester Institute of Technology said **many companies will increase entry-level computer systems jobs** 40% to 50% in the next four years.

Areas of strong growth will include telecommunications, networking and distributed systems, software engineering and artificial intelligence, said Wiley McKinzie, director of the Institute's School of Computer Science and Technology.

While such positions generally have been filled internally, they will become standard jobs with starting salaries near $28,000 for holders of undergraduate degrees, he said.

"Companies that used to hire students with degrees in computer science will be looking for students in other disciplines with significant computer expertise," added Guy Johnson, chairman of the school's Department of Applied Computer Studies.

■

There is relatively little chance a company's auditing firm will lose objectivity by **consulting on the design and installation of a computer system**, according to a survey.

Helping design and install a system was said to pose little or no chance of impairing objectivity by 66% of executives, financiers, attorneys and others, the survey reported. Helping design a system was described similarly by 73% of respondents, second only to studying a plant location, at 75%.

The evaluations contrast with those for other consulting services, which were judged to pose a great deal or some lack of objectivity. They include negotiating mergers and divestitures, cited by 76%, implementing a strategic plan, 63%, and renegotiating a procurement contract, 50%.

The survey was conducted for the Public Oversight Board of the American Institute of Certified Public Accountants, New York.

CALENDAR

JANUARY 18-24

Comlease Winter. New Orleans, Jan. 19-23 — Contact: Comlease, 3825-I South George Mason Drive, Falls Church, Va. 22041.

JANUARY 25-31

Networking PCs. Cleveland, Jan. 26-27 — Contact: T. Jess Seiple, American Institute, 55 Main St., Madison, N.J. 07940. Also being held Jan. 29-30 in Denver, Feb. 5-6 in Kansas City, Mo., and Feb. 9-10 in Boston.

How to Negotiate with IBM. Orlando, Fla., Jan. 26-28 — Contact: ICN, 238 Christopher St., Upper Montclair, N.J. 07043.

Entity Modeling: Techniques and Application. Chicago, Jan. 26-30 — Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Integrating Purchasing, Receiving and Accounts Payable Systems. Philadelphia, Jan. 26-30 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Mapper Installation, Coordination and Support. Dallas, Jan. 26-30 — Contact: Compumetrics Training Institute, P.O. Box 58383, Houston, Texas 77258.

NCITD Informational Forum. New Orleans, Jan. 27 — Contact: Eugene A. Hemley, Executive Director, National Council on International Trade Documentation, Suite 1200, 350 Broadway, New York, N.Y. 10013.

Annual Conference on Improving Productivity in EDP System Development. Phoenix, Jan. 27-30 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

IBM PC XT-PC AT Course. Morristown, N.J., Jan. 28-30 — Contact: The American Institute, 55 Main St., Madison, N.J. 07940.

1987 RIA Annual Meeting. San Diego, Jan. 28-30 — Contact: Robotic Industries Association, P.O. Box 3724, 900 Victors Way, Ann Arbor, Mich. 48106.

Computer Graphics New York '87. New York, Jan. 28-30 — Contact: Exhibition Marketing & Management, Inc., Suite 690, 8300 Greensboro Drive, McLean, Va. 22102.

Keeping U.S. Manufacturing Globally Competitive. San Diego, Jan. 28-30 — Contact: Robotic Industries Association, P.O. Box 3724, 900 Victors Way, Ann Arbor, Mich. 48106.

Conference on Desktop Communications. San Francisco, Jan. 28-31 — Contact: The Seybold Group, Inc., Suite 132, 20695 Western Ave., Torrance, Calif. 90501.

Being More Profitable and Competitive with PC CAD/D. Sarasota, Fla., Jan. 30 — Contact: Maura Belliveau, Graphic Systems, Inc., 180 Franklin St., Cambridge, Mass. 02139.

FEBRUARY 1-7

Computer and Electronic Printers. Key Biscayne, Fla., Feb. 1-3 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Integrated Systems: What Can be Done Today? San Antonio, Feb.1-4 — Contact: International Communications Association, Suite 710, LB-89, 12750 Merit Drive, Dallas, Texas 75251.

1987 ABA Bank Telecommunications & Data Processing Workshop. San Diego, Feb. 1-4 — Contact: American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Understanding Data Communications. Boston, Feb. 2-3 — Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015.

Long Range Information Systems Planning. Dallas, Feb. 2-5 — Contact: American Management Association, 135 West 50th St., New York, N.Y. 10020.

Instructional Computing Conference VII. Orlando, Fla., Feb. 2-5 — Contact: Florida Department of Education, Educational Technology Section, Knott Building, Tallahassee, Fla. 32399.

Third International Conference on Data Engineering. Los Angeles, Feb. 2-6 — Contact: The Computer Society of the IEEE, Inc., 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Automated Clean Room Processes. San Jose, Calif., Feb. 3-4 — Contact: Robotics

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International of Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Digital Image Processing. Washington, D.C., Feb. 3-6 — Contact: Integrated Computer Systems, P.O. Box 3614, Culver City, Calif. 90231. Also being held Feb. 24-27 in Palo Alto, Calif., March 17-20 in Boston and March 24-27 in Washington, D.C.

Machine Vision and Image Recognition. Washington, D.C., Feb. 3-6 — Contact: Integrated Computer Systems, P.O. Box 3614, Culver City, Calif. 90231. Also being held Feb 10-13 in San Diego, March 10-13 in Anaheim, Calif., April 7-10 in Palo Alto, Calif., and April 21-24 in Washington, D.C.

Implementing LAN in Your Organization. Milwaukee, Feb. 4-6 — Contact: Peter L. Tocups, Center for Continuing Engineering Education, University of Wisconsin-Milwaukee, 929 North Sixth St., Milwaukee, Wis. 53203.

National Information System Quality Assurance Association Meeting. New York, Feb. 5 — Contact: Pat Ragozzino, Peat, Marwick, Mitchell & Co., 1600 National City Center, Cleveland, Ohio 44114.

FEBRUARY 8-14

12th Annual SAS Users Group International Conference. Dallas, Feb. 8-11 — Contact: SUGI Registration, SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511.

Advances in Marketing Analysis: Research Applications and Decision Support Systems. Philadelphia, Feb. 8-13 — Contact: The Registrar, Office of Executive Education, The Wharton School, University of Pennsylvania, 200 Vance Hall, Philadelphia, Pa. 19104. Also being held May 3-8 in Philadelphia.

Planning, Scheduling and Controlling Technical Projects. Los Angeles, Feb. 9-10 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held March 9-10 in Cambridge, Mass.

Fourth and 5th Generation Data Management Software. Boston, Feb. 9-10 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held March 2-3 in Chicago.

Project Mangement Software. New York, Feb. 9-11 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held March 23-25 in Chicago, Ill.

How to Design & Improve a Cost Information & Control System. Los Angeles, Feb. 9-11 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held Feb. 18-20 in Boston, Feb. 25-27 in Chicago, March 9-11 in New York, March 16-18 in Washington, D.C., and March 23-25 in Dallas.

Key Issues in Managing Information Systems. St. Petersburg, Fla., Feb. 9-12 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

ATI '87 Eighth Annual Conference on Automated Technology, CAD/CAM and Engineering Data Handling. Monterey, Calif., Feb. 9-12 — Contact: Automation Technology Institute, P.O. Box 242, Pebble Beach, Calif. 93953.

Communications Networks '87. Washington, D.C., Feb. 9-12 — Contact: CW/Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

1987 Invitational Computer Conference — Computer Graphic Series. San Jose, Calif., Feb. 10 — Contact: Conference Management, B. J. Johnson & Associates, Inc., 3151 Airway Ave., C-2, Costa Mesa, Calif. 92626. Also being held Feb. 24 in Dallas, April 23 in Munich, W. Germany, April 29 in London, May 5 in Paris, Sept. 17 in Fort Lauderdale, Fla., Oct. 1 in Newton, Mass., and Oct. 14 in Irvine, Calif.

Technology Opportunity Conference. London, Feb. 10-12 — Contact: Rothchild Consultants, 256 Laguna

See **CALENDAR** page 76

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CALENDAR from page 75

Honda Blvd., San Francisco, Calif. 94116.

Computer Aided Publishing '87. Washington, D.C., Feb. 10-12 — Contact: Computer Aided Publishing, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

Systems Design & Integration Conference. San Jose, Calif., Feb. 10-12 — Contact: Electronic Conventions Management, 8110 Airport Blvd., Los Angeles, Calif. 90045.

Creating Box Structured Information Systems: A New Approach for Information Systems Analysis and Design. Orlando, Fla., Feb. 11-13 — Contact: Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

1987 Bank Data Security Technical Symposium. Orlando, Fla., Feb. 11-13 — Contact: Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

AM/FM International Regional Conference on Automated Mapping/Facilities Management. Orlando, Fla., Feb. 11-13 — Contact: Barbara Emery, AM/FM International, #820, 8775 E. Orchard Road, Englewood, Colo. 80111.

South Florida Data Base Users Group. Ft. Lauderdale, Fla., Feb. 12 — Contact: 4780 N. State Road 7, Ft. Lauderdale, Fla. 33319.

Pre-CADDM '87, An Inside Look at Implementing Automation in China and The USA-China Business Environment. Monterey, Calif., Feb. 12-13 — Contact: Automation Technology Institute, P.O. Box 242, Pebble Beach, Calif. 93953.

FEBRUARY 15-21

Electronic Imaging '87. Anaheim, Calif., Feb. 16-19 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

15th Annual Association for Computing Machinery Computer Science Conference. St. Louis, Feb. 16-19 — Contact: Department of Computer Science, University of Pittsburgh, P.O. Box 13526, Pittsburgh, Pa. 15243.

Showcase '87. Indianapolis, Feb. 17-19 — Contact: U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601. Also being held April 14-16 in Las Vegas.

Electronic Data Interchange. Alexandria, Va., Feb. 18 — Contact: American Trucking Association Management Systems Committee, 2200 Mill Road, Alexandria, Va. Also being held April 30 in Kansas City, Mo.

Resource Planning for Central File Conversion. New Orleans, Feb. 18-20 — Contact: Innovative Systems, Inc., 341 Fourth Ave., Pittsburg, Pa. 15222.

Interactive Instruction Delivery. Kissimmee, Fla., Feb. 18-20 — Contact: Society for Applied Learning Technology, 50 Culpeper St., Warrenton, Va. 22186.

Advanced Configuration Management II. San Diego, Feb.19-20 — Contact: TMSA Seminars, c/o Technology Training Corp., Dept. ACM2, P.O. Box 3608, Torrance, Calif. 90510.

FEBRUARY 22-28

1987 User Group Conference. Marina del Rey, Calif., Feb. 22-25 — Contact: Trax Software, Inc., 10801 National Blvd., Los Angeles, Calif. 90064.

Fourth Annual Electronic Printing Systems Conference. Miami, Feb. 22-26 — Contact: Dunn Technology, Inc., Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

Exchange Carriers Standards Association Technical Subcommittee T1Q1. Orlando, Fla., Feb. 23-27 — Contact: Radisson Plaza Hotel Orlando, 60 South Ivanhoe Blvd., Orlando, Fla. 32804.

IBM: Mastering the Transition 1987-1992. New York, Feb. 24-25 — Contact: The Yankee Group, Seminar Division, 200 Portland St., Boston, Mass. 02114.

Computer Aided Software Engineering Symposium. Atlanta, Feb. 24-26 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Introduction to Performance/Capacity Management. Phoenix, Feb. 25-27 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

ICIA '87/Commtex International. Atlanta, Feb. 25-28 — Contact: International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

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MANAGEMENT

Trainers air frustrations

From page 73

System/36 due to a merger, Baxter recruited payroll, personnel and MIS managers to teach the necessary classes. She taught these managers the basic skills to become temporary trainers, in part because they had the technical expertise and in part because the training program was a rush job and she had no regular training staff.

"Training these experts to train their own people provided us with an efficient use of available skills, reliable and credible training and a cost-effective and time-effective response to a very difficult situation," Baxter claimed.

DP trainers are faced with the perennial question of whether to use classroom training or CBT, a choice that may depend on the corporate culture and the training task at hand, according to Thomas J. Richards, a training specialist at the Internal Revenue Service.

Richards said the IRS is successfully using classroom teaching to help senior managers gain some computer literacy and to help DP professionals acquire better management skills.

But for teaching more technical skills, the U.S. Defense Logistics Agency is using about 60 CBT courses that can be downloaded onto microcomputer diskettes for distribution to the agency's 90 far-flung offices, according to Frank W. Savely, the agency's CBT program administrator.

Many end users view either method as boring and see CBT as frustrating, slow and inflexible, according to DP training consultant Gloria J. Gery.

Gery, president of Gery Associates in West Hartford, Conn., said courses also might not work because users' requirements vary. What is needed are highly flexible CBT courses that allow trainers to tailor courses to users' needs, she said.

DP training also will become more flexible through the use of embedded training techniques such as windows and memory-resident programs, natural language queries, simulations, content-sensitive Help and diagnostic screens, Gery added.

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MANAGERS ON THE MOVE

William L. Harrison, former director of information management for **The Hartford Insurance Group**, has been named the company's director of operations, processing and planning.

Harrison succeeds **Robert S. Slifka**, who has been named senior vice-president of **ITT Corp.**, The Hartford's parent company.

Harrison has also been elected chairman of **Redshaw, Inc.**, The Hartford's majority-owned subsidiary that markets automated systems to independent insurance agents, and will be responsible for **CLA Corp.**, a subsidiary that sells automation services to other insurance companies.

John T. Crawford, director of data processing systems, will succeed Harrison as director of information management.

■

Gregory S. Staszko has been named partner in management advisory services of **Deloitte Haskins & Sells** in Cincinnati. Staszko was formerly a director of systems implementation services for KMG Main Hurdman.

■

Independence Information Systems, a subsidiary of **Independence Bancorp** in Perkasie, Pa., has named **Patricia L. Bleasdale** administrative vice-president and director of management information systems. Bleasdale was systems manager at Norwich Eaton Pharmaceuticals, a subsidiary of Proctor & Gamble Co.

■

In an effort to expand its information technology center, **Booz, Allen & Hamilton, Inc.** in Chicago has named **James M. Stierwalt** a vice-president. Stierwalt is leading a multimillion dollar effort by the Chicago-based Railroad Retirement Board to design a retirement claims processing system.

■

Joel Rubin has been promoted to vice-president of information systems for **Avis Leasing Corp.** in New York.

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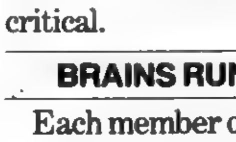

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Tax reform: Looking ahead

From page 73

> ***Many businesses will benefit from deferring income until 1988 and accelerating expenses into 1987, when tax rates will be higher.***

been repealed for all types of equipment, including computers. Except for certain limited transition rules for procurements or construction in progress during 1985, the repeal of the ITC is retroactive to the beginning of 1986. Hence, in determining the net after-tax cost of computer systems, the ITC generally will not be a consideration.

Changes in the rules for depreciation, or cost recovery, are more favorable with respect to computer equipment than to other types of property. The five-year life for depreciation purposes has been retained under the new code while depreciation lives for other assets have been stretched out.

Furthermore, the 200% declining balance method of depreciation is available for computer equipment, as opposed to the 150% declining balance method that was previously available.

The result is that deductions for purchases of equipment may be more favorable, although worth somewhat less after taxes because of the reduced tax rates.

The credit for research and experimentation expenditures, added to the tax law in 1981, has been an important provision for companies in research-intensive industries. The new tax law retains this credit. The credit, however, is reduced to 20% from 25%.

Further, the new law more clearly defines the types of research expenditures that must be excluded in computing the tax credit. It provides that expenditures will qualify only if the research is technological in nature, is part of an experimentation and is useful in the development of a new or improved business product, process, formula or invention. Software must be truly innovative and developed at significant risk to be eligible for the credit.

In general, many businesses will benefit from deferring income until 1988 and accelerating expenses into 1987, when tax rates will be higher. This traditional tax planning technique will be a particular benefit to companies that expect to be in the top corporate brackets. First, the tax deferred until 1988 generates a time-value-of-money benefit by deferring tax payments. Further, since rates will be lower in 1988 than in 1987, a permanent tax saving will result.

Additional considerations of less general applications include the following:

- Certain corporations may wish to evaluate the benefit of S corporation status. An S corporation is essentially treated for tax purposes as a partnership. In other words, corporate income, losses and credits pass through to the shareholders' individual returns. The drop in the top rate applicable to individuals below the corporate rate has generated new interest in S corporations. If the requirements for S corporation status are met, the income of the corporation is taxed only once, at the shareholder level.
- The demise of the investment tax credit retroactive to Jan. 1, 1986, may require amending returns for corporations that have already filed returns for fiscal years that included a period after Dec. 31, 1985, if, for example, the corporation overstated the allowable investment tax credit.
- Finally, the new law contains a provision of particular interest to companies that sell software. Several years ago the Internal Revenue Service ruled that one company that produced computer software for use by customers was a personal holding company. The effect of this unfavorable ruling was an additional tax on that corporation's undistributed income, known as the personal holding company tax.

The IRS ruling was based on the premise that the revenue from licensing software is technically royalty income, which is one type of personal holding company income.

Under the new law, licensing computer software is generally exempted from personal holding company income if the company is actively engaged in the computer software business and derives at least 50% of its ordinary gross income from software royalties in a given year, along with other requirements.

Furthermore, the exception is effective for royalties received before, on or after Dec. 31, 1986. So the exception is effective for all open tax years, including those still open for refund purposes under the applicable statute of limitations.

Therefore, software companies that previously paid the personal holding company tax should review the provision to determine whether refunds may be obtained by filing amended returns for years still open under the statute of limitations.

The 1986 code contains many opportunities for the careful business planner. It is difficult to overstate the importance of proper timing of transactions, selection of accounting methods and forms of doing business.

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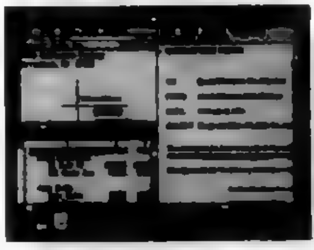

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PC's	August 12	July 3	PC Expo
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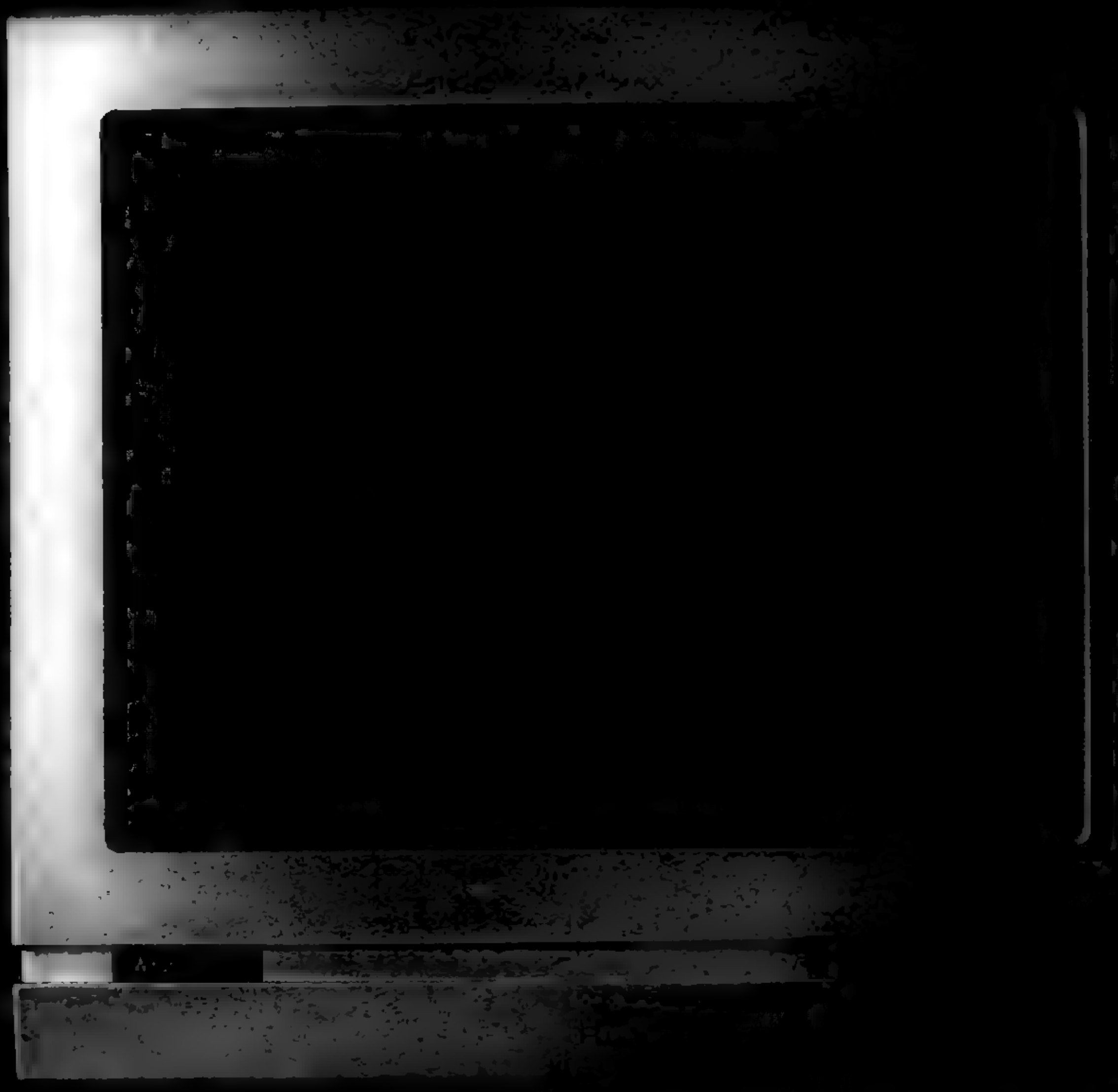

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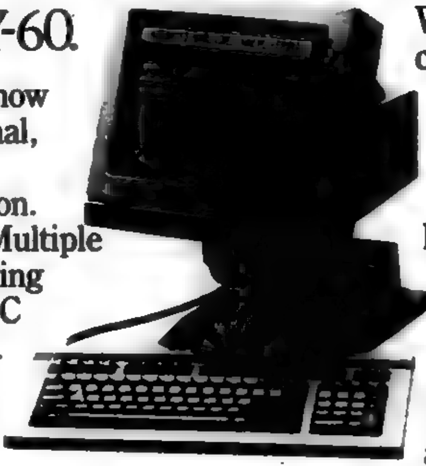

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NEW PRODUCTS

Add-on vector processor bows for DEC minis

NEWTON, Mass. — Numerix Corp. has introduced an add-on vector processor for use with Digital Equipment Corp. VAX computers in scientific environments as well as engineering computing environments.

The company claimed that the NMX-464 can be tightly coupled to the VAX hardware and to the VAX/VMS operating system to provide peak performance of 12 million to 24 million floating-point operations per second.

It reportedly features a 32-bit and 62-bit mixed-mode arithmetic capability that allows a user application to be optimized for speed and precision in a single processor.

Modeling uses

The NMX-464 was designed for use in application areas such as molecular and reservoir modeling, finite element analysis and electronic circuit simulation.

Numerix officials claimed that the processor supports virtual program memory sizes of up to one million instructions and that the NMX-464 also supports data memory sizes of up to 64M bytes.

The software includes an optimizing Fortran compiler that speeds vector and scalar program execution without the need for microcode programming, according to the vendor.

VAX/VMS transparency

The company claimed the NMX-464 architecture provides VAX/VMS transparency.

An entry-level version of the NMX-464, including software and support for four users, costs $66,500.

The entry-level version is intended for use with small DEC systems such as the Microvax II and VAX 8200.

Multiple units can be used with larger DEC processors, such as the VAX 8550 and VAX 8800.

Systems Strategies link ties VAX users to SNA

Systems Strategies, Inc. in New York, an AGS company, has introduced VAX-Link, a family of Digital Equipment Corp. VAX-to-IBM communication software packages.

The VAX-Link family is said to enable VAX and Microvax computer users to interconnect with IBM Systems Network Architecture (SNA) and Binary Synchronous Communications (BSC) networks, as well as exchange information through international CCITT X.25 packet-switched networks.

The software is available on VAX and Microvax systems under Ultrix, AT&T Unix and VMS operating systems.

The VAX-Link packages are downloaded in random-access memory (RAM) onto DEC's high-performance communication processor boards, such as the KCT for the VAX Unibus and the KMV for the Microvax Q-bus. Installation of the software is said to require no modification to existing DEC or IBM software.

Features of the VAX-Link family include autodial capabilities, menu-driven operation, full-color terminal capability, multiple protocol support in a single processor and multiple user support. In addition, users are said to be able to move between local VAX applications and IBM mainframe applications with a single keystroke.

Members of the VAX-Link software family include: VAX-Link/SNA 3270, VAX-Link/BSC 3270, VAX-Link/LU6.2, VAX-Link/SNA RJE and VAX-Link/BSC RJE. The VAX-Link/X.25 package allows DEC users to interface with packet-switched networks.

Single-copy pricing for the VAX-Link software packages ranges from $3,500 to $10,000.

INSIDE

Software & Services/84
Microcomputers/86
Communications/91
Systems & Peripherals/95
Price Reductions/98

Quanta announces 2000 series

Multiplexers provide options to 3270 users

Quanta Communications Systems, Inc. (QCS), an associate company of the Racal-Vadic group based in Anaheim, Calif., has announced the 2000 series family of multiplexers.

According to a company spokesman, the multiplexers, the 2100MX, the 2200MX, the 2300MX, 2500MX and the 2600MX, were designed to eliminate cable runs in IBM 3274 controller installations as well as provide a range of options to 3270 users.

The vendor said that a single center link, which may be either RG62A/U coaxial cable or multimode optical fiber, transmits data at 2.3587M bit/sec. between multiplexers.

The product line begins with the basic 2100MX, which supports up to eight IBM Type A and compatible devices. The most advanced model, the 2600MX, comes complete with a redundancy feature, full front-panel diagnostics and support for up to 32 devices.

Separate devices

The 2000 series is said to eliminate the need for separate devices at the controller and terminal ends of the system. According to a company spokesman, the 2000 multiplexers are compatible with all other QCS 2000 series products.

External dip switches allow multidrop addressing control with transmission up to 5,000 feet between controller and terminal.

Prices start at $800. The multiplexers are available immediately, the vendor said.

Talaris Systems printer debuts

Talaris Systems, Inc. in San Diego has announced a 15 page/min. laser printer featuring 21 standard fonts and a dual-page buffer in the print controller.

Called the Talaris 1500, the desktop printer is said to have a resolution of 300 dot/in. and a full-page bit-map controller for formatting complex graphics images and text at full resolution. The controller is equipped with 3.5M bytes of random-access memory (RAM) and a Motorola, Inc. 68000 for formatting complex pages before printing.

The printer can print on plain cut-sheet paper of weights ranging from 16 to 24 lb and on transparencies, labels or prepunched paper. It has two 250-sheet paper trays and a 500-sheet face-down output tray.

The dual-page buffer keeps the Talaris 1500 up to its rated speed of 15 page/min. by preparing a second bit map while the first is printing.

Graphics features include Tektronix, Inc. 4014 graphics emulation with four sizes of Tektronix fonts; polygon fill with 23 patterns, their reverse and solid black and white; end-point vector graphics processing for drawing lines from one to 31 dots wide; and raster graphics processing. The Talaris 1500 also has modes to accept data meant for printing on a Diablo Systems, Inc. 630 ECS or Qume Corp. Sprint daisywheel printer.

Priced at $11,900, the Talaris 1500 is available with a variety of interfaces including an RS-232, a Dataproducts Corp. parallel and an IBM 3274A. Talaris provides system support for Digital Equipment Corp. VAX/VMS, IBM VM/CMS, University of California at Berkeley Unix Version 4.3, System V Unix, IBM RT Personal Computer AIX, Prime Computer, Inc. Primos and IBM PC-compatible computers.

Honeywell offers IBM links

Multiplexer hooks controller, I/O device

Honeywell, Inc.'s Optoelectronics Division, based in Richardson, Texas, has announced the Honeywell HFN9318 fiber-optic multiplexer, which is said to provide interference-free data communications links for IBM 5251 cluster controller systems.

According to the Optoelectronics Division, the HFN9318 multiplexer operates with other Honeywell fiber-optic components, the HFN9308 multiplexer and the HFM5300 and HFM5305 modems, to provide lightwave data links between IBM 5251 controllers and their I/O devices.

In a typical configuration, the vendor said, the HFN9308 multiplexer is located at the controller site and is connected to the IBM 5251 by coaxial cable.

Located remotely, the HFN9318 multiplexer provides fiber-optic links to the HFN9308 multiplexer and, through the modems, to the I/O devices.

Full-duplex operation

Attributes of the HFN9318 multiplexer include eight twinaxial ports and the ability to multiplex all signals onto a single fiber-optic cable with full-duplex operation.

With a link budget of 18dB into a 50/125-micron cable, the HFN9318 multiplexer permits the installation of cable through several bulkheads up to the maximum distance of 4,700 meters, or 15,200 feet, the vendor said.

Priced at $8,270 for rack-mount and $9,183 for cabinet-mount version, the HFN9318 multiplexer allows less than one error per billion bits transmitted, according to Honeywell's Optoelectronics Division

SOFTWARE & SERVICES

Systems software

SDC Software has announced **Release 3.0** of its **Customer Information System** for IBM System/34, 36 and 38 minicomputers.

The software is said to be a package for maintaining customers, referrals, sales prospects and product inquiries. The new release features integrated activity entry, multiple customer contacts, an optional comment screen and the option of entering upper- or lower-case characters.

Other features include system-assigned account numbers and duplicate record detection.

Prices start at $1,800.

SDC Software, Suite 9, 400 Hot Springs Road Carson City, Nev. 89701.

■

Online/Database Software, Inc. has announced **Release 1.7** of **The Application Builder**.

Release 1.7 is said to expand the compatibility with Cullinet Software, Inc.'s IDMS/R and ADS/Online by including ADS/A functionality. Users can define complete application structures, including menus and application flow-of-control. ADS/A support enables the user to prototype applications linking the menus, application security, screen formats and program flow without processing logic.

The Application Builder costs $4,000.

Online/Database Software, One Blue Hill Plaza, Pearl River, N.Y. 10965.

Applications packages

Trax Softworks, Inc. has announced **Edword**, a word processor for IBM mainframe environments.

Edword is said to combine ruler formats, menus and Help panels. Users can access text files on the mainframe that were created by other text editors. In addition, documents can be hundreds of pages long, the vendor said. Edword can integrate with the Trax spreadsheet, ESS, or run as a stand-alone word processor.

Edword runs under IBM's VM/CMS, TSO and CICS. It supports all IBM 3270-type terminals. Prices range from $5,000 to $8,000.

Trax Softworks, 10801 National Blvd., Los Angeles, Calif. 90064.

Utilities

Interactive Solutions, Inc. has announced **CICS/Replay**.

CICS/Replay is said to be a tool for quality assurance, regression testing, system tuning, stress testing and capacity planning. Features include a logging facility that captures the I/O of a terminal and establishes a session library; the ability to compare replayed screens with original screens; analyze response time and other performance-related functions; and send screen images to other terminals or a CICS printer.

CICS/Replay costs $18,000 for an IS CPU and $13,000 for a DOS CPU.

Interactive Solutions, 53 W. Fort Lee Road, Bogota, N.J. 07603.

■

Systems Strategies, Inc. has announced **VSNA/3270** emulation software.

The micro-to-mainframe communications package is said to allow VMEbus-based systems to exchange information with IBM mainframe computers over a Systems Network Architecture network. The VMEbus hosts connect to the IBM mainframe by emulating a remote 3274 cluster controller. Terminals connected to the host emulate IBM 3278 terminals.

Depending on quantity, VSNA/3270 is priced from $600 to $5,000.

Systems Strategies, 225 W. 34th St., New York, N.Y. 10001.

■

Dylakor Division of Sterling Software, Inc. has enhanced its **Dyl-On-line under CICS**, its menu-driven program development tool for creating, testing and running programs in the IBM CICS environment.

Enhancements include a new installation procedure, sign-on and password protection, the ability to choose job names tailored to meet shop standards, nine subdirectories for each user and the ability to sort selected records in descending and ascending order.

Dyl-On-line under CICS, Release 2.0 costs $8,000 for the MVS version and $6,000 for VSE.

Sterling Software, Dylakor Division, 17418 Chatsworth St., Granada Hills, Calif. 91344.

■

The Adesse Corp. has upgraded its **VM/SP Archival Storage Subsystem** (Archives) program and its **VM/SP Shared File Directory Facility** (SFDF).

Archives is a CMS user-controlled file archival subsystem. It has been enhanced to include an end-user oriented front-end. The system combines a series of commands with a set of installation-defined procedures to control the movement of files between the subsystem's on-line staging disk and the tape archives.

Archives costs $240 per month and SFDF costs $86 per month.

Adesse, Suite 307, 36 Mill Plain Road, Danbury, Conn. 06811.

■

Woven Software has announced **SMFUTIL**, a general-purpose SMF data movement utility designed to move SMF data from one place to another.

The software is said to be able to

NOW Available for VM/GCS, too.

Who is accessing your VTAM Network tonight?

DO YOU HAVE ANY I.D?

With THE NETWORK DIRECTOR, access to your VTAM Network can be based on User Id and Password, not just terminal location.

The Network Director can require the terminal user to enter a User Id and Password before allowing the user access to VTAM applications.

Once the user enters a User Id and Password, The Network Director verifies the user's identity with your security package (ACF2, RACF, TOP SECRET or The Network Director) and then presents a Selection Menu of only those applications that the user is allowed to access. In addition, access to applications can be further restricted by terminal, time or day.

When the user makes a selection, The Network Director can pass the User Id and Password to many applications (CICS, IMS, TSO, IDMS, CMS, ROSCOE, Com-plete, and MODEL 204, for instance) to automatically sign-on the user to the application.

The Network Director can keep an audit trail of sign-on attempts, the duration of each user-application session, and more.

For physically secured terminals, a Selection Menu can be presented without requiring identification, and for dial-up terminals the initial screen need not identify the computer installation.

At a VTAM network level, The Network Director also offers bulletin board and help, message switching, broadcast, automatic application status, and network administration facilities.

The Network Director is available for MVS, VS1, VSE, or VM/GCS environments and fully supports cross domain, ENA, and SNI.

For more information contact North Ridge Software at 206/455-9809, Telex: 5106014846 (NRIDGE SOFTWARE).

THE NETWORK DIRECTOR

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NEW PRODUCTS/SOFTWARE & SERVICES

create daily and month-to-date archive tapes and subsets of specific record types with one pass of the data. It also features a set of flexible control specifications to limit the data copied to that which is required.

SMFUTIL is priced at $6,900.

Woven Software, 7202 Holder Forest Circle, Houston, Texas 77088.

■

Target Systems Corp. has announced **Version 5.0** of its **Target Calendar** management software for Digital Equipment Corp. VAX/VMS computers.

The program is said to provide personal and group calendar management. Users can maintain daily appointments and meetings and calendars can be accessed by other users based on the appropriate authorization. Entries may be searched for specific text and the user can print a hardcopy listing.

Target Calendar costs from $395 to $795.

Target Systems, 33 Boston Post Road W., Marlboro, Mass. 01752.

■

Massoglia & Associates, Inc. has announced **Mapics II IDDU File Definitions** financial and manufacturing package designed for the IBM System/36.

The package is said to provide the files, file formats and field definitions to put the power of Query to use. It provides more than 2,800 preset definitions that can be loaded and linked via menus.

The complete package is available for $495.

Massoglia & Associates, Suite 102, 4970 Northwind Drive, East Lansing, Mich. 48823.

■

Information Industries International has announced **Job Execution Tools** (JET), a complete productivity system for OS users.

The JET system is said to feature a structured programming language, System Management Facility reduction, line-printer graphs and Gantt charts. It can be used to create reports, perform CPU saturation forecasting, plan projects, populate and reformat files and write letters.

A JET site license costs $2,500.

Information Industries International, P.O. Box 3278, Humble, Texas 77347.

Services

Massoglia & Associates, Inc. has announced a series of publications for users of the IBM System/36 and 38.

The publications include *S/38 for Beginners, S/38 Subfiles Made Easy, Using the Power of Conversion Reformat (SORT) on the S/38, Getting Started with S/38 Edit Text, Advanced Methods with S/38 Edit Text, Getting Started with PS/38 Text Management, Advanced Methods with S/38* and *Everything You Always Wanted to Know about the System/38 But Nobody Told You.*

A single publication costs $65. Any two cost $55 each; any three cost $50 each; and four or more cost $45 each.

Massoglia & Associates, Suite 102, 4970 Northwind Drive, East Lansing, Mich. 48823.

Belcastro Computer Services has announced **Honos**, an off-site service for converting source code, JCL and screens from a Honeywell, Inc. mainframe to an IBM mainframe.

According to the vendor, Honos allows batch source code and JCL to be converted to either a DOS or MVS environment.

The on-line source code is converted to Command Level CICS code. Embedded screens and external screens are converted to IBM Basic Mapping Support maps, the vendor claimed.

The conversion is done off-site by Belcastro personnel prior to installation of the hardware.

According to the vendor, pricing for a conversion ranges from $50,000 to $300,000.

Belcastro Computer Services, 120 Millcreek Road, Niles, Ohio 44446.

MICROCOMPUTERS

Systems

Granite Systems has announced **Amy**, a turnkey microcomputer-based personnel scheduling system.

The system is said to take incoming telephone calls from employees unable to be on a shift, and then initiate calls to qualified replacement candidates in priority according to user-defined criteria. Amy also maintains attendance records and produces management reports.

The voice-response unit is a dedicated IBM Personal Computer-compatible PC with telephone line cards containing proprietary software. The host computer is IBM PC AT-compatible and stores the specific applications data base.

Amy is priced from $28,000.

Granite Systems, 3732 Mt. Diablo Blvd., Lafayette, Calif. 94549.

Software applications packages

Triangle Software Co. has announced the **CICS/PC** system, said to duplicate the functions of IBM's CICS on an IBM Personal Computer or compatible.

The CICS/PC system uses the same screens, commands and sequences that CICS programmers do, the vendor said. It allows users to develop and test mainframe CICS programs.

Site licenses range from $12,500 to $19,500. Monthly licenses range from $750 to $1,250.

Triangle Software, Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

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Maryland Casualty Company

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International Microcomputer Software, Inc. has announced **Desktop Publisher's Graphics**, a graphics package designed for desktop publishing.

The graphics software package features free-hand graphics and allows the user to import, edit and enhance images from programs such as Lotus Development Corp.'s 1-2-3, Chartmaster, Microsoft Corp. Chart and Autodesk, Inc.'s Autocad. It has built-in drivers for Tall Tree's JLaser.

According to the vendor, Desktop Publisher's Graphics requires the use of an IBM Personal Computer, PC XT, AT or compatible with two drives and 512K bytes of memory. It is priced at $195.

International Microcomputer Software, 1299 Fourth St., San Rafael, Calif. 94901.

Computerline, Inc. has announced a software package said to combine **Plantrac-CM,** its cost management program with **Plantrac,** its Critical Path Method program.

Plantrac-CM is said to provide all levels of management with a tool to estimate, plan and analyze project costs and resources against time-specific criteria. Plantrac provides scheduling, resource and cost planning and reporting features. When linked, they provide integrated scheduling and cost management.

The complete system costs $3,695.

Computerline, P.O. Box 308, 52 School St., Pembroke, Mass. 02359.

■

Terrex has released **LP Model,** a financial applications program for the IBM Personal Computer said to set up the financial framework and generate the financial projections for a real estate limited partnership.

LP requires Lotus Development Corp.'s 1-2-3. It will analyze a partnership based on commercial, residential, retail or industrial properties. Information includes cash flow from operations, sources and uses of funds, taxable income analysis, distribution and benefits per limited partner unit and projected results of sale.

LP Model costs $1,200.

Terrex, Suite 210, 170 Caldecott Lane, Oakland, Calif. 94618.

■

Aegis Development, Inc. has announced **Aegis Draw Plus,** a computer-aided design package for the Amiga personal computer.

Aegis Draw Plus is said to allow up to six independent drawings of 256 layers to be worked on using a basic 512K-byte Amiga computer.

According to the vendor, full 16-color capability is available and drawings may be saved in the Amiga's standard IFF file format for use in other programs.

Aegis Draw Plus is controlled by either a mouse and pull-down menus or with the keyboard.

Other attributes include ruler lines with variable measure types; adjustable grid sizes; unlimited zoom levels; parts library for storage of often-used objects; and plot spooling.

Aegis Draw Plus costs $259.95.

Aegis Development, #227, 2210 Wilshire Blvd., Santa Monica, Calif. 90403.

■

Spot Systems, Inc. has introduced **The International Teller System,** the sixth in its series of International Finance Systems for the IBM Personal Computer and compatibles.

The software is said to automate the teller station by providing for the issuance and purchase of drafts, the buying and selling of foreign currencies and travelers' checks and the sale of outgoing wires.

The International Teller System may be integrated with Spot System's Foreign Exchange Trading System and Multicurrency General Ledger products. It also contains features for support of transactions created by downstream correspondents, fee tables based on the originating bank and individual teller passwords and balancing controls.

The International Teller System costs $7,500.

Spot Systems, Suite 617, 690 Market St., San Francisco, Calif. 94104.

■

Qcad Systems, Inc. has announced Version 3.0 of its typesetting package, **Qroff**.

Qroff is a typesetting package designed for the Hewlett-Packard Co. Laserjet and Laserjet Plus printers. It is said to provide the capability to mix different fonts, align margins, center, underline, subscript and generate an index.

Version 3.0 allows users to format a document while filtering out the actual Laserjet command codes. Version 3.0 also runs on the Digital Equipment Corp. VAX/VMS systems in addition to the IBM Personal Computer family.

The PC version costs $79.95. The VAX version costs $295.

Qcad Systems, 3333A Octavius Drive, Santa Clara, Calif. 95054.

Software languages

Cogent Software, Ltd. has announced **Cogent Prolog** for the IBM Personal Computer and compatibles.

Cogent Prolog is an intepreter said to support the full Edinburgh Prolog syntax and more than 100 standard predefined predicates.

Features include binary file I/O, screen functions, user-programmable error handling, debugging and access to DOS and BIOS.

Cogent Prolog comes with a tutorial reference manual and sample artificial intelligence programs written in Prolog. It costs $79.

Cogent Software, 21 William J. Heights, Framingham, Mass. 01701.

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CSI-75, The HIGH PERFORMANCE TurboDOS System.

Are you looking for a way to stay ahead of the pack in today's business computer market? Commercial Systems Inc. has the winning answer for TurboDOS VARS and distributors. The CSI-75 is the perfect combination of power, performance and price. With its superior, multiprocessor architecture the CSI-75 will handle up to 12 users per chassis without any sacrifice of speed or access time. And the CSI-75 won't leave you idling at the starting line when your customers are ready to expand their operations. With additional chassis our systems can expand to serve over one million user stations.

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The CSI-75 comes packaged with extensive software for even greater value. Included are the TurboDOS operating system, a multi-user database management system with a complete accounting package, and a powerful word processor designed to operate in a multi-user environment. With data communications equipment for inter-city and inter-regional networking and the ability to support printers of all types, the CSI-75 is the ultimate expandable business system.

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NEW PRODUCTS/MICROCOMPUTERS

Software utilities

Intelligenceware, Inc. has announced **Experteach-II**, an expert-system product for the IBM Personal Computer.

Experteach-II is a guide to expert system technology. It consists of an integrated collection of expert system tutorials, case studies, on-line and interactive teaching programs, expert-system building tools with source code, sample expert systems and artificial intelligence languages.

Users are said to be able to build their own expert systems and experiment with a variety of artificial intelligence tools and languages on the PC.

Experteach-II costs $475.

Intelligenceware, Suite 730, 9800 S. Sepulveda Blvd., Los Angeles, Calif. 90045.

■

C-Level Software Development, Inc. has announced **FM plus**, a desktop utility package.

FM plus includes a full-feature menu manager, an appointment calendar with alarm and file manager. Features include a time tracker, a background print and print queue manager, global file search and multiple file and directory commands.

The memory resident program runs under Microsoft Corp. MS-DOS or IBM PC-DOS Version 2.0 or higher. It costs $160.

C-Level Software, P.O. Box 128, Cypress, Texas 77429.

■

The Software Factory, Inc. has announced **Opal**, a personal computer-based programmer productivity tool.

Opal is a batch executive interpretive language said to integrate itself with DOS and applications running under DOS, providing the application developer with control over DOS applications.

Other features include screen and menu definition; flow-of-control; CALLs; DO groups; I/O operations; DATE manipulation; string manipulation; and disk, file, directory and system functions.

Opal is priced at $169.

The Software Factory, Suite 750 LB44, 15301 Dallas Pkwy., Dallas, Texas 75248.

Software enhancements

Office Solutions, Inc. has announced **Officewriter 5.0**.

Features in the latest release include the abilities to view up to 15 columns on-screen, create line and box drawings, outline documents, create indexes, number paragraphs and search and sort documents.

Other features include a 40,000-word thesaurus, five-function math and automatic hyphenation.

Officewriter 5.0 is priced at $495.

Office Solutions, 2802 Coho St., Madison, Wis. 53713.

■

Strategic Software Planning Corp. has announned **Version 2.5** of its **Promis** project management integrated system.

Version 2.5 features improved subnetworking capability, faster sorting, enhanced on-screen reporting, increased what-if analysis flexibility and enhanced graphics adapter support.

The improved subnetworking allows top-down or bottom-up creation of subprojects to merge projects or to create summary-level reporting capabilities. Sorting now offers a wild card selection.

Promis runs on IBM Personal Computer XTs and ATs and costs $2,995.

Strategic Software Planning, 245 First St., Cambridge, Mass. 02142.

■

Brightbill-Roberts & Co. has announced **Show Partner 2.0**, an enhanced version of its personal computer-based software.

Show Partner allows a user to create computer-controlled presentations for training, informing, advertising, marketing and demonstrating. Version 2.0 is composed of four programs. The Show runtime module now allows the user to display the same script on the IBM Color Graphics Adapter, Enhanced Graphics Adapter and the Hercules Computer Technology, Inc. Monochrome Adapter without modification.

Show Partner 2.0 comes bundled with Microsoft Corp.'s Microsoft Mouse 6.0. It costs $79.

Brightbill-Roberts, Suite 421, 120 E. Washington St., Syracuse, N.Y. 13202.

Communications

Comtrol Division of Control Systems, Inc. has announced the **Smart Hostess**, an intelligent communications controller said to be IBM Personal Computer bus-compatible.

The board contains its own microprocessor and will act as the front-end processor for serial communications. It can utilize the PC AT I/O channel signals, allowing 16-bit memory transfers, and provides four or eight serial channels, of which two can be synchronous.

Other features include a maximum asynchronous data rate of 76.8K bit/sec. and a maximum synchronous data rate of 1.22M bit/sec.

An eight-port RS-232C with 256K bytes of dynamic random-access memory and 32K bytes of eraseable programmable read-only memory costs $1 495.

Comtrol Division, 2675 Patton Road, St. Paul, Minn. 55113.

Data storage

Chorus Data Systems, Inc. has enhanced its **Color Photobase** application package by providing optical disk support.

Color Photobase is said to merge real-life pictures with data base management systems such as Ashton-Tate's Dbase II and III, Microrim, Inc.'s Rbase 4000 and 5000 and the IBM Filing Assistant.

A complete Color Photobase Workstation includes computer, video digitizer, graphics card, optical and hard disk drives and display monitor. It is priced from $15,393.

Chorus Data Systems, P.O. Box 370, 6 Continental Blvd., Merrimack, N.H. 03054.

■

Cipher Data Products, Inc. has introduced the **Cipher 5230**, a ¼-in. tape backup system for all models of the Digital Equipment Corp. Pro line of microcomputers.

The backup system is said to allow DEC Pro users to backup Winchester disk drives. It consists of a Cipher Floppy Tape ¼-in. backup module including chassis and power supply, a controller board, a chassis adapter box and backup software.

Continued on page 90

Now backup files on *any* media in just minutes.

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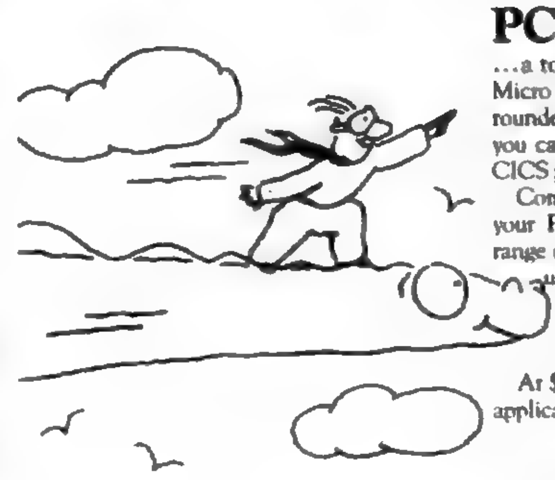

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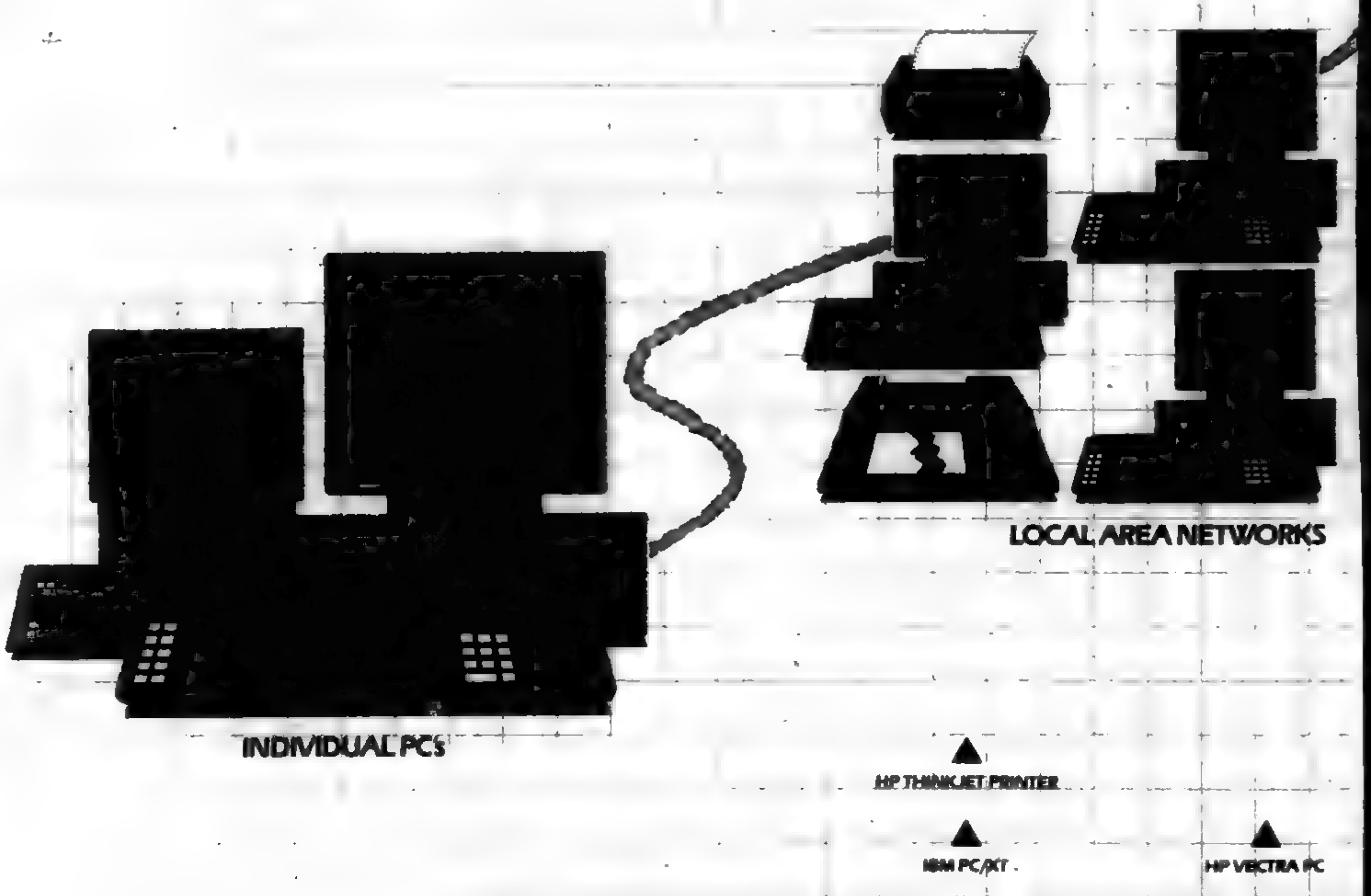

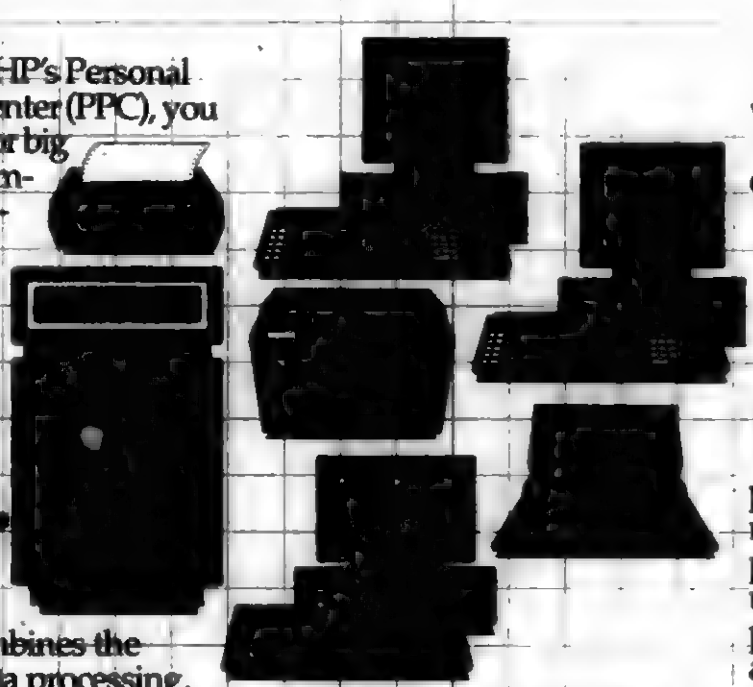

In fact, with HP's Personal Productivity Center (PPC), you can start small or big and create a compatible office information network. A network that lets you manage growth easily. A network that can change as you change, grow as you grow.

The PPC combines the strengths of data processing, personal computing and advanced networking. So individuals, work groups, departments or entire corporations can access, share and exchange information better.

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PPC products are compatible across a wide range (more so than even IBM), so you can easily alter, upgrade or expand a PPC configuration. Without re-writing one line of software.

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If you need mainframe performance, one of our new HP 3000 Series 930 supermini's can supply processing power to as many as 400 users. And, to create a company-wide information network, our HP AdvanceNet provides powerful networking solutions that link together *multiple* systems. So everyone can make better decisions faster.

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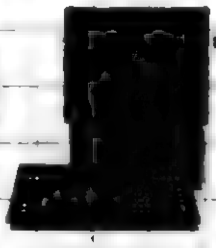

It can include advanced electronic mail, easy database access from PC's, and IBM mainframe communications that let your people manage information more effectively. The PPC supports a full range of HP products like our IBM PC/AT compatible Vectra PC, The Portable and HP LaserJet printers, to name a few. And since it also supports IBM PC's, you can extend the PPC to these users as well.

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Continued from page 87

The 5230 Floppy Tape system provides 25M bytes of backup.

The 5230 costs $1,495.

Cipher, P.O. Box 85170, 10101 Old Grove Road, San Diego, Calif. 92138.

Printers/Plotters/Peripherals

Centronics Data Computer Corp. has added Hewlett-Packard Co. Laserjet Plus emulation to its **Pageprinter 8** laser printer.

This emulation is said to increase the printer's ability to support downline load capability of the fonts. It also allows software-selectable printing in either portrait or landscape mode and permits the intermixing of multiple fonts on a single page.

The Centronics Pageprinter 8 is priced at $2,295. The HP Laserjet Plus emulation board is priced at $250 and requires an expansion memory option priced at $500.

Centronics, One Wall St., Hudson, N.H. 03051.

■

Hewlett-Packard Co. has announced the **HP Quietjet** printer, the narrow-carriage version of the HP Quietjet Plus printer.

The HP Quietjet printer offers 48 char./sec. printing for near-letter quality and 192 char./sec. printing for draft documents. It supports graphics resolutions of 96-by-96 dot/in., 192-by-96 dot/in. and 192-by-192 dot/in. The printer features both RS-232C serial and Centronics parallel I/O interfaces and works with most personal computers, terminals and software. It supports six different print pitches and has several resident character sets and graphics.

The HP Quietjet printer costs $599.

Hewlett-Packard, 1820 Embarcadero Road; Palo Alto, Calif. 94303.

Board-level devices

Intelligent Graphics Corp. has announced **Cadcard Model 1040**, a graphics controller for IBM Personal Computers and compatibles.

The Cadcard is said to feature an Intel Corp. 80186 CPU with 512K bytes of memory dedicated to storing the emulating microcode for IBM's color graphics and professional graphics controller. The card features a graphics accelerator.

The Cadcard Model 1040 costs $1,750.

Intelligent Graphics, 2680 Bayshore Frontage Road, Mountain View, Calif. 94043.

■

DBM, Inc. has introduced the **Magna-3/Multi-Scan** graphics adapter for the IBM Personal Computer and compatibles.

The Magna-3 is said to be a full-featured high-resolution board. It is said to provide support for more than 256 types of color and monochrome monitors including the IBM Color Display and Enhanced Display and the Sony Corp. CPD 1302.

The board features resolution of up to 1,024 by 760 pixels and includes multifunction features such as two serial ports and a parallel port.

The Magna-3 costs $1,095 to $1,595.

DBM, 634 Georgia Ave., Palo Alto, Calif. 94306.

Newer Technology has introduced **Attention**, a dynamic random-access memory (RAM) packaged extended memory board for IBM Personal Computer ATs and compatibles.

Users can place four Attention boards in AT expansion slots and access the entire 15M bytes of upper memory, the vendor said. Attention supports 16-bit word access. It runs at 6, 8, 10 and 12 MHz with 6- and 8-MHz versions switchable to run at one wait state or zero wait state. Standard software for Attention includes Lotus/Intel/Microsoft Expanded Memory Specification software for expanded memory compatibility; print spooler; and RAM disk.

Attention, complete with 4M bytes of memory, costs $995.

Newer Technology, 251 Whittier, Wichita, Kan. 67207.

Auxiliary equipment

Digital Communications Associates, Inc. has announced **Aleckey**, a keyboard said to provide IBM System/34, 36 and 38 users with the functionality of both an IBM 3179/80 terminal keyboard and an IBM Personal Computer keyboard.

Aleckey is said to include all of the keys found on both an IBM 3179/80 keyboard and a PC keyboard. The keys are labeled with the functions they perform. Aleckey can also be remapped by the vendor's Smart Alec emulation software to function like the 3179/80 terminal keyboard.

Aleckey is compatible with IBM PCs using the old BIOS as well as the new extended BIOS. It costs $349.

Digital Communications Associates, 1000 Alderman Drive, Alpharetta, Ga. 30201.

ICS Computer Products has introduced the **UDM-PC** ultrasonic distance measurement board for use with IBM Personal Computers and compatibles.

The board is said to measure the distance to target objects using a remote transducer. Distances between five inches and 35 feet can be measured. A software-programmable range window provides target discrimination by distance.

A hardware local mode provides a stand-alone maintenance range-testing feature.

The board requires one expansion slot. Expansion up to 14 channels is possible using external multiplexing options.

The UDM-PC costs $695.

ICS Computer Products, Suite 208, 5466 Complex St., San Diego, Calif. 92123.

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COMMUNICATIONS

Communications controllers

Local Data, Inc. has announced **Datalynx/3174**, a 16-port cluster controller connecting asynchronous networks, personal computers, terminals and printers to IBM 3270 mainframe computers.

Datalynx/3174 is said to emulate IBM's System Network Architecture 3174, 3274 and 3276 control units. Users can mix and match IBM and asynchronous terminals throughout the network. Datalynx is said to be able to transfer and control up to 32 simultaneous data streams.

A four-port unit costs $3,000. A standard 16-port unit costs $6,000.

Local Data, 2771 Toledo St., Torrance, Calif. 90503.

Apollo Computer, Inc. has introduced the **Domain/Bridge G703**, a communications product designed to extend the functionality of the Domain System across high-speed European long-distance communication services.

According to the vendor, it allows European users to connect dispersed Domain workstation networks and maintain advanced services such as the Domain networkwide single-file system for resource sharing.

The Domain/Bridge G703 costs $14,250.

Apollo Computer, 330 Billerica Road, Chelmsford, Mass. 01824.

■

Distributed Logic Corp. (Dilog) has introduced the **CQ1620** eight-channel asynchronous communications controller designed for use with Digital Equipment Corp. Q-bus computers.

The controller is contained on a single dual-size circuit board. According to the vendor, it features larger transmit buffers on each channel that permit higher throughput between the CPU and peripheral devices. It runs standard DEC DHV11 driver and diagnostics software and provides full-duplex communications capabilities at data transfer rates from 50 to 38.4K bit/sec.

The CQ1620 costs $1,100.

Dilog, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

Voice/data communications

Granite Systems has introduced **Televox-1000**, a microcomputer-based voice response system said to take incoming telephone calls and initiate outgoing calls.

According to the vendor, the Televox-1000 acts as an intelligent interface between a host computer and telephone lines. It maintains a lexicon of sentence fragments and words that are retrieved to construct appropriate questions or answers.

The Televox-1000 is priced from $20,000 for a two-line configuration.

Granite Systems, 3732 Mt. Daiblo Blvd., Lafayette, Calif. 94549.

Software

Tekelec, Inc. has introduced **X.75** software for its Chameleon II and 32 protocol simulator and analyzers.

The software is said to ensure high-quality X.75 implementation and performance of X.75 interfaces. Users can test station terminating equipment to verify its performance operating under the procedures recommended by the Consultative Committee on International Telephone and Telegraph.

The product costs $2,000.

Tekelec, 26540 Agoura Road, Calabasas, Calif. 91302.

■

DA Systems, Inc. has announced the **Isobridge**, **Hub** and **Node** software packages for its Dasnet Wide Area network.

Dasnet is a distributed peer-to-peer network of IBM Personal Computers, ATs and compatibles. The software packages run on its QNX multiuser, multitasking operating system, IBM PC-DOS or Microsoft Corp. MS-DOS.

The Hub option allows computers running Node software to become accessible through the Dasnet network.

Prices range from $39.95 to $1,390.

DA Systems, 1503 E. Campbell Ave., Campbell, Calif. 95008.

■

Emulex Corp. has introduced the **Net41**, a switching option for its CS41 T1 multiplexer.

The CS41 with Net41 is said to be a Digital Equipment Corp.-compatible asynchronous multiplexer with multihost access capabilities. The Net41 supports up to 143 users distributed between the six DEC VAX host computer systems with no external switching hardware required.

The unit occupies a single hex-sized slot and features 50,000 char./sec. throughput.

The Net41 software costs $1,000. The CS41 multiplexer with one 24-line distribution panel and switching firmware costs $5,500.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

Multiplexers/Modems

Artel Communications Corp. has announced the **LS250**, a device designed for users of Gould, Inc. 984 and 584 series programmable controllers.

The LS250 is said to be able to send data between the Gould remote I/O stations and the Gould programmable controller. The LS250 includes link diagnostics from either end and a switch that permits adjustment for short- and long-range applications.

The LS250 costs $1,050 per end.

Continued on page 94

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by resting on what's behind.

Somewhere along the way, a leader has to break away from the pack. And go it alone. That's what leadership is all about. Standing up, bearing down, and moving ahead.

Breaking Away.

Novell broke out of the local area networking (LAN) pack four years ago with the introduction of the file server. We called it a LAN milestone. Others scoffed. Three years later, when IBM announced that its LAN systems would be file server-based, the rest of the pack finally headed for that first milestone.

But Novell was already milestones ahead. By porting the NetWare® LAN Operating System to over 30 major LAN hardware systems and offering nearly 4,000 NetWare-compatible multiuser applications, Novell had established a de facto LAN standard. A standard now supported by more than 400,000 NetWare users worldwide.

And with the introduction of System Fault Tolerant (SFT™) NetWare, Novell passed another LAN milestone: affordable fault tolerance for nearly all LAN systems.

Moving Ahead.

Today, Novell isn't resting. On past achievements or anything else. While other companies are struggling to reach Novell's LAN milestones, Novell is forging an even bigger lead with new milestones like the Universal Network Architecture (UNA) strategy and the opening of NetWare Centers worldwide. A lead so big that many major LAN competitors are buying Novell technology just to stay in the race.

Being a leader is hard work. But Novell is in front to stay. Because nothing compares to the view from the front. Especially when you look forward to the milestones ahead.

NOVELL
Milestones Ahead.

Continued from page 91

Artel Communications, P.O. Box 100, West Side Station, Worcester, Mass. 01602.

■

Scitec Corp. U.S.A. has announced its **Saturn D4** advanced T carrier modem.

The modem is said to operate between NRZ data equipment and North American terrestrial DS1 services. It uses AT&T services at 1.544M bit/sec. and provides subrates of 768, 384, 256, 192, 128 and 64K bit/sec. for clear channel conferencing. It provides line, local and remote loopbacks and comes equipped with a 37-pin female D RS-422/499 connector and an MS34 connector for V.35.

The Scitec Saturn D4 advanced T carrier modem costs $3,500.

Scitec, 850 Aquidneck Ave., Middletown, R.I. 02840.

Local-area networks

Corvus Systems, Inc. has announced **PC/NOS**, a network operating system for its Omninet local-area network.

PC/NOS is said to allow networks to be created without file servers. Features include file-server support of the IBM PC-DOS 3.1 file, record locking calls and access security control for nodes, peripherals and files. PC/NOS can support multiple servers when necessary and permits the sharing of all resources that are available on the network.

PC/NOS is priced at $695 for 64 users.

Corvus, 2100 Corvus Drive, San Jose, Calif. 95124.

■

Proteon, Inc. has announced the **P1680**, a network interface for Gould, Inc.'s Selbus-based Powernode and Concept/32.

The board connects to the Selbus via Gould's high-speed data interface II (HSD II) to provide access to the Pronet-80, an 80M bit/sec. token-ring local-area network. The P1680 Gould Selbus Host Interface costs $2,900. A diagnostics package for the interface costs $250.

Proteon, Two Technology Drive, Westboro, Mass. 01581.

Test equipment

Navtel, Inc. has announced the **X.25 Application Pack** for the Datatest 5 field service protocol analyzer.

The X.25 pack is said to allow users to monitor X.25 packet-switching networks, decode frame and packet level activity and collect statistics. More than 75 tests and measurements are supported, the vendor said. The X.25 pack intercepts network activity and explains what is happening. It provides a full decode to the packet level.

The X.25 application pack costs $175. The Datatest 5 costs $4,995.

Navtel, Suite 190, 6611 Bay Circle, Norcross, Ga. 30071.

■

Test & Measurement Systems, Inc. has announced the **LRR-101** remote programming and data retrieval unit.

The unit is said to provide instantaneous information on signal strength in satellite communication systems. It operates in conjunction with the vendor's LRF-102 fading analyzer. It provides instantaneous programming of the remote unit and real-time monitoring. The product is also said to allow users to dial up any remote location for printouts for signal information.

The LRR-101 costs $8,700. The LRF-102, inclduing RS-232 and GPIB interfaces, costs $16,900.

Test & Measurement Systems, 2934 Corvin Drive, Santa Clara, Calif. 95051.

■

Intelco Corp. has introduced the **611**, a T1 handheld bit-error rate pattern analyzer.

The 611 is said to automatically synchronize on all T1 patterns received. It allows users to perform bit-error rate analysis in remote field sites when a bit-error rate signal source can be generated and transmitted from a central facility, according to the vendor.

Analysis can be made with the 611 on standard QRSS patterns, fixed repeating patterns or live data traffic, the vendor said.

The Intelco 611 is priced at $3,950.

Intelco, 8 Craig Road, Acton, Mass. 01720.

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

SYSTEMS & PERIPHERALS

Turnkey systems

Tektronix, Inc. has announced a version of its **PCB Worksystem** product for the enhanced Apollo Computer, Inc. DN3000 workstation.

The PCB Worksystem offers schematic capture, board layout and optional simulation with the Hilo-3, logic-simulation system, the vendor said.

According to the vendor, the DN3000-based PCB Worksystem standard configuration includes 4M bytes of main memory, a 155M-byte hard disk, keyboard, mouse, the Aegis and University of California at Berkeley Unix Version 4.2 operating systems and Tektronix PCB design and layout software.

Prices start at $49,900.

Tektronix, 5302 Betsy Ross Drive, Santa Clara, Calif. 95054.

Processors

Philips and Signetics Microsystems has added the **PG2030 VMEbus Processor**, the **PG2260 Memory** module and **PG2210 Dynamic RAM** module to its VMEbus Module line.

The modules are said to provide the basic computing nucleus for single- and multiprocessor configurations in real-time industrial, data communications and instrument applications.

The PG2030 is priced from $1,800; the PG2260 Memory module costs $975 and the PG2210 is priced from $1,700.

Philips and Signetics, M/S27, P.O. Box 3409, 811 E. Arques Ave., Sunnyvale, Calif. 94088.

Graphics systems

Gamma Electronics Systems Corp. has announced the Gamma stand-alone controller for color display.

The Gamma controller is said to allow a mix of different-size monitors and various keyboards producing color graphics terminals to be custom fitted to end user and OEM requirements. The Gamma controller features 14 emulation options including both Digital Equipment Corp. and Tektronix, Inc. resolution of up to 800 by 240 pixels and 16 colors from a palette of 4,096.

Pricing for the Gamma controller starts at $900.

Gamma Electronics Systems, 6175-W Shamrock Court, Dublin, Ohio 43017.

Data storage

Cambex Corp. has announced a **quick-disconnect option** for its Certainty 810 Series streaming tape system.

The option is said to allow users to remove the backup unit from their IBM Series/1 rack enclosure and ship it to repair sites.

The option is priced at $125. The Cambex Certainty 810 Series streaming tape system costs $5,425.

Cambex, 360 Second Ave., Waltham, Mass. 02154.

■

California Peripherals Corp. has introduced a series of **¼-in. streaming tape drives** that provide 60M bytes and 125M bytes of formatted storage.

The drives, designated Models CP-60 and CP-125, fit the half-height 5¼-in. floppy disk drive form factor. The CP-60 has nine recording tracks with a density of 8K bit/in. and 60M bytes of formatted storage.

The CP-125 has 15 tracks with a density of 10K bit/in. and 125M bytes of formatted storage.

The CP-60 costs $650. The CP-125 costs $850.

California Peripherals, 19701 S. Vermont Ave., Torrance, Calif. 90502.

Terminals

DY-4 Systems, Inc. has introduced the **SVME-676**, a VMEbus-compatible alphanumeric CRT controller with serial and parallel I/O, a timer and a real-time calendar clock with battery backup.

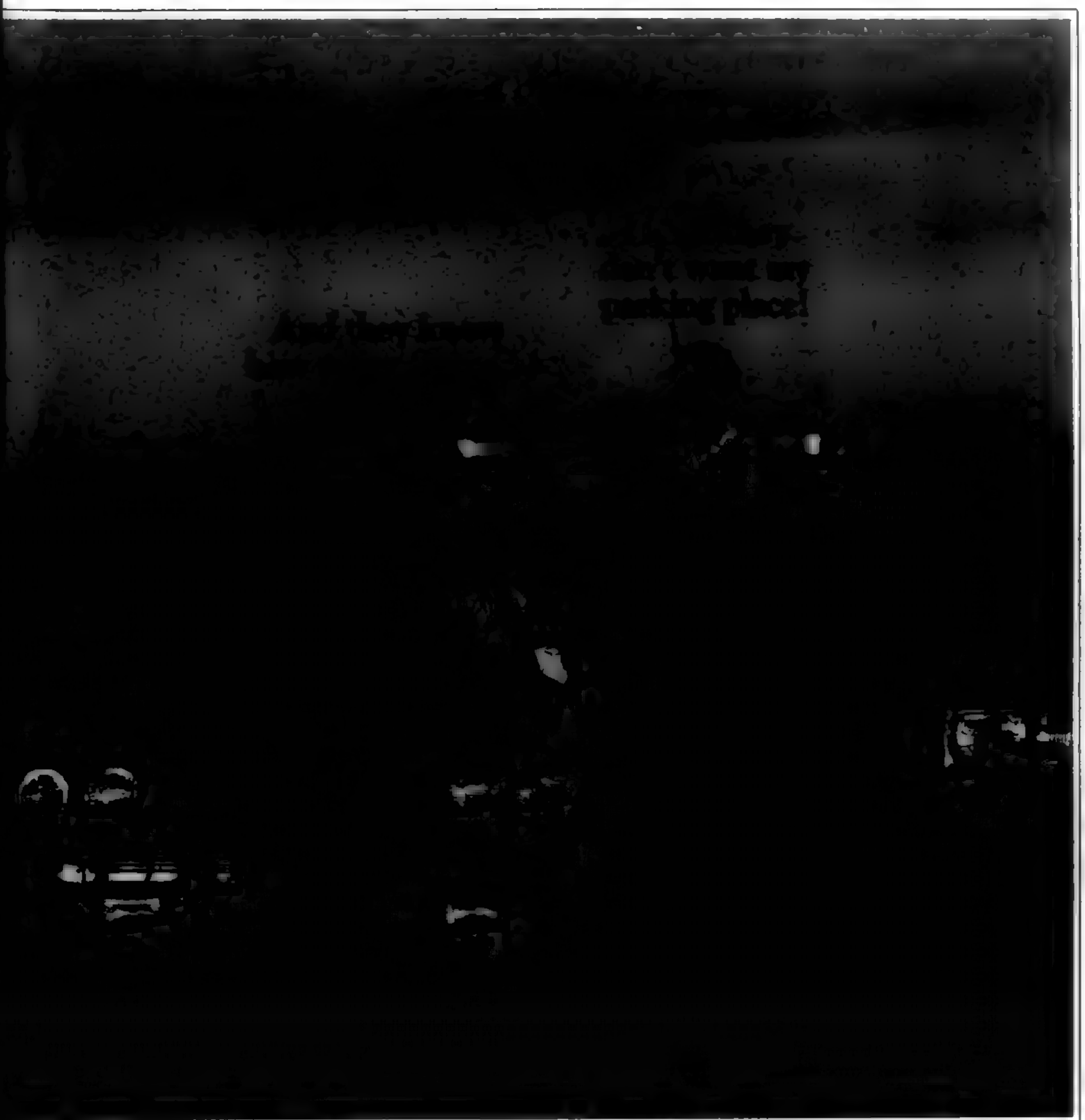
The CRT controller function is said to provide RS-170 output with nonserrated vertical synchrony for alphanumeric display.

According to the vendor, it acts as the interface between a CPU and a raster-scan CRT display.

Other features include software-selectable screen formats, a programmable cursor and programmable cursor blink rates.

The SVME-676 costs $1,690.

DY-4 Systems, Suite 202, 1475 S. Bascom Ave., Campbell, Calif. 95008.



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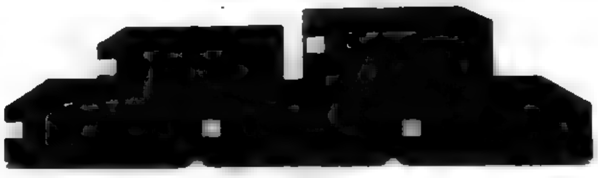

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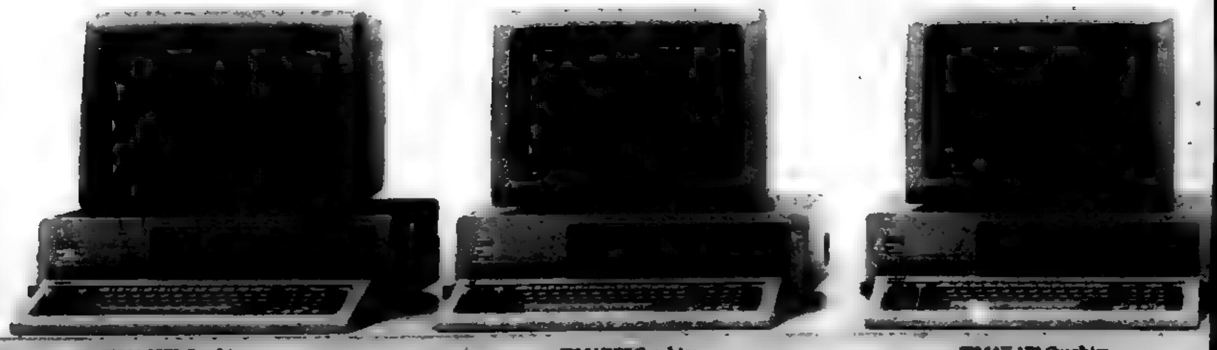

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NEW PRODUCTS/SYSTEMS & PERIPHERALS

Mitsubishi International Corp. has introduced the **Grafnet-02** digitizing tablet for graphics or computer-aided design and engineering input.

The tablet has an active area of 13 by 16½ in. It is supplied with a four-button cursor puck, a wall plug DC power supply and a 5-ft data cable terminated in a D-9/F connector, for coupling to an IBM Personal Computer AT-compatible serial port. Data output is via a standard RS-232 interface.

The Grafnet-02 digitizing tablet costs $595.

Mitsubishi International, 520 Madison Ave., New York, N.Y. 10022.

Printers/Plotters

Centronics Data Computer Corp. has announced the **Linewriter 855T** and **1200T** Tempest printers.

The Tempest products are configured to provide tamper-proof security by preventing the escape of radio frequency and electromagnetic emanations from information processing equipment.

The 855T and 1200T Linewriters are said to perform at speeds of 800 and 1200 lines/min, respectively. The Model 855T is equipped with an acoustical cabinet rated at 55dBA.

The Model 855T is priced at $14,500, and the Model 1200T is priced at $16,900.

Centronics Data Computer, One Wall St., Hudson, N.H. 03051.

•

GTCO Corp. has introduced **Autoplot**, a D-size open-frame flatbed pen plotter.

Autoplot features a 16-bit processor and a 256K-byte buffer, expandable to 1M byte. It is said to be able to draw on any flat material regardless of size or thickness.

Other features include Hewlett-Packard Co.'s HPGL command set and dual pass-through RS-232C ports, which permit a second peripheral to share a computer interface.

Autoplot costs $4,495 with one pen and a 256K-byte input buffer. The 1M-byte input buffer option costs $400. The eight-pen option is $500.

GTCO, 7125 Riverwood Drive, Columbia, Md. 21046.

•

Eastman Kodak Co. has announced the **Komstar systems manager printer** for use with its Komstar imaging system.

The printer is said to allow users to output mailing labels and print information contained in the unit's systems manager. The printer enables hard copy printouts to be obtained from the data stored in the systems manager.

The Komstar systems manager printer is priced at $1,420.

Eastman Kodak, 343 State St., Rochester, N.Y. 14650.

Power supplies

RTE Deltec Corp. has introduced a rack-mount version of its **7000 Series Uninterruptible Power System** product line.

The rack-mount systems are said to assure on-line, regulated, continuous AC power for computers and other critical equipment in the 3KVA power range. The systems fit into standard 19-in. equipment racks and operate at 60Hz with 120V input. They provide 120V output to the critical load.

The 7000 series rack-mount models cost $5,195.

RTE Deltec, 2727 Kurtz St., San Diego, Calif. 92110.

Auxiliary equipment

ICS Computer Products, Inc. has announced the **ICS 1021 Touch Control Screen.**

The screen acts as an interface between users and computer-driven systems. It interprets character strings from the host computer and acts as a software-configured control panel.

The ICS 1021 can be mounted into a panel or rack or on a tabletop. It is priced at $1,795.

ICS Computer Products, Suite 208, 5466 Complex St., San Diego, Calif. 92123.

PRICE REDUCTIONS

Productivity Software International, Inc. has announced a price reduction for **PRD+**, its personal computer keyboard and macro enhancement program.

The program is said to increase typing and data entry speed by enabling users to enter a shorthand form of frequently used text. According to the vendor, it does not require commands that break a user's typing rhythm.

PRD+ is memory resident and runs on IBM Personal Computers and compatibles. It costs $68.

Productivity Software International, 1220 Broadway, New York, N.Y. 10001.

•

Ampex Corp. has announced price reductions for its **Ampex 210 Plus** and **230 Plus** ASCII video display terminals.

The Ampex 210 Plus offers an 80- and 132-col. display, 14 programmable function keys and 400 bytes of nonvolatile memory. The Ampex 230 Plus features four 80-col. display pages, 16 programmable function keys and 6,000 bytes of nonvolatile memory. It offers emulation of the Wyse Technology, Inc. WY-50, Televideo Systems, Inc. 910, 920/912 and 924/914.

The 210 Plus is priced at $419, and the 230 Plus costs $519.

Ampex, 401 Broadway, Redwood City, Calif. 94063.

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COMPUTER INDUSTRY

Section begins on page 122

Pansophic steps outside of traditional mainframe arena

Purchased number of products, firms in 1986

By Jean S. Bozman

OAK BROOK, Ill. — Last year was a hectic one for Pansophic Systems, Inc., as the suburban Chicago software systems house pursued a fast-paced series of acquisitions that added both new products and new corporate entities to the company.

The intent of the actions, said Chief Executive Officer David J. Eskra in a recent interview, is to enlarge the company beyond its traditional IBM mainframe environment, adding links to the minicomputer and microcomputer systems in growing corporate networks.

"The bulk of our business will continue to be with IBM systems," Eskra said, "but we would like to be able to provide software that can run in a variety of environments."

Porting to minicomputer environments

That means Pansophic will spend the balance of the 1980s learning to port its application development tools, like Telon, to Digital Equipment Corp. and other minicomputer environments. "If our productivity tools are quick, and our products are portable to other systems," Eskra said, "then it really won't matter what environment they are used in."

Through the flurry of 1986 additions, Eskra said Pansophic will grow to $100 million in sales by the middle of this year and to $200 million by the end of 1988. He said the company's larger size will help it compete with the industry's other acquisition-minded players — Computer Associates International, Inc., Management Science America, Inc. and Sterling Software, Inc.

In the past year, Pansophic generated $80 million in software revenue and intended to pay nearly as much for acquisitions. Pansophic was able to plan this growth based on cash reserves of $62 million and $150 million in assets. Some of the cash reserves came from two 1985 public offerings, which together raised $42 million.

Acquisition canceled

The previously announced $32 million acquisition of SPSS, Inc. was called off when the two companies could not come to terms [CW, Jan. 5]. SPSS is a Chicago-based supplier of statistical analysis and graphics applications software.

"The deal is off permanently," an SPSS spokesman said. "A number of things had to be agreed upon by the end of the year in order to take advantage of the 1986 tax law." SPSS intends to continue operations as a privately held company for the foreseeable future, the spokesman said.

Pansophic's David J. Eskra

Jim Hodges, senior vice-president of finance and administration at Pansophic, would not comment on what issues kept the two from consummating the deal, which was based on an October 1986 letter of intent. The merger, he said, would have added to both companies' profits and broadened both product lines. "But," Hodges added, "if you can't get something at the right price, then you have to walk away."

PCR largest purchase

Pansophic did not walk away from other acquisitions in 1986. Its largest purchase was the $19 million December acquisition of Professional Computer Resources, Inc. (PCR), an Oak Brook, Ill., provider of IBM System/38 turnkey systems. PCR will remain as a freestanding development organization, as will some of the other acquired companies.

PCR is expected to open new markets in mid- and small-size IBM shops, in which Pansophic had not had a substantial base. Pansophic developers hope to learn from PCR's experience in dealing with smaller IBM shops that use the System/38 in manufacturing and accounting applications.

Other Pansophic acquisitions in 1986 included micro-to-mainframe link supplier Remote Data Systems, Inc. in Brookfield, Wis., for an undisclosed amount and Fusion Products International, a San Rafael, Calif., supplier of System/36 and 38 system products, for $7.2 million.

Acquired products included Starburst, a graphics package acquired from Audio Visual Laboratories in Tinton, N.J., D-Pict, a graphics package acquired from British Petroleum Co., and Ingot, a decision support system acquired from Schonfeld & Associates, Inc., an Evanston, Ill., software house.

Reorganization

In order to better absorb its new businesses, Pansophic forged a line-of-business operation in late December, reorganizing into four divisions. Responsibility for the original Pansophic product line will be given to two divisions — systems life cycle products and productivity products.

A separate graphics products division will sell Starburst and D-Pict, while a fourth division is composed of PCR's business.

Industry analysts have had mixed reactions to Pansophic's quest for greater size and a broader product line. Scott Smith of Donaldson, Lufkin and Jenrette said he believes that Pansophic has set itself a possible dream. "They have the cash to acquire these companies, and I'd rather see them spend it on acquiring good businesses than keeping it in the bank," Smith said.

But others, like Terence Quinn, a vice-president and senior technology analyst with E. F. Hutton & Co., are concerned that the company may be spreading its resources too thin. "The acquisitions were not painless," Quinn said, "and some of Pansophic's primary product business has slowed."

Confidence in management

But Quinn expressed confidence in Pansophic's top management team, saying they are equal to the challenge of restructuring the compnay. "It's certainly possible that they could soon be doing $200 million in business a year," he said. "But if they're building an addition, they'll have to make sure that, in doing it, the main section won't fall down."

Eskra said he remains confident, noting that by 1995, Pansophic should be positioned to help its present base, which consists of more than 9,000 IBM mainframe sites, cope with the array of minicomputers and micros scattered throughout their corporate networks. The concept of adding to Pansophic's product line-up, according to Eskra, was driven by end users.

"We'd like to think we're listening to our customers and their plans into the 1990s," he said, "and putting ourselves in a position to deliver products that address those needs."

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Growth seen in hardware

By Mitch Betts

WASHINGTON, D.C. — Revenue for the computer hardware industry will grow about 10% in 1987, while revenue for the software and services industry will grow about 11% to 12%, according to the recent annual forecast issued by the Computer and Business Equipment Manufacturers Association (CBEMA).

CBEMA's forecast noted that hardware industry revenue grew only 6.5% in 1986 to $107.6 billion, a growth rate well below the average annual rate of 13.8% between 1975 and 1985.

Revenue for the software and services industry grew by 10.5% in 1986 to $45 billion, the trade group said.

CBEMA expects only marginal gains for the telecommunications industry.

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IBM, Merrill Lynch to close Imnet financial services venture

By Alan Alper

NEW YORK — Management indecisiveness and an ill-fated product strategy caused the demise of International Marketnet (Imnet), the IBM/Merrill Lynch & Co. financial information services venture that will cease operations at the close of the first quarter.

The 22-month venture suffered from product delays and an inability to attract large Wall Street brokerage clients, observers said. In a terse statement, IBM and Merrill Lynch said the venture is being closed following a reassessment of its financial viability. Neither firm would elaborate on the decision to end the venture.

Wall Street sources said both firms had invested more than $70 million in the venture. A Merrill Lynch spokesman, however, called that figure grossly overestimated and inaccurate.

Analysts and potential customers said Imnet's IBM Series/1-based distributed branch office system was too expensive, too complicated to use and offered more features and functions than brokers really required.

"It was overkill," noted Tom Lawton, editor of "The Computer Services Report," a Belmont, Mass., newsletter. "The idea that a broker is anything more than a telephone salesman is ridiculous. They don't know what to do with all that computing power."

Merrill Lynch's participation in the venture also scared off brokerage houses that likened working with Imnet to dealing with the enemy. "Obviously, Merrill Lynch was a bigger drag on the venture than the two partners wanted to admit in the beginning," Lawton said.

Gary Fernquist, vice-president of Loomis Sales, Inc., an investment counseling firm that had considered evaluating Imnet's products, said he wasn't surprised by the venture's demise. "They had a lot of competition and, in reality, were selling futures," he noted. "Their system would have cost plenty of money, and from what I hear, there were some questions about management's ability to make decisions."

Although rumors had persisted that Imnet was in trouble, the Merrill Lynch spokesman said neither partner had sought to bring another corporate investor into the partnership. "We were trying to market to other brokerage houses and institutions," the spokesman said, "not bring in other partners."

An IBM spokesman would only say that both partners had explored various options to keep Imnet viable. He declined to say what those options were.

The 31 employees Merrill Lynch and IBM had contributed to the venture will rejoin their respective firms. Approximately 230 unattached workers will be laid off, receiving a severance package including salary and benefits through May 8.

Imnet's assets will be divided between the partners, both firms said. The software Imnet used will revert back to Merrill Lynch, where it was developed, the firm noted.

The Merrill Lynch spokesman said the firm has not determined how it will use its technology. It had intended on using Imnet systems internally for its 10,000 account executives. Merrill Lynch currently uses Quotron Systems, Inc.'s financial information services under an agreement that runs until 1988.

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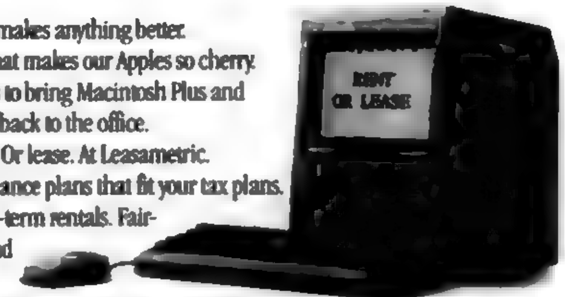

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Apollo plans to enter AI arena

By Rosemary Hamilton

CHELMSFORD, Mass. — Intending to make a major push into the artificial intelligence arena — an area recently targeted by major workstation vendors — Apollo Computer, Inc. last week inked pacts with two of the dominant players in the AI software market, Teknowledge, Inc. and Intellicorp.

The agreements call for Apollo and the software vendors to jointly market systems based on the full range of Apollo hardware. Teknowledge is scheduled to provide its S.1 and M.1 software, and Intellicorp is slated to offer its Knowledge Engineering Environment product.

Olivetti licenses Orion facility

From page 122

LU6.2 and PU2.1 peer-to-peer communications packages that would enable Olivetti systems to participate as peers in a Disoss network.

Olivetti, the second largest computer supplier in Europe, is the second European manufacturer to license Orion's IBM Systems Network Architecture-based software. Orion announced a similar contract with Philips International in the Netherlands last September. Orion's other clients include Apple Computer, Inc. and Banyan Systems, Inc.

MERGERS AND ACQUISITIONS

AT&T and **Ford Aerospace & Communications Corp.** announced that AT&T had agreed to acquire 100% of the stock of a Ford Aerospace subsidiary, the **Ford Aerospace Satellite Services Corp.** (FASSC), for $2.7 million in cash and other considerations.

Concurrently, the two companies asked the Federal Communications Commission to transfer to AT&T an authorization held by FASSC to build, launch and operate two new communications satellites. FASSC has held the authorization since July 1985.

■

Unisys Corp., the merger of the former Sperry Corp. and Burroughs Oorp., and **Hercules, Inc.** announced that **Hercules Aerospace** will acquire the Sperry Microwave and Systems Support Operations of Unisys for $42 million in cash.

Located in Clearwater, Fla., the Sperry operation is a supplier of guidance systems, certain electronic warfare products, automatic test systems and other specialized systems based on radio frequency technology. The Microwave and Systems Support division currently employs approximately 1,000 workers.

■

Ross Systems, Inc. and **Virtual Microsystems, Inc.** in Berkeley, Calif., announced that they are merging the two companies to form **Rossdata Corp.**

Rossdata, with estimated combined sales of more than $17 million, will concentrate in Digital Equipment Corp. VAX applications and services software as well as VAX-to-IBM Personal Computer communications products. Both firms will continue to exist as operating companies, while Rossdata will provide overall management support.

■

Intel Corp. and **Memtech, Inc.** have signed a letter of intent outlining the sale of Intel's magnetics operation to Memtech.

The letter of intent details an agreement whereby Memtech, a recently formed company, may buy certain assets and inventory related to Intel's magnetic bubble memory business for an undisclosed price.

In October 1986, Intel announced that it would phase out the magnetics operation, responsible for the company's bubble memory product line, as the company focused on other product technologies.

■

Baron Data Systems Co., a supplier of computer systems for the court reporting, medical and legal markets, signed a letter of intent to purchase **Software Technology, Inc.**, a Lincoln, Neb.-based developer of the software package Tabs III.

The purchase expands Baron's ability to penetrate the microcomputer-based legal systems market.

Software Technology is a vendor of microcomputer software systems for law offices. Currently, the company has more than 2,200 installations.

■

V-Band Systems, Inc. has agreed in principle to acquire **CP International, Inc.** and its U.S. and UK subsidiaries, suppliers of video and digital switching systems to the financial service industry, for approximately $8 million cash plus an additional contingent amount based upon CP International's financial results for the year following the acquisition.

■

Zentec Corp. announced that it has sold its service and maintenance operations to **Dow Jones & Co.** for an undisclosed cash price.

Zentec's service operations include the service and maintenance operations of the data products division of Lear Siegler, Inc., which was recently purchased by Zentec.

As part of the transaction, Zentec and Dow Jones have signed a five-year agreement under which Dow Jones, which provides maintenance on a wide range of electronic equipment through 76 service centers across the country, will continue to provide warranty and maintenance service for Zentec products.

Santa Clara, Calif.-based Zentec designs, develops and markets intelligent terminals for OEMs and systems integraters.

■

Genicom Corp. has announced that an agreement has been reached with **Televideo Systems, Inc.** to acquire the printer-related assets of Televideo System's daisywheel business unit.

The transaction will be made for approximately $3.24 million, payable to Televideo over five years.

Also, royalties that could exceed $1.2 million during the five-year period will be paid to Televideo for printers that are sold above a stipulated base amount for each of the five years.

■

Southern Net, Inc. announced that it has entered into a merger agreement with **Mid-Atlantic Telecom of Virginia, Inc.**

Under the terms of the proposed merger, Mid-Atlantic would merge into **Southern Net Services, Inc.**, a wholly owned subsidiary of Southern Net.

Mid-Atlantic, a privately held corporation, has been a supplier of long-distance telecommunication services to companies in Virginia since 1984.

■

Jefferson-Pilot Data Systems (JDS) in Charlotte, N.C., and **Data Communications Corp** (DCC) in Memphis, announced that DCC would be acquired by JDS.

JDS, a division of **Jefferson-Pilot Communications Co.**, develops and markets in-house computer systems for radio and television.

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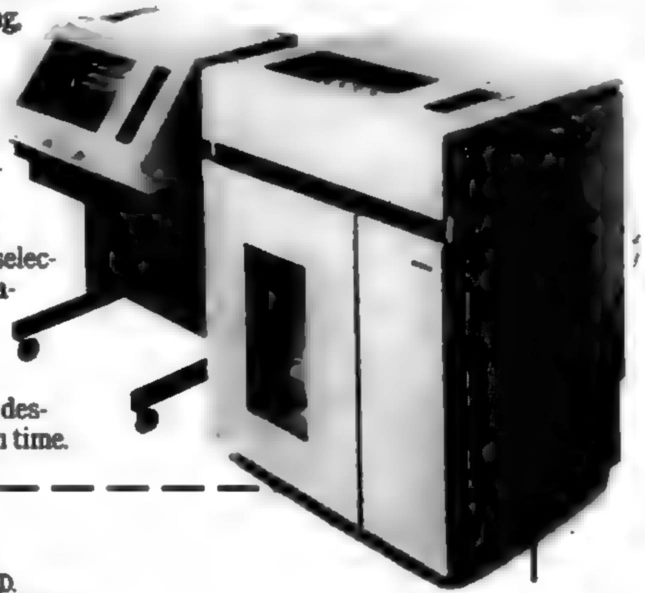

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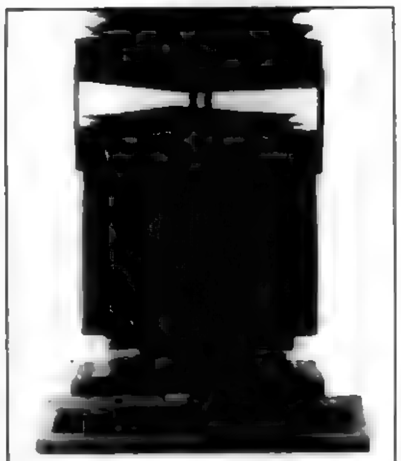

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EXECUTIVE CORNER

ADAPSO, the computer software and services industry association, has elected officers and directors for 1987. **Jay Goldberg**, chairman and chief executive officer of New York-based Money Management Systems, Inc., will be chairman of the ADAPSO board of directors.

David Eskra, vice-chairman and CEO of Pansophic Systems, Inc., will serve as vice-chairman. **John Courtney**, president of Computer Task Group, Inc., will serve as treasurer.

■

NCR Corp. announced the appointment of **R. Elton White** and **Gilbert P. Williamson Jr.** as executive vice-presidents and the appointment of **Warren A. Castay** as vice-president, Pacific Group. In addition, **Manuel Garcia**, executive vice-president and member of NCR's Executive Office, is retiring effective Aug. 1, 1987.

■

Control Data Corp. named three executive vice-presidents in a senior management realignment. **Thomas C. Roberts**, formerly president of Schlumberger Ltd.'s Fairchild Camera and Instrument Corp. unit, was named vice-president in charge of mainframes. He succeeds **Larry E. Jodsaas**, who becomes senior vice-president of quality and operations review. Jodsaas succeeds **Henry J. White**, who will retire in March. Also named vice-presidents were **Lawrence Pearlman** and **David P. White**.

■

Ronald L. Skates has been elected senior vice-president of finance and administration for Data General Corp. Skates replaces **Kenneth V. Jaeggi**, who left to pursue other business opportunities.

■

Grid Systems Corp. announced the election of **John P. Morgridge** to the new post of president and chief operating officer. He will also join Grid's board of directors. Previously, Morgridge served as senior vice-president of marketing at Stratus Computer, Inc.

Samuel J. Wiegand, Grid's present chairman and president, will continue as chairman and chief executive officer of the company.

■

Teradata Corp. has appointed **Kenneth W. Simonds** chief executive officer. Previously, Simonds shared the chief executive duties with **Jack E. Shemer**. Shemer will now support corporate programs for financing, investor relations, strategic allowances and planning.

■

Autographix, Inc., a developer and manufacturer of presentation graphics systems and software and imaging services, announced the appointment of **Ken Draeger** as president and CEO. He is replacing **Thomas H. Conway**, who has served as interim CEO for six months. Draeger formerly served as chairman and CEO for Computer Corporation of America.

■

Mark Morley has joined Encore Computer Corp. as vice-president of finance, chief financial officer and treasurer. He is an attorney and CPA and will act as legal counsel to management.

■

Roger A. Philips, president of Transform Logic Corp., has resigned to pursue other interests. His CEO duties will be assumed on an interim basis by a three-man executive committee consisting of Chairman **Garrett P. Melara**, who will also be appointed president, **Jan C. Koontx**, who will serve as chief operating officer, and **Thomas K. Yerkes**, who recently joined the company as vice-president of finance and administration.

■

James R. Risher has been named president and CEO of Exide Electronics Corp. in Raleigh, N.C. Previously, Risher served as senior vice-president and head of distribution operations at Motorola Computer Systems, Inc.

■

Tandem Computers, Inc. announced the promotions of **Robert F. Hoogstraten** and **Gerald D. Held**. Hoogstraten, former regional director in northern Europe and managing director for Tandem Computers Holland, was elected corporate vice-president and managing director of Tandem Computers Europe. Held, who was formerly director of new ventures, was elected corporate vice-president of new ventures.

■

Albert W. Moulton has been named president of Skok Systems, Inc. Moulton will take charge of Skok's corporate administration, concentrating on fortifying Skok's dealer distribution program.

■

James E. Williams, former vice-president and treasurer of Syntex Corp., has joined Masstor Systems Corp. as senior vice-president and chief financial officer and will become director of the company. He is replacing **Richard P. Beck**, who is resigning to pursue other business interests.

■

Rand Information Systems, Inc. announced that it has retained **Texas Infinity Corp.** to assist in restoring Rand to profitability. **F. Richard Sleavin Jr.** of Texas Infinity will become acting president and CEO of Rand, reporting to its board of directors.

Ashton-Tate sues Migent

From page 122

dence that was developing, we thought it was necessary for us to take legal action in this case," said Luther Nussbaum, president of Ashton-Tate. Nussbaum declined to comment on what evidence was obtained or whether physical aspects of technolgy or product concepts were involved.

Migent disagreed. "There is no merit to the lawsuit. Ashton-Tate is a large company that is trying to hold on to their customer base," Gritzmaker said.

Historically, such suits have often been attempts by one firm to delay the entry of another into a particular market, observers noted, and are especially common in the computer industry because time to market is so crucial to a product's success.

Nussbaum denied that delaying a Migent product introduction was a key goal of the suit but admitted the suit does not refer to any products currently marketed by Migent.

Ratliff said he believes Ashton-Tate will succeed in delaying the introduction of Emerald Bay. "I think they are going to be successful. It is going to take a lot of my time talking to lawyers, making statements, gathering information," he said.

When Ratliff left Ashton-Tate, he sold the Dbase technology to Ashton-Tate and had signed a three-year noncompete clause that expired last September. "In my own mind I carefully abided by the agreement," Ratliff said.

According to Ratliff, Ashton-Tate is determined to ward off any competition. "Ashton-Tate would always get extremely paranoid when a new competitor would enter the market," he said. "They would fly off the handle. When Ansa Software Co.'s Paradox came out, they were just panic stricken. I think the same thing is true with the product that I am working on now."

Codefendant in suit

Queue Associates, Inc., a Pacific Grove, Calif., consulting firm that designed software for Ashton-Tate, is a codefendant in the suit with Migent.

The charges against Queue are unclear. "Their principals were working under contract for development for Ashton-Tate at one time. Those products were never brought to market and are completely owned by Ashton-Tate," Nussbaum said.

He declined to comment on what Queue was developing for Ashton-Tate.

Queue principals could not be reached for comment. According to Migent, Queue is no longer in business.

Unisys withdraws from MCC

From page 122

not acquired.

At the end of 1985, BMC Corp., Mostek Corp. and Gould, Inc. announced their departures from MCC. Mostek sold its share to Westinghouse Electric Corp., BMC sold to Hewlett-Packard Co. and Gould has not found a buyer, Stotesbery said.

The departure of Unisys and others will have no effect on MCC's $75 million 1987 budget, Stotesbery added. He said the departures represent change in the industries in which those companies compete and not dissatisfaction with MCC.

"Support from shareholders has been quite good, as we have raised the MCC budget from $65 million to $75 million," he said.

In an unrelated matter, Joseph Boyd, chairman of the board at Harris Corp., became MCC's interim chief executive officer effective Jan. 1. MCC's five-member committee is continuing its search to replace retired Adm. Bobby Inman, who chaired the fledgling consortium.

Stotesbery would not comment on potential candidates for the position. Inman announced in September that he would be leaving MCC [CW, Sept. 15]. His last day was Dec. 31.

COMPUTER INDUSTRY

Inside buyers bid on firm's subsidiaries

By James A. Martin

NORCROSS, Ga. — Intelligent Systems Corp., which announced last fall it would sell its subsidiaries in an effort to increase the stock value of the company, has found several suitors from within the company.

Intelligent Systems directors and shareholders recently approved the sale of Intecolor Corp., a minicomputer graphics terminal manufacturer, to Intecolor's management and employees.

The transaction, valued at $13 million, is composed of cash, notes and the sale of Intelligent Systems stock by Intecolor employees back to Intelligent Systems.

In addition, the management of Peachtree Software, Inc. is said to be negotiating to buy that subsidiary from Intelligent Systems. Peachtree Software, which specializes in microcomputer software for small businesses, was purchased by Intelligent Systems from Management Science America, Inc. in 1984. Although Peachtree President William Goodhew confirmed that negotiations were ongoing, he would not elaborate.

Intelligent Systems announced last fall that it would be up for sale [CW, Oct. 6], and the company hoped to liquidate some assets before existing tax credits expired on Dec. 31. When that did not materialize, the company restructured itself as a master limited partnership to take advantage of new tax laws regarding the transfer of assets.

Intelligent Systems was formed in 1973 to sell minicomputer graphics terminals. After acquiring Quadram in the early 1980s, the company spun off that business into the newly formed Intecolor division, according to Charles Muench, an Intelligent Systems founder and Intecolor investor. Intecolor is now owned mainly by top management and outside investors. Some 20% is owned by the company's 170 employees through a stock ownership plan.

In a related development, Asher Technologies President and Founder Wil Riner has departed to start his own company after an unsuccessful bid to buy Asher from Intelligent Systems.

In the meantime, however, Intelligent Systems has secured a temporary restraining order to prevent Riner's new firm, The Network Connection, from directly competing against Asher.

Japanese firms make sobering '87 resolutions

By Takahisa Kondoh

TOKYO — Leading Japanese high-tech vendors have urged employees to pay strict attention to the bottom line in order to survive continuing economic strife in 1987.

In a series of New Year's addresses by top executives of computer and electronics firms, workers were told that their companies would emphasize a reduction in costs, product viability and drastic corporate restructuring to restore overseas profitability, which plummeted last year.

Many vendors predicted that their sales in foreign markets will remain sluggish for the first half of 1987, as it seems unlikely that the Japanese yen will soon drop in value against the U.S. dollar.

According to Katsushige Mita, president of Hitachi Ltd., a firm whose mid-year profits for 1986 slipped 55% from 1985 levels, "For Hitachi, 1987 has to be the year of comeback. We are looking for a new management culture and balanced overseas operations as well as learning to cope with the new foreign exchange climate."

Toshiba Corp. President Sugichiro Watari asked the company's 120,000 employees to focus on market-specific merchandising by increasing departmental collaboration. His goal is to boost Toshiba's domestic revenue share of markets including computers, communications gear and semiconductors to 50% from its present 33%.

Mitsubishi Electric Corp., rivaling Hitachi and Toshiba as a full-line electronics manufacturer, will reportedly overhaul its overseas manufacturing operations and augment its profitable divisions such as office automation equipment.

Hitachi, Toshiba and Mitsubishi have been forced to redistribute their work forces with new emphasis being directed at communications, office automation, software and integrated circuits.

Kondoh is Asian bureau chief of the CW Communications International News Service.

IBM's shifting service strategy

From page 122

particular. This will become the key mechanism for generating both revenue and profit directly from service, as well as for controlling market share.

IBM's service strategy is designed to both preempt new third-party maintenance organizations and defend against the existing manufacturing service organizations that are attempting to penetrate the network services market.

The best manifestation of IBM's new service strategy is the array of specific service plans and programs offered by IBM in 1986. Last spring, IBM began to roll out its Enterprise Strategy on a limited basis.

Integrated program

This involved a marketing approach to IBM's top 60 to 75 major accounts, offering them an integrated network service program supported by both IBM and Rolm Corp.'s knowledge and capability.

Under the Enterprise Strategy, a low-key, low-profile approach, IBM began to offer price discounts for bundled integrated network services.

The specific enterprise strategy was followed last summer by an offer of specific discounts for multiyear agreements. The effect of the multiyear approach was to lock in IBM service customers on a long-term basis by offering price discounts.

In October, 1986, IBM promulgated the Corporate Services Amendment (CSA), offering further discounts to customers who had installed a service management system in collaboration with IBM service.

This involved the creation of a network service coordination center and individual help desks. Organizations establishing such procedures and systems were offered significant price discounts.

The CSA created a centralized service procedure, under major customer account MIS control, that is highly oriented toward IBM service.

It further preempts third-party maintenance organizations from attempting to penetrate an IBM-controlled service base, since the independent cannot make use of the IBM help desk.

A deep discount

At the bottom line, IBM has created a deep service price discount of up to 40% — particularly for IBM Personal Computers on a stand-alone or network basis in large corporations.

Since IBM generally provides little service to micros, these major price discounts have a much greater economic impact on IBM's third-party micro service competitors than on IBM directly.

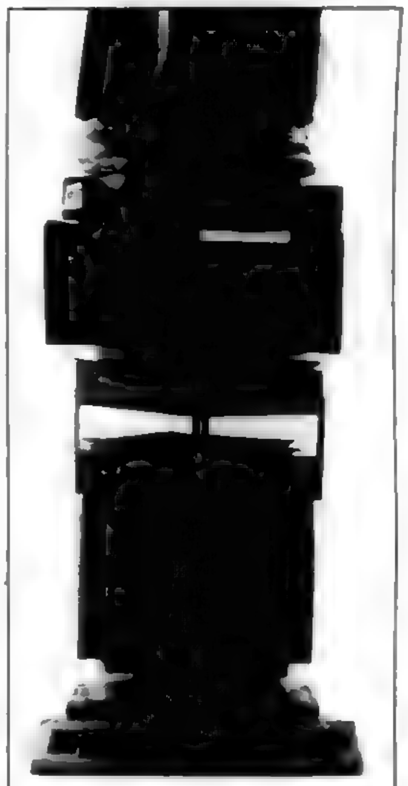
IBM has announced even more service price and quality improvements to be expected this spring and summer. Many corporate customers are eagerly awaiting these announcements before making any major service commitments to other vendors.

As IBM has proven before in other market segments, as a market becomes larger and the competition more aggressive, IBM can move strategically, with a sophisticated marketing and pricing approach, to take market control.

For IBM's competitors in service, the window of opportunity that existed at the start of the decade is now beginning to close.

If the independent service market is going to keep up competitively, then only sophisticated marketing and pricing approaches will prevail. Those service organizations that have attempted to survive and grow with a simple sales approach are now at great risk.

Every major service organization should seriously evaluate its business and marketing strategy and marketing and sales support plans in light of the new IBM service strategy.



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The most advanced personal

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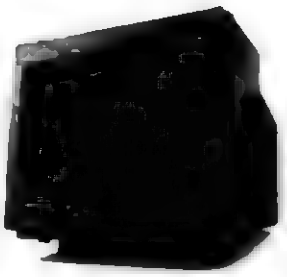
advanced-technology computers

hardware and expansion boards already available. But the chip is only the beginning of this story.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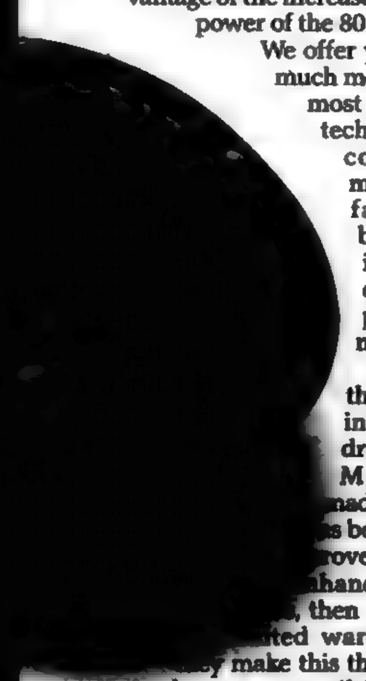

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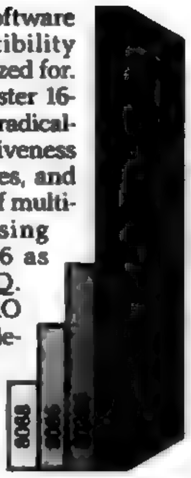

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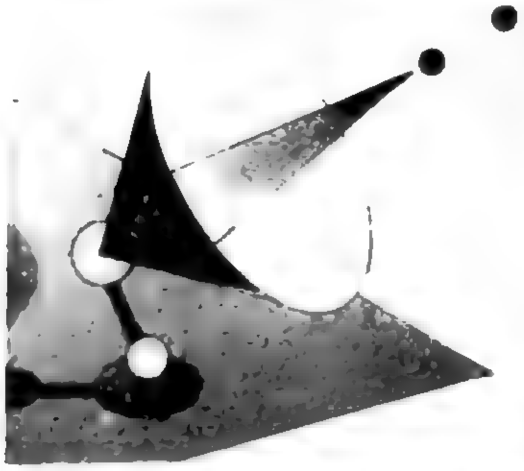

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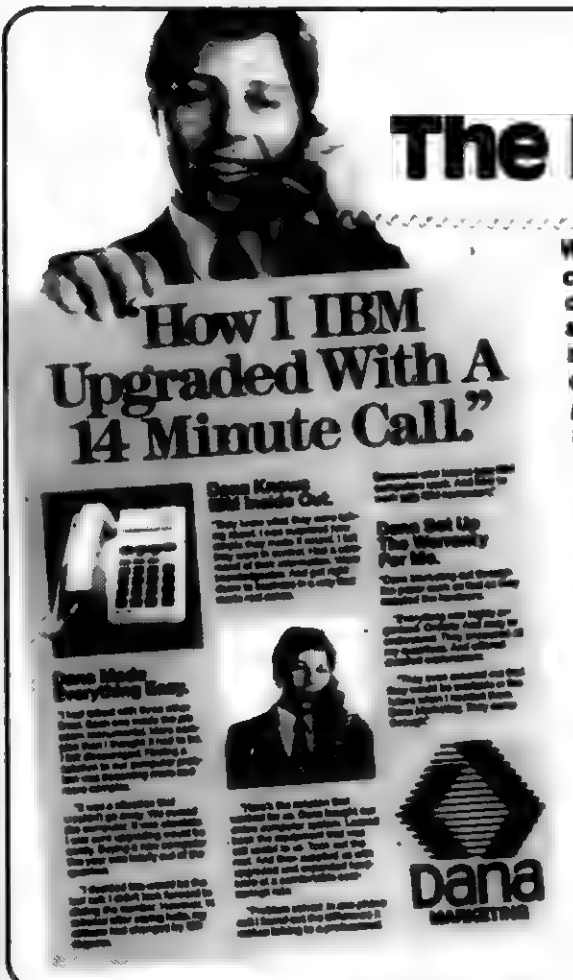
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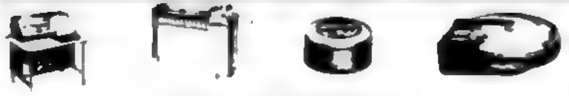

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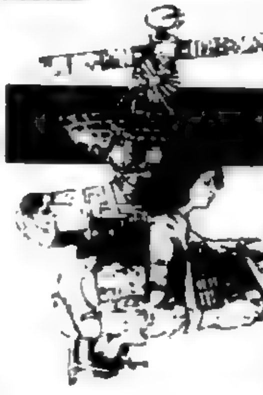

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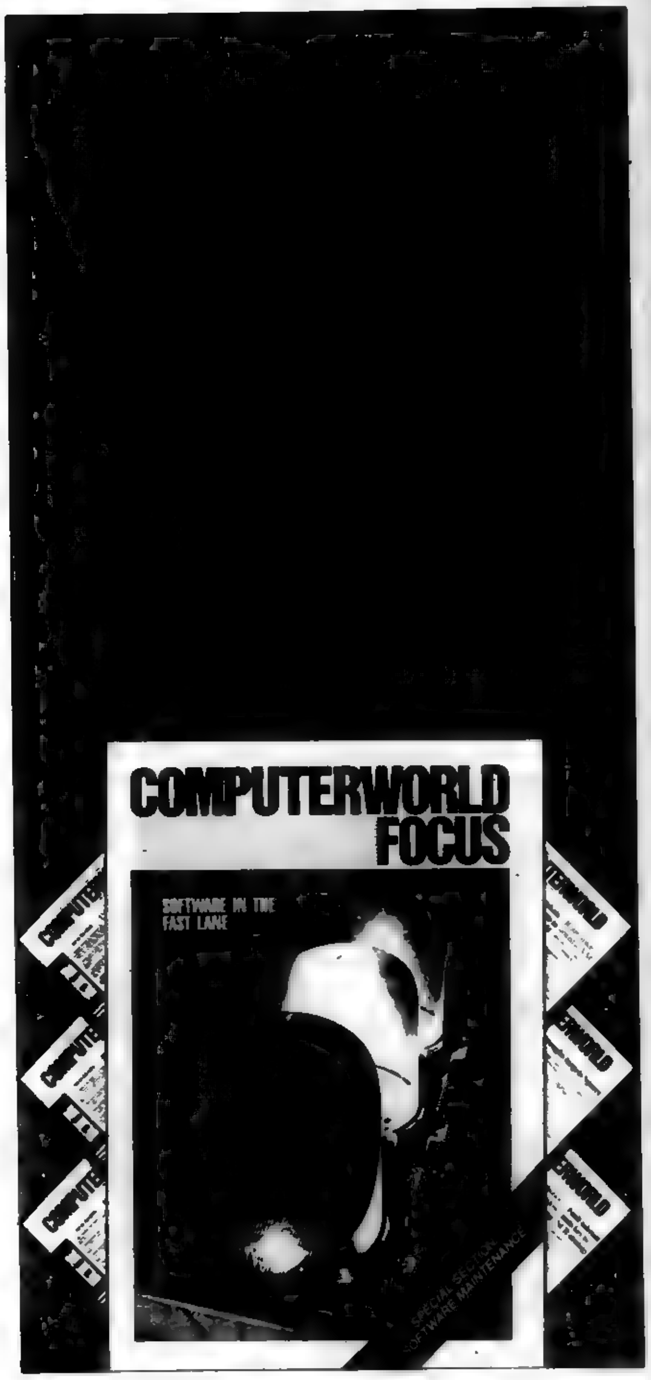

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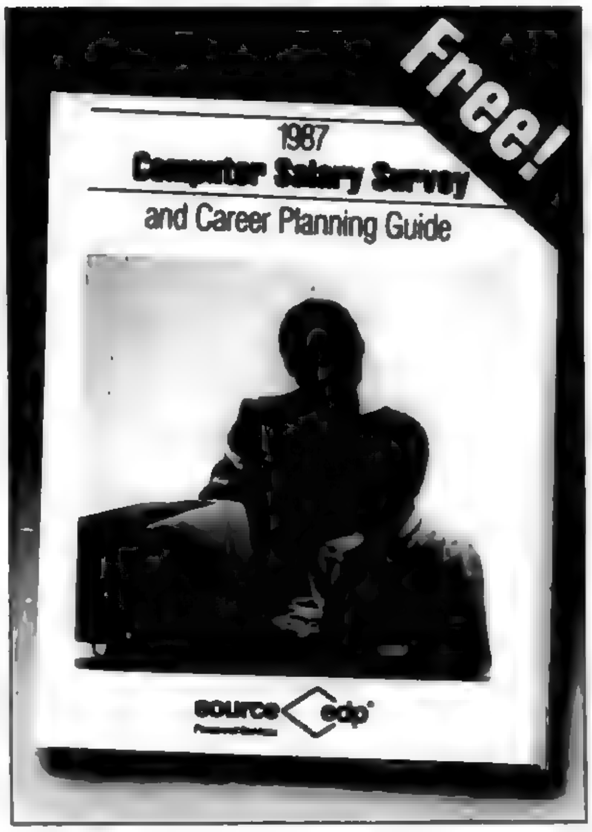

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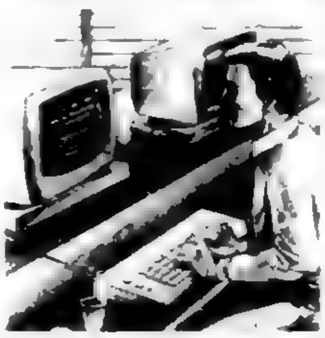

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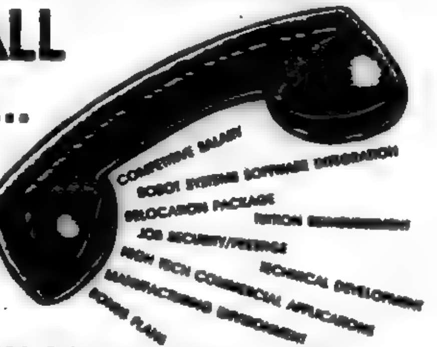

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Foreign Editorial/Sales Offices

Argentina: Ruben Argento, CW Communications S/A, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-5583. Telex: (390) 22644 (BAZAN AR).

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ADVERTISERS INDEX

ADR	3
AI '87	98
Artificial Intelligence	85
AT&T Information Systems	66-67,78-79,90-91
Ausdata USA	68
Bendata	40
BMC Software	54
Business Recovery Systems	13
Cambex	56
Canaan Computer	22
CDI Information Systems	75
CGI Systems	28
Chipcom	60
Cincom	48-49
Comm Systems	86
Communications Networks '87	106
Compaq	104-105
Concurrent Computer	18
Cullinet	62-63
CW Circulation	59
CW Focus	81
CW Testimonial	118
CXI	76-77
Data Base Management Inc.	99
Data General Corp.	30-31
Data Language	74-75
Datalex	99
Digital Communications Associates	44-45,96-97
Digital Services Corp. Ltd.	13
Emergency Power Engineering	52-53
Fischer Innis Systems	25
Fujitsu	94-95
Hewlett-Packard	[illegible]-89
H&M Systems Software	123
IBM	32-33
Innovation Data Processsing	7
Landmark Systems	58
Lawson Associates	38-39
Leasametric	100
LINC Systems	8
Lotus Development Corp.	70-71
Michaels Ross & Cole, Ltd.	32
MicroFocus	87
Microsoft	80
NEC	34-35
North Ridge Software	84
Novell	92-93
On-Line Software International	26-27,102-103
Oracle	11,37
Printronix	101
Quadram	36
Rapid Systems Development	10
Realia, Inc.	14
Relational Technology	24
RSD America	15
SAS Institute	20-21,29
Seiko	46-47
Simware	50
Software Engineering of America	[illegible]
Software House	40
SouthWest Software	6
SQ Software	33
Syncsort	5
Systems International	87
Tandon Computer	51
Technologic Software Concepts	23
Televideo	64
Triangle Software	61
Unicom Systems	65
Universal Data Systems	72
Van-Tel	124
Walker Interactive	69
Westinghouse	12
Windleaf	68
Wyse	82
Xerox	10

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Wang posts loss: cuts salaries, jobs

From page 1

and shipment schedules. While users have generally praised Wang's hardware, they have traditionally given the company low marks for service and support. And the firm's sales force has been criticized for high turnover and inexperience.

"They have not matured as a DP company," said Sam Davis, senior DP staff member of Henley Paper Co., a VS 300 user in Greensboro, N.C. "They tried to go too far into DP before they were ready. For example, we have had five different Wang salesmen in three years, and only the first one had any previous experience with Wang systems. I think Wang will be around for the long-term, but I would doubt whether they will have the DP market share they want."

In addition to its expense reductions, Wang moved last week to shore up its reputation in two areas where it has been considered weak: sales and service. In sales, the company will increase its worldwide sales force by 25%, but some expressed skepticism about that solution. "Adding people doesn't gain them familiarity with the product line," Davis said.

Doretti noted, however, that the Wang sales force will adopt a new approach under Ian Diery, the newly named head of U.S. operations. "Our salesmen will become more of a consultant, business partner type of person," he said. "We realize that hardware has become much more of a commodity."

In service, more responsibility will be shifted to Wang's six U.S. regional offices to be more closely coordinated with the sales force. In addition, the coordination of replacement parts distribution at the firm's Lowell headquarters will be consolidated with the distribution of systems, resulting in the elimination of 200 jobs.

Wang laid off 1,600 employees in June 1985 and reduced its work force by a comparable number in 1986 through attrition and retirements. But a reduced cost structure has not translated to much improvement at the bottom line.

After earning a modest $50 million in fiscal 1986, Wang lost $30 million in the quarter ended Sept. 30 and will report a loss of about $35 million in the most recent quarter, the company said last week. Analysts estimate that Wang will not return to profitability until its fourth fiscal quarter and is likely to report its first-ever annual loss in fiscal 1987.

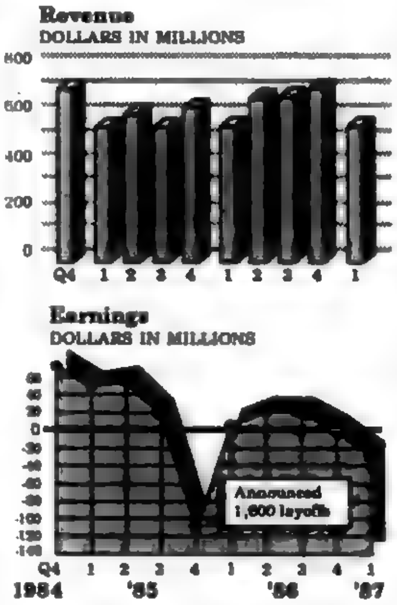
"Fortune 1,000 companies have Wang for word processing, but the MIS attitude is that they will stay off in that corner," said George Colony, president of the Forrester Research, Inc. consulting firm in Cambridge, Mass.

In his less than two months as president, Fred Wang has taken several major actions, including a realignment of sales executives as well as last week's work force cuts. Even with cost savings, however, most observers and users say the company faces an uphill struggle.

"Credibility with the MIS director is still tough for anyone who's not IBM; Digital Equipment Corp. is making some inroads, but Wang is not," said Mark Hayward, a Houston-based Coopers & Lybrand office systems consultant who has worked with several large Wang users, including Tenneco Corp.

MITCHELL J. HAYES

Wang financials



CW CHART

"We've had a lot of start-up problems with Wang, but we like most of their products," said Walt Jenison, chief of the information systems branch of the Tennessee Valley Authority, which recently signed a potential five-year contract extension for up to $57.9 million. "We've got some apprehension as to whether Wang will maintain currency. IBM has a deep pocket, but the question is, How deep is Wang's pocket?"

Wang to unveil VS 150

LOWELL, Mass. — Wang Laboratories, Inc. reportedly is set to announce what shapes up as a replacement for its mid-range VS 100 superminicomputer.

The introduction, scheduled for Wednesday, is expected to center on what has been known during development stages as the VS 150. Wang also is expected to announce enhanced software programs.

However, observers also speculated that Wang plans to introduce a new nomenclature for its higher performance systems by [illegible] the VS 100 and VS 300 in the new VS 7000 family. That would help to differentiate the VS 7000 from the older and smaller VS systems, which use different architectures than the VS 150 and VS 300.

The VS 150 is said to provide more power than the [illegible] VS 100, which observers have rated at 1.1 million instructions per second. One analyst said the VS 150 will be suited for customers who need to support [illegible] users but who do not need the power of a VS 300.

— [illegible]

Soothsayers list full menu of IBM PC products in 1987

By David Bright

In terms of personal computer announcements, IBM will be busy in 1987.

Among the computer giant's expected introductions are a low-end replacement for the original PC, a faster PC AT system and a next-generation workstation, all of which could have extra built-in functionality such as graphics and communications capabilities.

"It's been two years since they introduced anything reasonably significant, and I think you're going to see a lot of activity from them" in 1987, says Gibbs Moody, an analyst with Gartner Group, Inc. in Stamford, Conn.

The first item on IBM's agenda appears to be a small, low-end Intel Corp. 8086-based PC, which most observers say will be targeted for the home and educational markets. IBM's severe PC XT price reductions to dealers earlier this month indicate that "the new low-end 8086 machine is certainly coming soon," according to Aaron Goldberg, vice-president of microcomputer services at International Data Corp., a Framingham, Mass.-based market research firm.

The new system will be priced in the $1,200 to $1,400 range, Goldberg says. While this price is still considerably higher than many clones, Goldberg says the unit will contain built-in extras such as a color graphics adapter and as much as 1M byte of random-access memory.

IBM is generally expected to announce a 10MHz 80286-based AT system in the first quarter.

Some analysts note that IBM will probably use application-specific integrated circuits to reduce the size and manufacturing costs of the new AT. Clare Fleig of International Technology Group in Los Altos, Calif., says that the system will likely contain fewer add-in slots because more functionality will be built into the motherboard. As a further space savings, the system might also incorporate 3.5-in. floppy disk drives, Fleig says.

Fleig and many observers peg the price of the new AT at about $4,000. IBM's XT Model 286 and entry-level AT price reductions of last week — from $3,995 to $3,395 — would seem to make room for such a system.

Many IBM watchers are convinced that Big Blue will further respond to corporate America's demand for faster systems by introducing an Intel 80386-based PC system this year. This is a topic of much debate, but Tim Bajarin of Creative Strategies Research International in Santa Clara, Calif., argues that IBM has no choice because of the corporate world's "insatiable appetite" for more speed.

On the other hand, John Rutledge at Dillon Read & Co., New York, maintains that IBM's next-generation workstation, due in the first half of this year, will not use the 80386 as its main processor. Instead, he says, the system will be centered around proprietary hardware and a proprietary operating system with an emphasis on connectivity.

"The whole purpose of the offering will be to enhance the power of the MIS director again," Rutledge says.

Andy Seybold, president of The Seybold Group, Inc. in Torrance, Calif., agrees that IBM will use connectivity in an attempt to set itself apart from the clones and that "the 386 AT is not going to happen" in 1987.

For the long term, many observers say they would not be surprised to see IBM offer a version of its VM operating system for a 32-bit microcomputer system, but Moody and others say that is not likely to happen this year.

It is generally expected that IBM will add some proprietary features to the forthcoming multitasking version of PC-DOS, but Microsoft Corp. has given no timetable for the new DOS.

In line with its connectivity thrust, IBM will move toward putting LU6.2 and Token-Ring interfaces in firmware, observers say.

Seybold expects IBM to improve its Token-Ring network and perhaps bring out a faster network as well.

Esber: IBM OS going proprietary

By Alan Alper

NEW YORK — IBM will embrace a proprietary operating system in its next generation of microcomputers as part of a strategy to strike back at personal computer-clone vendors, according to Edward Esber, chairman and CEO of Aston-Tate.

Speaking to the New York Society of Security Analysts last week, Esber said market-share gains made by PC clones and IBM's collaboration with Intel Corp. on custom circuitry lead him to believe that a proprietary operating system cannot be too far behind.

"I firmly believe IBM will go proprietary," he said. "There will be communications and graphics capability built into the box to take it from a commodity to a higher margin product."

Esber said that while a proprietary operating system would have distressed the microcomputer industry a year ago, today there appears to be an impetus for a non-IBM Personal Computer standard. "There is no question IBM has been slow to innovate," he said. "If companies like Tandy Corp. and Compaq Computer Corp. endorse a second standard, I believe there will still be a viable industry not tied to IBM's coattails."

Ultimately, IBM, like Digital Equipment Corp., will have one operating system spanning its micro, mini and mainframe computer lines, according to Esber . "If you ask any MIS manager today, he'd tell you he'd like one operating system for mainframes through micros," he said. But, he added, "If you have one operating system for the PC through the 3090, there would be too many compromises."

Cullinet Software buys PCI

Pays $4.3 million in cash for small company

By Clinton Wilder

WESTWOOD, Mass. — Cullinet Software, Inc. last week acquired Planning Control International, Inc. (PCI), a small developer of project management applications targeted at the government contract manufacturing market.

Cullinet will pay $4.3 million in cash for the firm.

PCI's main product is Easytrak, a project management package initially developed for the Digital Equipment Corp. VAX computer line. It has recently been ported to IBM mainframes and specially equipped IBM Personal Computer ATs and XTs.

Easytrak is used by about 50 customers in manufacturing and government contracting.

Wholly owned subsidiary

Privately held PCI, based in Newport Beach, Calif., employs 40 people and recorded approximately $4 million in sales in 1986. PCI will operate as a wholly owned Cullinet subsidiary, and PCI President Michael Sippie will report to new Cullinet President George Tamke.

According to Cullinet, PCI's products will complement Cullinet's Contract Tracking and MRPII software for manufacturing planning and control.

PCI's other products are Easybids, a pricing and scheduling application, and Performance Management System. Performance Management System compiles government-required information for Easytrak.

Microrim CEO Johnson quits; Marketing VP Hull takes helm

By Peggy Watt

REDMOND, Wash. — Kent Johnson resigned last week after nearly five years as president and chief executive officer of microcomputer data base developer Microrim, Inc. for other, unspecified business pursuits.

Succeeding Johnson is David F. Hull, Microrim's vice-president of marketing for the past nine months.

Also promoted by the board of the privately held firm was Joseph L. Silva, to executive vice-president and chief operating officer. Silva will retain his post as Microrim's chief financial officer.

Hull said Johnson's departure was a surprise, adding that the departure was amicable and that the former CEO will remain as a part-time consultant to Microrim.

Will explore new ventures

Hull said Microrim will explore several new ventures under his leadership, including the role of software publisher for outside developers and forays into other applications besides data bases.

"You never know when the next software category is going to be born," said Hull, who mentioned project management and graphics applications among Microrim's potential interests.

He said Microrim will also look upward to larger CPUs for both new programs and connectivity for its existing Rbase product line.

Hull came to Microrim from Ashton-Tate, where he was director of product marketing for data base products.

First micro venture

Microrim was Johnson's first microcomputer venture, and he was its seventh employee, according to company records.

The Seattle native is a Certified Public Accountant and a former manager in the management consulting division of Arthur Andersen & Co.

Microrim founder Wayne J. Erickson remains company chairman.

Prize offered to developer

SAN FRANCISCO — PCW Communications, Inc. has announced the first Andrew Fluegelman Award, a $5,000 cash prize to be awarded to the developer of innovative and significant personal computer software.

Any micro software product that was developed by an individual or team and that was released between 1983 and 1986 will be considered eligible.

Nominations, which may include utilities, applications, languages or other software packages, may be submitted by anyone who did not participate in the development of the product.

Vendors may nominate products they market but must nominate the developer or development team, not the company.

Judgment criteria will include advancement of personal computing, concept and design innovation and level of orientation to the user.

Nominations must be postmarked by Feb. 1. The winner will be announced in March.

The award will be given in honor of Fluegelman, the late developer of PC Talk, which was the first powerful, easy-to-use communications program for the IBM Personal Computer.

Nomination forms can be obtained by writing to Andrew Fluegelman Award, PCW Communications, Inc., Suite 600, 501 Second St., San Francisco, Calif. 94107.

Analysts hold moderate expectations for stocks

ACTIVE ISSUES
Kathy Porteus

Because an upturn in domestic demand continues to elude the overall computer industry, analysts hold only moderate expectations for technology stock performances this year.

"If we keep going through this sloppy business environment, investors will be hard-pressed to find winners in the minicomputer sector," says Thomas McCrann of Merrill Lynch & Co.

McCrann says stock selectivity remains the watchword. He suggests looking for companies with effective cost-reduction programs and, optimally, with development of new product lines. "The key is finding stocks where fundamentals have improved but the stocks have not."

At this time, McCrann says he favors Apollo Computer, Inc. (APCI — 17¼) because its technical workstation business has begun improving and Wang Laboratories, Inc. (WANB — 11¾) because investor expectations are so low that much of the risk has been removed from the stock.

According to Michael R. Weisberg, director of research with Robertson, Colman & Stephens, this year investors should look for opportunities in the markets for technical workstations, vector processing, local-area networking and low-end commercial systems.

Weisberg says he believes stocks of niche utility software and niche semiconductor companies should also perform well. What makes these technology sectors attractive, Weisberg adds, is that their improving fundamentals have set the stage for strong earnings momentum among well-positioned players.

Paul Johnson, semiconductor analyst with L. F. Rothschild, Unterberg Towbin, agrees that smaller, niche-oriented semiconductor companies will "probably get to strut their stuff" this year. Johnson cites Integrated Device Technology, Inc. (IDTI — 10⅛) and LSI Logic Corp. (LLSI — 11¼).

Johnson says he expects the semiconductor industry to grow between 5% and 10% this year, barring any big swings in inventory. "This represents a stable growth year in which the best-managed companies will have the chance to excel, whereas those firms with weak management will not have the market to save them."

Another Rothschild analyst, Frederic Cohen, suggests that the strong performance in 1986 among low-end computer and software stocks may begin spreading to the rest of the computer group this year. "It looks as though a recovery cycle in the computer group is underway, and we are playing the low-end companies now because they are the first to show improvement in their business," Cohen says.

"But broad-based investing in technology will still not be attractive," says Fran Saldutti, who recently moved from Gartner Securities to L. F. Rothschild. "Areas that pick up in 1987 will do so because of new product cycles," he adds.

Although investors this year face basically the same issues of stock selectivity that existed throughout 1986, they now also face the effects of a changing business climate in Europe. According to Weisberg of Robertson, Colman, companies serving foreign markets will see that portion of their business worsen as the year progresses.

But the overall earnings performance of computer companies this year will not be materially different from that of 1986, Weisberg estimates.

Nevertheless, the timing of this upturn in domestic demand is uncertain enough to cause some analysts to hold back stock recommendations. As Merrill's McCrann says, "check back with me in three or four months."

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Comdisco unit loses $22M

By Clinton Wilder

ROSEMONT, Ill. — Comdisco, Inc. said last week it will report sharply lower earnings in the quarter ended Dec. 31 because of a substantial loss from its risk arbitrage subsidiary, Comdisco Equities, Inc.

The independent computer-leasing industry leader said it will report a profit of 15 to 20 cents per share for the first quarter of fiscal 1987.

In the year-earlier quarter, Comdisco earned 57 cents per share, or $23.5 million, on revenue of $225 million.

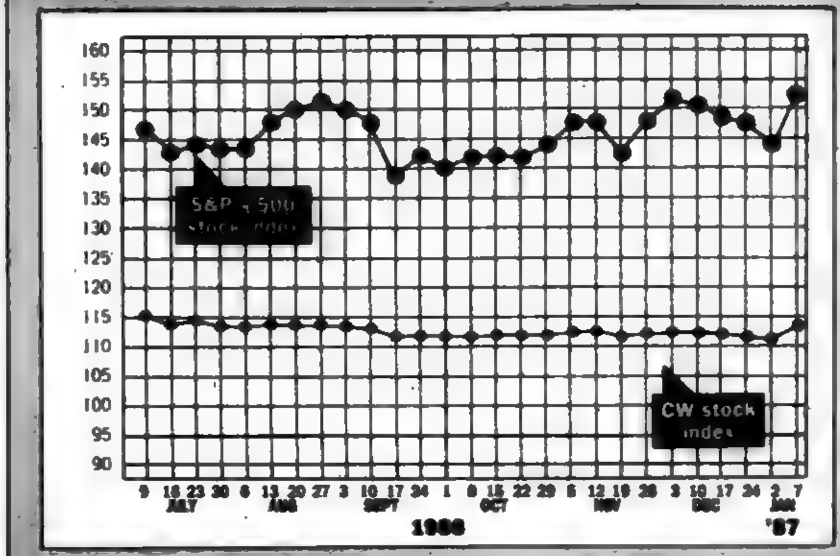
Comdisco Equities incurred a $22 million pretax loss, which constituted 14% of its invested equity, during the quarter.

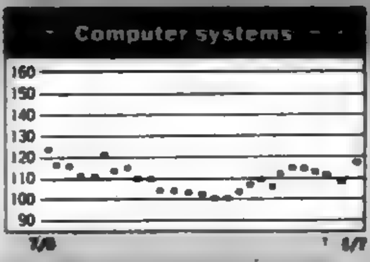
Comdisco Chairman Kenneth Pontikes said the loss was directly attributable to the plunge in risk arbitrage stocks after the Securities and Exchange Commission charged arbitrageur Ivan Boesky with illegal insider trading. This charge came on Nov. 14.

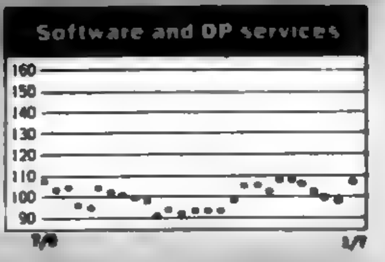
Pontikes said Comdisco's core businesses, including computer leasing and remarketing and disaster recovery services, earned approximately $16 million during the quarter, compared with $5 million in the year-earlier period.

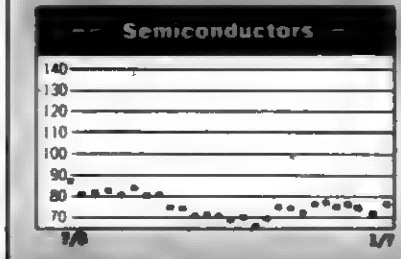
MITCHELL J. HAYES

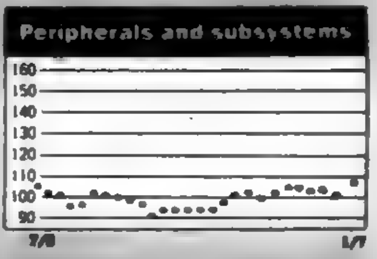
Computerworld stock trading index

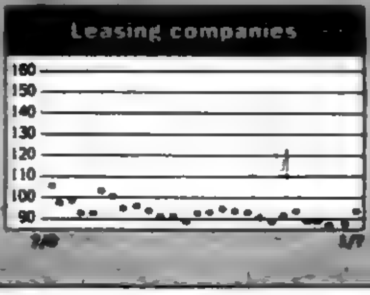


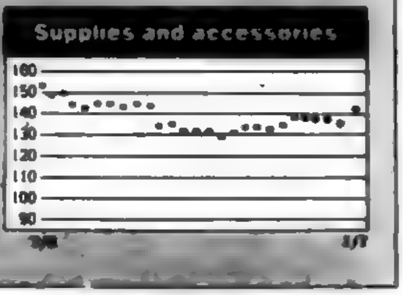












All indexes reflect a weighted base of 100 on Dec. 31, 1984, and track stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	1/2/87	1/7/87
Computer systems	109.7	118.3
Software and DP services	98.9	107.1
Peripherals and subsystems	100.4	106.6
Supplies and accessories	136.6	141.7
Semiconductors	71.4	78.7
Leasing companies	87.2	92.8
CW stock index	111.6	113.0
Standard and Poor's 500 stock index	144.8	152.7

Computerworld stock trading index

CLOSING PRICES WEDNESDAY, JANUARY 7, 1987

COMPUTER SYSTEMS

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 7 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4.75	+0.1	+2.7
O	ALTOS COMPUTER SYS	19	10	12.25	+1.0	+8.9
A	AMDAHL CORP	27	14	26.75	+3.4	+14.4
O	APOLLO COMPUTER INC	18	9	18.00	+1.9	+11.6
O	APPLE COMPUTER INC	45	22	44.75	+4.3	+10.5
N	AT&T	28	21	25.75	+0.8	+3.0
O	C P T CORP	7	3	3.50	+0.3	+7.7
N	COMPAQ COMPUTER CORP	23	12	22.38	+3.1	+16.2
A	COMPUTER CONSOLES INC	12	6	8.88	+0.6	+7.6
O	CONCURRENT COMP CORP	25	1	17.50	+1.3	+7.7
N	CONTROL DATA CORP	29	19	26.88	+0.5	+1.9
O	CONVERGENT TECH	14	4	6.63	+0.6	+10.4
N	CRAY RESH INC	100	57	88.75	+7.9	+9.7
O	DAISY SYS CORP	28	8	9.50	+1.1	+13.4
N	DATA GEN CORP	40	25	34.13	+4.5	+15.2
N	DATAPOINT CORP	9	5	6.13	-0.3	-3.9
N	DIGITAL EQUIP CORP	112	66	111.38	+6.6	+6.3
N	FLOATING POINT SYS INC	46	11	11.63	+0.4	+3.3
N	GOULD INC	32	15	17.75	+1.5	+9.2
N	HARRIS CORP	37	28	32.25	+2.5	+8.4
N	HEWLETT PACKARD CO	50	38	44.25	+2.4	+5.7
N	HONEYWELL INC	84	58	60.25	+1.1	+1.9
N	IBM	162	119	123.50	+3.5	+2.9
O	IPL SYS INC	4	1	2.38	+0.3	+11.8
N	ITT CORP	60	35	56.63	+3.3	+6.1
N	M A COM INC	19	12	13.13	+0.5	+4.0
N	MATSUSHITA ELEC INDL LTD	136	80	126.75	+0.0	+0.0
O	MENTOR GRAPHICS CORP	20	11	18.63	+3.4	+22.1
N	NBI INC	14	8	9.38	+0.5	+5.8
N	NCR CORP	57	38	40.50	+5.4	+12.2
N	PRIME COMPUTER INC	28	16	18.38	+2.0	+12.2
O	STRATUS COMPUTER	28	17	26.00	+4.9	+23.1
O	SYMBOLICS INC	15	4	4.75	+0.4	+8.6
O	TANDEM COMPUTERS INC	40	20	37.75	+3.5	+10.2
N	TANDY CORP	49	31	48.13	+5.6	+13.2
N	TEXAS INSTRS INC	148	103	120.00	+1.9	+1.6
A	ULTIMATE CORP	35	13	23.00	+1.4	+6.4
N	UNISYS	87	56	86.63	+6.6	+8.3
A	WANG LABS INC - B	22	11	11.50	-0.1	-1.1
A	WANG LABS INC - C	22	11	11.38	-0.1	-1.1
N	XEROX CORP	72	49	63.00	+3.0	+5.0

SUPPLIES & ACCESSORIES

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 7 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	27.38	+1.6	+6.3
N	BARRY WRIGHT CORP	25	14	16.13	+1.0	+6.6
A	DUPLEX PRODS INC	23	18	18.50	+0.6	+3.5
N	ENNIS BUSINESS FORMS INC	29	21	28.63	+2.1	+8.0
N	3M CO	121	86	120.38	+3.8	+3.2
N	MOORE LTD	28	19	21.38	+0.8	+3.6
O	STANDARD REGISTER CO	50	32	36.25	+0.1	+0.3
N	WALLACE COMPUTER SVCS	50	37	42.75	-0.8	-1.7

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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SOFTWARE & DP SERVICES

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 7 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	4.25	+0.3	+6.3
N	ADVANCED SYS INC	19	12	18.00	-0.5	-2.7
N	AGS COMPUTERS INC	32	17	31.25	+3.2	+11.6
O	AMERICAN MGMT SYS INC	24	11	24.00	+4.8	+24.7
O	AMERICAN SOFTWARE INC	19	9	18.75	+2.4	+14.5
N	ANACOMP INC	7	3	4.13	+0.4	+10.0
O	ANALYSTS INTL CORP	10	4	8.75	-0.3	-2.8
O	ASHTON TATE	49	18	48.75	+4.3	+9.8
O	ASK COMPUTER SYS INC	15	9	11.88	+1.4	+13.1
O	ASTRADYNE COMP IND	3	1	1.44	+0.1	+4.6
N	AUTOMATIC DATA PROC	40	28	38.25	+4.0	+11.3
O	BOOLE & BABBAGE INC	7	4	6.38	+0.6	+10.9
O	COMPUTER ASSOC INTL INC	25	16	18.25	+0.0	+0.0
O	COMPUTER HORIZONS CORP	14	10	11.25	+0.8	+7.1
O	COMPUTER NETWORK TECH	10	4	4.31	+0.1	+3.0
N	COMPUTER SCIENCES CORP	46	30	45.00	+2.8	+6.5
O	COMPUTER TASK GROUP INC	19	11	12.25	+0.4	+3.2
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	16	10	12.88	+0.4	+3.0
N	CULLINET SOFTWARE INC	19	6	6.75	-0.1	-1.8
O	CYCARE SYS INC	17	7	8.88	+1.5	+20.3
O	DUQUESNE SYS INC	33	14	35.50	+3.8	+11.8
N	GENERAL ELEC CO	91	67	91.00	+5.0	+5.8
N	GENERAL MTRS CORP	50	24	24.13	-0.8	3.0
O	HOGAN SYS INC	12	7	11.88	+1.3	+11.8
O	INFORMATION SCIENCES INC	4	1	0.94	+0.2	+25.1
O	INFOTRON SYS CORP	19	7	8.00	+0.3	+3.2
O	KEANE INC	16	5	8.25	+0.8	+11.1
N	LOGICON INC	41	22	28.00	+3.9	+16.1
O	LOTUS DEV CORP	58	20	53.25	+1.5	+2.9
O	MANAGEMENT SCI AMER	16	11	13.75	+1.0	+7.8
O	MCI COMM CORP	13	6	6.63	+0.4	+6.0
O	MICOM SYS INC	23	10	14.75	+1.3	+9.3
O	MICRO PRO INTL CORP	4	2	2.69	+0.1	+4.9
O	MICROSOFT CORP	54	26	54.00	+5.8	+11.9
O	NATIONAL DATA CORP	26	16	22.75	+1.5	+7.1
O	ON LINE SOFTWARE INT	17	10	16.00	+1.8	+12.3
O	ORACLE SYS CORP	29	13	22.00	+1.3	+6.0
N	PANSOPHIC SYS INC	38	24	26.00	+0.1	+0.5
O	POLICY MGMT SYS CORP	25	15	25.00	+2.0	+8.7
O	PROGRAMMING & SYS INC	11	8	8.88	+0.6	+7.6
O	REYNOLDS & REYNOLDS CO	42	25	33.75	+0.8	+2.3
O	SCIENTIFIC COMPUTERS INC	6	4	5.81	+1.4	+31.0
O	SEI CORP	28	15	19.75	+1.3	+6.8
O	SHARED MED SYS CORP	44	29	43.50	+3.0	+7.4
O	SOFTWARE AG SYSTEMS INC	22	10	12.75	+1.0	+8.5
O	SOFTWARE PUBG CORP	9	5	8.13	+1.1	+16.1
A	STERLING SOFTWARE INC	21	10	11.00	-0.3	-2.2
N	SUNGUARD DATA SYSTEMS	16	10	14.75	+1.3	+9.3
N	UCCEL CORP	27	15	26.75	+2.1	+8.6
N	URS CORP	18	11	17.13	+1.6	+10.5
O	VM SOFTWARE INC	24	12	23.75	+3.8	+18.8

SEMICONDUCTORS

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 7 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	34	13	14.50	+0.8	+5.5
N	ANALOG DEVICES INC	25	14	17.25	+1.6	+10.4
O	ANALOGIC CORP	15	10	11.00	+0.3	+2.3
N	APPLIED MAGNETICS CORP	20	13	17.00	+2.1	+14.3
O	AVANTEK INC	23	14	16.63	+1.4	+9.0
O	HADCO CORP	6	3	3.13	+0.3	+8.7
O	INTEL CORP	32	16	23.25	+2.3	+10.7
O	MICRO MASK INC	7	2	4.25	+1.1	+38.0
N	MOTOROLA INC	50	34	37.50	+1.9	+5.3
N	NATIONAL SEMICONDUCTOR	16	8	11.63	+1.0	+9.4
N	TERADYNE INC	30	16	16.63	+0.3	+1.5

PERIPHERALS & SUBSYSTEMS

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 7 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	7.38	+1.0	+15.7
A	ANDERSON JACOBSON INC	3	1	1.75	-0.1	-6.7
O	AST RESH INC	32	11	14.13	+1.3	+9.7
O	AUTOTROL CORP	10	5	6.00	+0.3	+4.3
O	AVANT GARDE COMPUTING	7	3	4.88	+0.9	+21.9
O	BANCTEC INC	13	6	10.63	+1.4	+14.9
N	BOLT BERANEK & NEWMAN	48	34	45.00	+5.6	+14.3
A	CETEC CORP	9	5	5.13	+0.1	+2.5
A	COGNITRONICS CORP	6	2	3.00	+0.4	+14.3
N	COMPUGRAPHIC CORP	28	16	19.63	+0.6	+3.3
N	COMPUTERVISION CORP	19	10	14.50	+1.1	+8.4
N	CONRAC CORP	18	12	13.50	+0.8	+5.9
A	DATAPRODUCTS CORP	18	11	12.25	+0.8	+6.5
A	DATARAM CORP	18	7	7.13	+0.5	+7.5
O	DATA SWITCH CORP	9	5	6.13	+0.8	+14.0
O	DATUM INC	7	4	4.75	+0.5	+11.8
N	DECISION INDS CORP	15	8	9.63	+0.9	+10.0
O	ENDATA INC	8	4	7.00	+0.3	+3.7
O	EMC CORP	22	11	21.00	+4.0	+23.5
O	EVANS & SUTHERLAND	29	18	27.75	+2.5	+9.9
N	FLOATING POINT SYS INC	46	11	11.63	+0.4	+3.3
O	GANDALF TECHNOLOGIES	8	5	7.63	+0.5	+7.0
N	GENERAL DATACOMM IND	15	8	8.50	+0.5	+6.3
N	HAZELTINE CORP	30	16	29.75	+0.0	+0.0
O	ICOT CORP	13	8	9.38	+1.1	+13.6
O	INFORMATION INTL INC	18	13	13.88	+0.6	+4.7
O	INTECOM INC	7	3	3.00	+0.0	+0.0
O	INTERLEAF INC	15	8	12.13	+1.4	+12.9
O	MEGADATA CORP	5	2	2.75	-0.1	-4.3
A	MSI DATA CORP	14	10	11.63	+0.5	+4.5
N	NASHUA CORP	28	15	22.38	-1.0	-4.3
O	NETWORK SYS CORP	17	10	15.63	+1.8	+12.8
N	NORTH AMERN PHILIPS CORP	46	35	43.63	+2.3	+5.4
N	NORTHERN TELECOM LTD	38	25	33.63	+2.0	+6.3
O	NOVELL INC	29	14	28.75	+3.0	+11.7
N	PARADYNE CORP	11	4	5.00	+0.0	+0.0
A	PENRIL CORP	9	4	4.38	+0.8	+20.7
N	PLESSEY PLC	38	22	27.88	+0.9	+3.2
O	PRINTRONIX INC	15	10	10.25	+0.3	+2.5
O	QMS INC	16	9	9.38	+0.5	+5.6
O	RAMTEK CORP	7	3	5.63	+0.3	+4.7
N	RECOGNITION EQUIP INC	20	10	19.00	+3.5	+22.6
O	SCAN TRON CORP	19	11	15.75	+2.1	+15.6
N	SCIENTIFIC ATLANTA INC	15	9	11.63	+0.5	+4.5
O	SEAGATE TECHNOLOGY	22	7	22.00	+2.9	+15.0
N	STORAGE TECHNOLOGY	7	2	3.88	+0.4	+10.7
O	SUN MICROSYSTEM INC	26	11	26.13	+2.1	+8.9
A	T-BAR INC	8	5	7.75	+0.0	+0.0
A	TAB PRODS CO	15	11	14.13	+0.8	+5.6
O	TANDON CORP	6	2	2.50	+0.2	+8.1
A	TEC INC	7	3	3.50	+0.1	+3.7
N	TEKTRONIX INC	74	55	73.25	+5.3	+7.7
O	TELEVIDEO SYS INC	4	2	2.25	+0.3	+12.5
N	TELEX CORP	75	52	73.88	+6.9	+10.3
N	TIMEPLEX INC	27	14	26.75	+3.4	+14.4
N	TITAN CORP	12	6	7.00	+0.4	+5.7
O	VISUAL TECHNOLOGY INC	1	0	0.44	+0.0	+0.0
O	WYSE TECH	20	11	19.88	+2.6	+15.2

LEASING COMPANIES

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 7 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	25	12	17.13	+1.4	+8.7
N	CONTINENTAL INFO SYS	12	6	9.63	+1.1	+13.2
O	FINALCO GROUP INC	5	2	2.94	-0.1	-2.1
O	PHOENIX AMERN INC	6	3	4.00	+0.6	+18.5
O	SELECTERM INC	12	5	5.00	-0.3	-4.8
N	U.S. LEASING	47	38	44.25	+2.1	+5.0

COMPUTER INDUSTRY

INSIDE

Pansophic moves outside the IBM mainframe world with product and corporate acquisitions/**99**

IBM, Merrill Lynch abandon Imnet financial services venture/**100**

Japanese vendors preach austerity in 1987 as the yen continues to be strong/**103**

Cullinet buys a small project management software developer/**120**

INSTANT ANALYSIS

"It wasn't until mid-1985 that we began to understand what the business market really wants and needs and what we as a company really have to offer."

— John Sculley, chairman, president and CEO of Apple Computer, Inc., in Apple's 1986 annual report

Ashton-Tate sues Migent

Says Dbase II author, other former workers lifted secrets

By Douglas Barney

TORRANCE, Calif. — Stung by the defection of numerous key employees in the past year to Migent Software, Inc., Ashton-Tate last week filed suit against Incline Village, Nev.-based Migent, charging misappropriation of trade secrets, unfair competition and breach of contract.

Migent currently markets Ability, an integrated package that competes in the same market as Ashton-Tate's Framework, and Enrich, a data base that competes with Ashton-Tate's Dbase III. Migent Chairman Carl Gritzmaker is a former Ashton-Tate executive, and some 15 to 20 other Migent employees, formerly worked for Ashton-Tate.

Observers said they believe a Migent project code-named Emerald Bay is the key reason Ashton-Tate filed suit. Emerald Bay is currently under development by C. Wayne Ratliff, author of the original Dbase II. Migent claims Emerald Bay will employ a data base engine with interfaces and applications surrounding it.

Ashton-Tate has publicly stated its interest in the data base engine concept, referring to the approach as unbundling Dbase or "hitting Dbase with a hammer." A source close to Migent indicated that Ashton-Tate hopes to prove that the data base engine concept is proprietary.

Ratliff, who left Ashton-Tate in early 1986 to found Ratliff Software Productions, Inc. in Los Angeles, holds the honorary title of chief scientist for Migent.

According to Ashton-Tate, Migent and codefendant Queue Associates, Inc. illegally transferred Ashton-Tate's software technology. "Given the overwhelming evi-

See **ASHTON-TATE** page 102

IBM to close analytical tools unit

By Clinton Wilder

ARMONK, N.Y. — In its first cost-cutting move of the year, IBM announced last week that the firm will exit the U.S. analytical instruments business in the next six months.

IBM will shut down its Danbury, Conn.-based IBM Instruments, Inc. subsidiary and offer its 150 employees other positions within IBM. A spokeswoman for the company refused to disclose the unit's annual revenue.

IBM, which will announce its second straight annual earnings decline next week, has been pursuing an unprecedented corporate austerity program for the past year.

Actions by the computer industry giant in 1986 included early retirement incentives, a virtual hiring freeze, curtailment of travel and meeting expenses and the closing of a parts distribution center in Greencastle, Ind.

A corporate statement said IBM formed the instruments subsidiary in 1980 to help its computer business gain a foothold in sales to analytical laboratories in government, industry and education.

Will remain in market

The company said it will continue to participate in the market without selling analytical instruments.

Bruker Instruments in Billerica, Mass., will continue to market and distribute IBM instruments in the U.S. IBM divested its partial ownership of Bruker and one other company that manufactured IBM instruments under IBM contracts.

IBM said it will accept no more orders for instruments after April 13. However, its national service division will continue to service the subsidiary's products for five years.

INDUSTRY INSIGHT
Donald F. Blumberg

IBM's shifting service strategy

IBM has always been a major force in the computer equipment service market. In fact, IBM has always used service strategically as a factor in supporting and influencing its product sales and in controlling its market share and product position. However, significant changes have been taking place with respect to IBM's future growth and existing business strategy.

IBM's combination of deteriorating revenue and profit performance and the emergence of major third-party maintenance competition have created a new service strategy within IBM.

This strategy is broadly focused on delivering service to customer sectors as a separate line of business. A new Customer Service Sector marketing team has been established to provide total service and support to the customer base with focus in vertical market segments, such as finance and brokerage, banking and manufacturing.

The strategy is to deliver total integrated and managed service and support to the installed base of equipment on the customer's premise, focusing specifically on network services and support.

In essence, the new IBM service strategy visualizes total support of the customer's installed base of equipment in general and network structures in

See **IBM's** page 103

Blumberg is president of D. F. Blumberg & Associates, a consulting firm in Fort Washington, Pa.

Unisys one of three shareholders withdrawing from MCC research

By James A. Martin

AUSTIN, Texas — Unisys Corp. was one of three shareholders at Microelectronics and Computer Technology Corp. (MCC) to announce recently that it will pull out of the consortium's research programs at the end of 1987.

Sperry Corp., which merged with Burroughs Corp. and became Unisys, was involved in all four MCC research and development projects. But Unisys management decided to drop out of MCC and redirect R&D efforts elsewhere, according to Unisys spokesman J. Peter Hynes. He would not elaborate.

According to an MCC requirement, members interested in dissolving their shares must notify the consortium one year in advance. As a result of this requirement, Unisys will continue as an MCC shareholder until Dec. 31 of this year or until it sells its share to another company.

In addition to Unisys, both Allied-Signal, Inc. and Lockheed Space and Missile Co., a subsidiary of Lockheed Corp., announced they will withdraw from MCC at year's end. Allied-Signal is departing because it is selling its Amphenol Products division, which was involved in MCC research projects.

Lockheed said that it wants to concentrate on developing products that are not related to any MCC research projects.

A company can withdraw with less than one year's notice if it locates a buyer for its share, according to William Stotesbery, MCC spokesman. Each member owns one share of MCC. At present, there are 20 shareholder companies. That figure will drop to 17 by year's end if the shares of the three departing companies are

See **UNISYS** page 102

Olivetti licenses Orion facility

Implementation to begin with PC 6300

By Elisabeth Horwitt

BERKELEY, Calif. — In a development that will allow the AT&T Personal Computer 6300 to exchange documents using IBM protocols, Ing. C. Olivetti & Co. has agreed to license The Orion Group, Inc.'s Document Interchange Architecture (DIA) facility for implementation on Olivetti computer systems.

DIA specifies protocols for packaging a document that can then be exchanged with systems that support DIA protocols. These include IBM System/36 and 38, IBM's Distributed Office Support Systems (Disoss) and a growing number of non-IBM computers. Olivetti and Orion are expected to jointly announce their agreement today.

While the license permits Olivetti to implement Orion's DIA software on any of its systems, the company will initially target the PC 6300, which Olivetti manufactures for AT&T, and minicomputers distributed in Europe.

While the Microsoft Corp. MS-DOS-based PC 6300 can use IBM 3270 terminal emulation boards to access IBM hosts, the DIA software provides direct document exchange between AT&T's micro and IBM systems using the DIA format, according to Orion Group President Paul Rampel.

Support of DIA will also enable Olivetti computers to exchange documents with non-IBM systems that support DIA and to access library and distribution services on IBM's Disoss protocols.

At the present time, Olivetti has announced no plans to license other IBM-based communications software offered by Orion, in particular the

See **OLIVETTI** page 100

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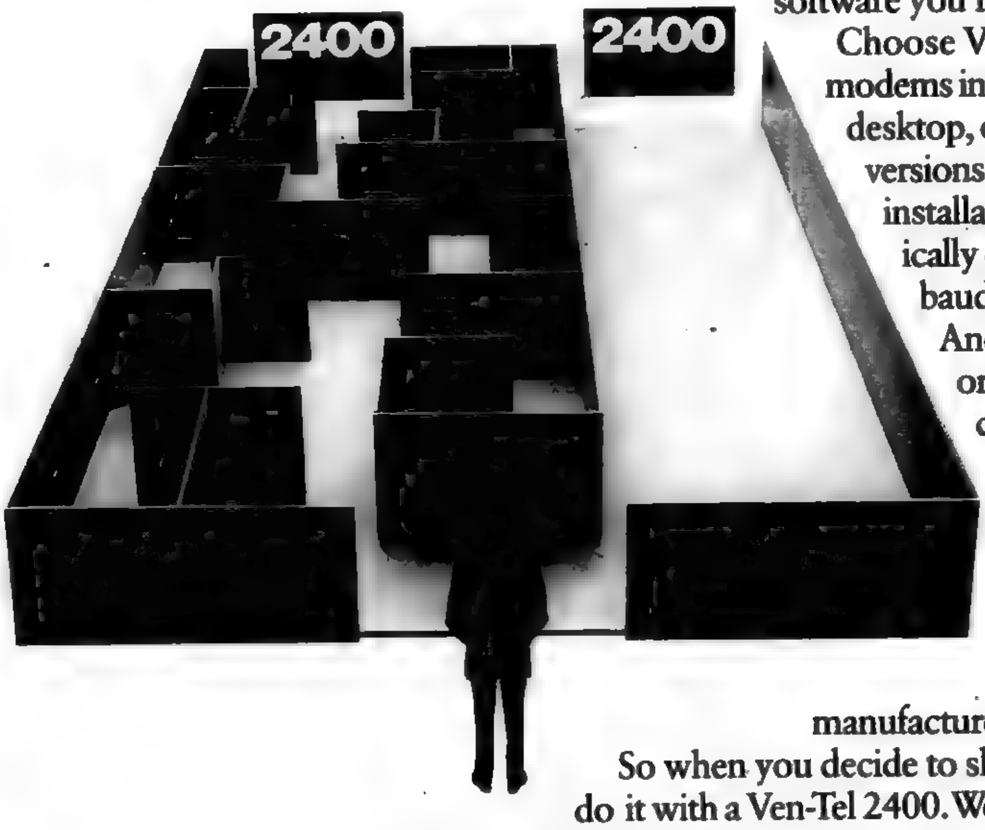

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COMPUTERWORLD

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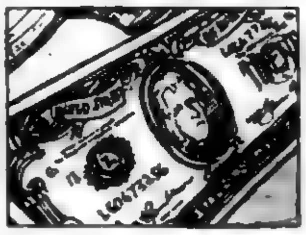
INSIDE



In Depth — If a company sends its in-house software to market, is it giving away the store? **Page 41.**

■

Spotlight — VDTs are shaping up to face the competition from micros. This generation boasts more features muscle and trimmer prices. **Follows page 40.**

■ ■ ■

Processor parade. A big wave of hardware announcements hits the market, including the following:

- National Advanced Systems XL 70, positioned to take advantage of a perceived gap in IBM's lineup. **Page 5.**
- DEC's expected assault on the data center market with powerful clusters of VAX 8700s. **Page 10.**
- Encore Computer's parallel processing system, said to offer up to 40 MIPS. **Page 4.**
- Prime Computer's intent to sell a minisupercomputer, which will be aimed at the scientific and engineering markets. **Page 14.**
- Enmasse Computer's second generation of Unix-based computer systems. **Page 13.**
- Upgrades to Alliant Computer's FX/8 parallel processors. **Page 14.**
- Harris's speedy, low-cost superminicomputer. **Page 37.**

■

CW previews announcements expected at this week's Uniforum 1987. **Page 13.**

■

ANSI's SQL standard differs from IBM's version. **Page 8.**

■

The once invincible Wordstar gets its first major revamp in three years. **Page 12.**

Users of 8100 led down path

IBM will port DPPX to 9370

By Jean S. Bozman

IBM will port the DPPX operating system for its 8100 distributed processing systems to run in native mode on the IBM 9370, the company confirmed last week. But 8100 users seeking a speedy migration path will have to wait at least two years.

Although no public announcement has been made, a company spokesman confirmed that an evaluation of DPPX/SP executing on the IBM 9370 was successfully concluded. "We are proceeding with development, which is expected to take at least two years," the spokesman said.

That two-year development effort may not be enough to retain the loyalty of 8100 users, many of whom, according to a recent survey, are evaluating or planning migration to other alternatives (see story page 91).

IBM said it decided to retain DPPX/SP as a "full-function product for centrally managed distributed networks." The spokesman added, "We believe that DPPX/SP is a state-of-the-art software product that provides high levels of function and capability."

Central-site management

DPPX allows central sites to monitor remote 8100 sites and, if necessary, to shut them down. For this reason, some industry analysts believe that DPPX will strengthen the role of central-site management in a distributed network of IBM 9370s.

In a speech to the Guide User Group last spring, an IBM executive said the company planned no further 8100 hardware offerings but was evaluating moving the DPPX environment onto 370-based systems.

While the 8100's days appear numbered, the IBM 8150 is still in production, the IBM spokesman said last week. Users can buy 8100 hardware, software and applications from IBM until an unspecified time when an alternative is available, the company said. In addition, users may buy older 8100 models, including 8130s and 8140s, from third-party resellers or lessors, industry analysts said.

The fate of the DPCX operating system appears tied to the remaining lifespan of the 8100. In its presentation to Guide last spring, IBM said DPCX would not be functionally enhanced in the future. Unfortunately for DPCX users, said William Ackerman, vice-president of Distributed Systems, Inc. in Cupertino, Calif., it will be far easier for

See USERS page 91

Wang on offensive, revamps VS

By James Connolly

LOWELL, Mass. — Only six days after announcing job reductions and an expected quarterly loss of more than $30 million, Wang Laboratories, Inc. went on the offensive last week by restructuring the upper half of its minicomputer line.

Wang officials, repeatedly stating their commitment to the commercial data processing market and to compatibility throughout Wang's product line, introduced the VS 7000 series as a successor to the VS 85, VS 100 and VS 300. In addition, the company enhanced its Professional Application Creation Environment (see story page 6) and announced plans to offer later this year a dual-proces-

See WANG page 6

1-2-3 sue! Lotus vs. clones

By Douglas Barney

CAMBRIDGE, Mass. — Landmark lawsuits filed by Lotus Development Corp. against two firms that allegedly cloned its software may forever change the nature of software development as well as the characteristics of software available to users.

Many users and much of the software industry are up in arms over the suits filed last week, which allege that Paperback Software International, Inc. and Mosaic Software, Inc. violated Lotus's copyright by cloning 1-2-3. Others applaud Lotus's effort to protect a market the firm worked hard to create.

Filed in U.S. District Court in Boston, the suits allege false advertising and unfair trade practices. Lotus seeks to prevent the sale of the clone products, Paperback

See 1-2-3 page 8

IBM finds friends in bid to influence OSI standard

By Elisabeth Horwitt

PARIS — IBM, allied with two leading European vendors, is expected this week to again attempt to embed elements of its LU6.2 protocol in the Open Systems Interconnect standards.

While use of LU6.2 as the basis for OSI transaction processing protocols could shorten the road to fully functional OSI products, users, vendors and industry analysts fear the possibility that IBM would use LU6.2 as a Trojan horse to gain further dominance in the marketplace.

At the International Standards Organization Transaction Processing Subcommittee meeting, to be held here this week, a contingent comprising IBM, Siemens AG and

See IBM page 10

SUPERBOWL PRINTOUT

Fortran forecaster says Orange Crush will fizzle

Pat Summerall: "Well John, the Giants are grinding it out on the ground, throwing short passes and sticking to their game plan, but the Broncos are throwing more and more, trying to catch up."

John Madden: "Yup, it's just like Bud Goode said: Football is still a running game. He picked the Giants by four, and it looks like he's going to hit it right on the head. Goode definitely makes the All-Madden Team."

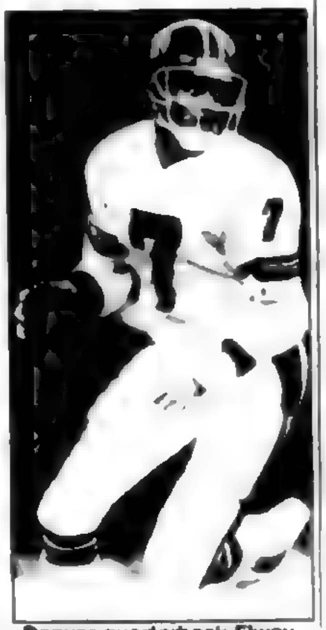
By Bruce Hoard

LOS ANGELES — The New York Giants. The Denver Broncos. Pat Summerall. John Madden. Bud Goode. The biggest names in the biggest football game of them all, the Super Bowl.

Goode, you say? Who in the world of pigskin is Bud Goode? Ask Giants coach Bill Parcells; he's a client of Goode. Ditto Chicago Bears' mentor Mike Ditka and four more of the National Football League's most illustrious head coaches.

To these NFL head coaches, Goode is a statistical analyst par excellence. To readers of the *Philadelphia Inquirer*, he's a fearless Fortran forecaster, picking NFL games against the Las Vegas line. To others, he's

See FORECASTER page 4



Denver quarterback Elway

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Fannie Mae system wins out

Fixed 1,500 software bugs before start-up

By Mitch Betts

WASHINGTON, D.C. — Despite 1,500 software bugs that had to be fixed and a cost overrun of $25 million, the Federal National Mortgage Association, commonly called Fannie Mae,, successfully cut over to its new Laser Reporting data base system in October and has achieved three months of smooth operations, according to a major user of the system.

Skeptics had doubted the $60 million system would work because of the numerous software bugs in the complex Cobol software and the lack of a backup system [CW, Aug. 11]. The skeptics included disgruntled programmers at Fannie Mae as well as outside mortgage lenders who transmit data to the system.

"A lot of them are amazed that we got it installed, but they acknowledge that we got it in, it works and it's doing a creditable job," said Richard Leegant, senior vice-president for mortgage administration at Fannie Mae and the major in-house user of the system. Laser Reporting provides monthly updates on two million loans, based on monthly accounting reports filed by 600 lenders.

Leegant reported that the error rate for Laser Reporting was 2% in its first month and was subsequently reduced to 1.5%. He attributed the successful installation to a pilot test that essentially put the system through a dress rehearsal and numerous 12-hour days spent by teams of users and programmers aiming to meet the Oct. 1 deadline for start-up.

Leegant said the pilot test ran for four months with 10% of the loan data while the old exception system was still running. "So when we went live with Laser, there were no surprises, because we had run the equivalent of a parallel system for several months with a substantial volume of loans," he said.

Furthermore, he said, virtually all of the 1,500 software bugs were minor. Most of the bugs took only four to eight hours to fix, Leegant added, noting that a recent audit showed that 99% of the Cobol was structured code.

MAP/TOP users group signs COS for financial assist in development

By Rosemary Hamilton

PHOENIX — The complex and expensive task of establishing networking standards for the factory floor and office environment has prompted a users group to seek both technical and financial assistance from the Corporation for Open Systems (COS), an independent group made up primarily of vendors.

The Manufacturing Automation Protocol/Technical Office Protocol (MAP/TOP) Users Group officially agreed last week to sponsor a June 1988 demonstration of MAP/TOP Release 3.0, the next release of the factory and office networking specifications, which originally had been scheduled to debut this November.

According to Charles Gardner, chairman of the MAP/TOP Users Group Steering Committee, COS will take development and financial responsibility for approximately 40% of the testing effort, which Gardner estimated will have a total cost of between $15 million and $20 million.

COS, established a year ago, is an international group of vendors and users whose goal is to accelerate the establishment of computer and networking standards.

A COS spokeswoman said the organization did not know what the total cost of MAP/TOP test development would be but estimated that COS's portion would represent a $3 million to $4 million investment. She also said the 40% portion assigned to COS by the users group is still being worked out.

"It may have been possible to do it on our own, but it would have been hard for the users to rationalize all these costs themselves," Gardner said.

Despite this alliance, the MAP/TOP organization found itself unable to ready all the necessary tests by the original target date in November for the debut of MAP/TOP Release 3.0.

According to Tony Durham, a users group member who serves as MAP liaison to the General Motors Corp. advanced engineering staff, the delay has nothing to do with the development of the MAP/TOP Release 3.0 specifications, which he said will be ready by year's end.

MAP and TOP are sets of emerging standards that are based on the International Standards Organization's Open Systems Interconnect seven-layer networking model. MAP, whose major backer is GM, was designed for the factory floor; TOP, whose primary promoter is Boeing Computer Services Co., was to be MAP's counterpart in the office environment.

MAP/TOP Release 3.0 was originally scheduled for public introduction at the Autofact '87 trade show, which will take place in November. Unlike the MAP demonstration at the Autofact '85 show, which Gardner called a prototype version of future products, the users group wanted the Release 3.0 demonstration to show product-level components.

To achieve this, the user organization decided that a whole series of tests would be needed. All suppliers, including hardware and networking vendors, will be required to pass the conformance tests to ensure that their products adhere to the MAP/TOP Release 3.0 specifications.

When the users group announced the Autofact '87 debut of Release 3.0 last September, it was negotiating with COS to join in what was then dubbed the 1987 MAP/TOP Enterprise Networking Event. As negotiations proceeded, "we realized that the testing program time line did not follow the original projection," GM's Durham said.

In this issue

NEWS

Encore introduces high-performance parallel processing system/ **4**
NAS adds dyadic processor, doubles line's channel transfer rates/ **5**
Wang upgrades PACE software/ **6**
ANSI SQL standard differs from marketplace versions/ **8**
DEC aims for high-end IBM mainframe market with VAX 8700 clusters/ **10**
Bankruptcy court rules $22.8 million tax liability for Storage Technology/ **10**
Wordstar upgrade features more than 125 enhancements/ **12**
Datapoint president resigns unexpectedly/ **12**

Page 16

Enmasse to premier second-generation Unix-based system/ **13**
Caseware to show products for computer-aided software engineering market at conference/ **13**
Variety of product announcements will characterize Uniforum 1987/ **13**
Alliant ups parallel processing systems' performance/ **14**
Prime Computer to introduce minisupercomputer aimed at science and engineering markets/ **14**
Retailers at NRMA conference praise computer technology/ **15**
Users migrating away from IBM 8100 product line/ **91**
Vendors seek to position systems in IBM 8100 area/ **91**

NETWORKING

PC, Microvax connections highlight MAP/TOP users group meeting/ **19**
Excelan and allies will release products for MS-DOS workstations/ **19**
Network Software releases software that runs remote job entry in background mode/ **19**
Tekelec unveils ISDN tester, multiprotocol translator/ **19**

SOFTWARE & SERVICES

Cobol restructuring techniques debated by software authors/ **25**
Design tool for Telon mainframe users offered/ **25**

MICROCOMPUTING

Multitasking operating system for 80386-based PCs gains support/ **33**
Desktop publishing product announcements characterize Macworld/ **33**
Macworld attendees want Apple applications, connectivity/ **33**

SYSTEMS & PERIPHERALS

Users and analysts finding answers to questions surrounding IBM 9370/ **37**
Harris to introduce supermini for technical markets/ **37**

MANAGEMENT

Agway sets up independent DP operation/ **51**
Retailers focus on integrating systems, according to study/ **51**

COMPUTER INDUSTRY

Ultimate attributes success to serendipity/ **69**
DEC reports 98% profit increase in second-quarter '86/ **94**
ADP to develop stock quote system for Merrill Lynch/ **94**
Injunction against DEC-compatible peripheral maker reinstituted/ **94**
Intel reports sixth consecutive quarterly loss/ **94**

SPOTLIGHT

In the terminal market, fierce competition has driven prices down and has spurred the development of new functional features. Meanwhile, integrated voice/data terminal makers are coaxing executives toward the keyboard with a host of telephone-convenience and time-management features. By JoAnn Granger/ **Follows page 40**

IN DEPTH

A good gamble: By marketing its home-grown software for outside use, a company can parlay an investment of time and money into a profitable venture. By Richard Raysman/ **41**

OPINION & ANALYSIS

Mallach tells how to enjoy an EDP audit/ **17**
Reed evaluates the apron strings manager/ **25**
Zachmann reviews Toshiba's 1100+ laptop/ **33**
Connolly reports on shifting purchases in 3270 market/ **37**
Kolence calls for diversification in capacity management/ **51**
Wilder monitors IBM, EDS's entrances into high-end banking software/ **94**

DEPARTMENTS

Editorial/ 16
Calendar/ 55
New Products/ 59

PAGE 17 ILLUSTRATION BY ALAN WITSCHONKE
PAGE 1 PHOTO FROM WIDE WORLD PHOTO

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Encore upgrades Multimax parallel processor

Designed as general, not specialized, system

By James Connolly

MARLBORO, Mass. — Acknowledging it is depending on software developers to produce commercial data processing Unix software that can be optimized for parallel processors, Encore Computer Corp. last week introduced a parallel system designed to provide more than twice the performance of the firm's first processor.

Encore President James R. Pompa said the Multimax 320, unlike many other parallel processors, is designed as a general-purpose computer rather than as a specialized scientific system. "We believe general-purpose parallel processing is an emerging trend," Pompa said. He cited data base management as one of the key markets for parallel systems.

The basic difference between the Multimax 320 and the year-old Multimax 120 is the use of a National Semiconductor Corp. 32332 processor in the newer system rather than the 32032 in the Multimax 120. The Multimax 320 uses Encore's 100M byte/sec. Nanobus system bus and UMAX operating system, which were introduced with the Multimax 120.

However, the Multimax 320 will run a version of UMAX designed to be compatible with AT&T Unix System V.3 or the University of California at Berkeley Unix Version 4.2.

Encore claimed the 32332 processes up to 2 million instructions per second (MIPS). The Multimax 320 houses up to 10 processor cards, each with two microprocessors, for a maximum performance of 40 MIPS, compared with 15 MIPS for the Multimax 120, Pompa said.

The processors can share 128M bytes of main memory and 100G bytes of storage. Encore also announced a mass storage card said to increase I/O to 60M byte/sec.

Scheduled to be available in April, an entry-level, 4-MIPS Multimax 320 costs $131,000. Additional processor cards cost $29,000 each.

Pompa reported that Encore has installed 40 Multimax 120s, with about 30 of those being delivered to research centers and the remainder being used in commercial fields, including the commercial scientific area.

"If all of those 40 machines are revenue-producing machines for Encore, that's an interesting development. That means they have been much more aggressive than I expected," noted Itom International President Omri Serlin, a Los Altos, Calif.-based observer of the parallel processing industry.

Serlin said several parallel processor makers have been trying to drive into the commercial DP market, particularly in the data base area, but that packages such as data bases will require heavy modification by Encore before they are suited for parallel processing.

Serlin and Thomas Willmott, vice-president of International Data Corp., a Framingham, Mass.-based market research firm, said Encore has made progress in reducing expenses. Willmott said Encore was hurt by the resignation of cofounder Gordon Bell last year but that Bell was instrumental in developing the Nanobus, which the company can build upon for several years.

Willmott said a downside of the Multimax 320 is the machine's continued use of National Semiconductor chips when many Unix systems are running Motorola, Inc. microprocessors.

Forecaster predicts fizzle

From page 1

just Groucho Marx's former PR man.

Whether he's servicing coaches or fans, Goode relies on the same 80-page computer printout, a compilation of 170 sometimes arcane football variables. Each week, he trundles down to the nearby Unisys Corp. computer center, runs his weekly stats through a Univac 1106 and then shares the results with the coaching cognoscenti and would-be bettors who read the *Inquirer*.

"I'm satisfied that I can explain the game," Goode says. "But picking against the line is a 50-50 proposition."

In this, his eighth year of performing computerized prognostication, he claims to have finished a couple of games more than 50-50. But, as he is quick to note, "I do not incite to bet."

Nor does Goode necessarily respect other, less scientific forecasters who do incite to bet.

Of Jimmy the Greek, he says without pause, "The Greek is an interesting person, but you could write the world's thinnest book on what he knows about football. That's a quote." Indeed.

What Goode does incite is a sea of stats, many of which spring from differential variables. For example, consider his most significant stat of all, the difference in the number of running plays.

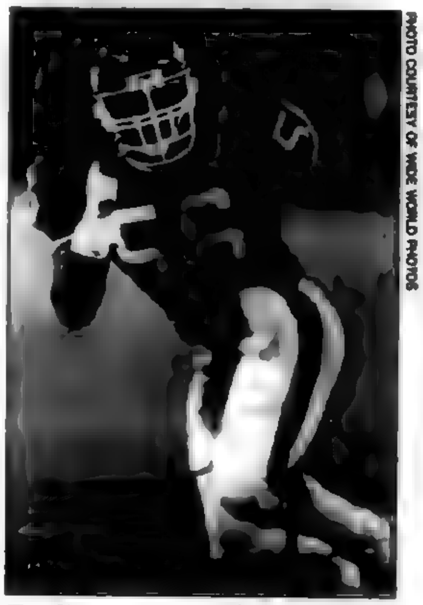
He bases his Giants-by-four pick in this Sunday's Super Bowl XXI on this key category.

The Giants lead the league in executing more running (or *rushing* in football parlance) plays than their competition. This year they averaged 13 more rushing plays per game than the opposition.

Denver, on the other hand, is not a strong rushing team, averaging a relatively paltry 1.4 rushing-play advantage against the competition.

"I'd be surprised to find Denver with five first downs on the ground against the Giants," Goode notes. "They have to throw to win."

But be careful there, Bronco quarterback John Elway, because if you throw more than two interceptions, you have committed what Goode calls "a fatal error in computerese," meaning your chances of winning are extremely remote.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The Giants' Lawrence Taylor

Now, mix up all these numbers, shake well, and you arrive at the inexorable Goodean conclusion: The Giants shall triumph on the ground while the Broncos fill the air with footballs.

True to form, Goode won't bet on the game. But he does gamble in the stock market. "The last few days have given me a new car," he proudly relates. "I'm going to buy my wife a T-Bird."

Hoard is editor of Network World, *a CW Communications publication.*

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NAS improves AS/XL channel rate with dyadic processor

By Jeffry Beeler

MOUNTAIN VIEW, Calif. — National Advanced Systems Corp. (NAS) last week plugged a hole in its largest mainframe family by introducing a dyadic processor that reportedly provides a performance compromise between IBM's 3090 Models 200 and 400.

In adding the Model 70 to its AS/XL series of IBM-compatible machines, the company also doubled the product line's channel transfer rates from 3M to 6M byte/sec. The enhancement, which will be extended to all six AS/XL members, makes NAS's channel throughput twice as high as the 3090's and 33% faster than Amdahl Corp.'s mainframes'.

To accommodate the accelerated data transfers, NAS has enhanced its existing Model 7900 semiconductor disk subsystem with the addition of a second controller option, the 7970-3. The introduction enables the semiconductor disk's 7990-2X storage modules, which previously moved a maximum of 3M byte/sec., to support the AS/XL family's improved channel rates.

Rounding out its suite of announcements, NAS disclosed its intention to make expanded memory available as an option on all its AS/XL-series models, including the just-announced AS/XL 70. Support for expanded memory will begin during the third quarter.

Reaction favorable

Among industry analysts, reaction to last week's NAS moves was generally favorable. New York investment banking firm Kidder Peabody & Co. Vice-President Adam Cuhney said he expects the announcements to appeal strongly to the company's target customers.

"During fiscal 1987, NAS has been nothing short of phenomenal in its ability to attract new accounts," Cuhney said; the latest additions to the AS/XL line will almost certainly give the firm's recent successes further momentum, he added.

IBM and plug-compatible manufacturer analyst Bob Djurdjevic, head of Annex Research, Inc. in Phoenix, said he views the product less as an effort to attract new customers than as a response to recent criticisms. Last year, he said, NAS suffered from disclosures that its AS/XL 60 uniprocessor provides less computing horsepower than its closest IBM rival, the 3090 Model 200.

But NAS did gain an edge with the introduction of 6M byte/sec. channels, Djurdjevic added.

That will do users little good, however, until NAS can offer storage devices that match the channel speed. "Most peripherals out there on the market today still operate at 3M byte/sec.," noted Don Foster, who specializes in hardware acquisitions for Pacific Gas & Electric Co., a large NAS user. During the system announcements, however, NAS officials referred to upcoming storage product announcements but provided no details.

Since March 1985, when the AS/XL line made its debut, NAS has offered plug-compatible alternatives to IBM's two original Sierra series members. The AS/XL 60, a uniprocessor, corresponds to the 3090 Model 200, and the dyadic AS/XL 80 competes with the 3090 Model 400.

During the ensuing months, however, NAS claims to have noted a sharp upturn in the number of users who want more power than a 3090 Model 200 can deliver but who are unwilling to jump to a Model 400. So to provide such users with a happy medium, the vendor decided to create a deliberately degraded version of the AS/XL 80, according to Carl Claunch, director of NAS systems marketing.

The result is the AS/XL 70, which outperforms the AS/XL 60 by 20% to 40% but offers only 60% to 80% as much internal throughput as the AS/XL 80, Claunch said.

Although both of NAS's Sierra-class dyadic mainframes boast identical channel and main memory capacities, the AS/XL 70 holds just half as much cache and dynamic working storage — 128K bytes and 512K bytes, respectively — as the AS/XL 80.

Configuration options

For any given top-of-the-line NAS mainframe, users will have the option of configuring up to half their available channels for 6M byte/sec. operation.

The twofold improvement in the AS/XL's data rates necessitated the introduction of the 7970-3 controller, which moves up to 6M byte/sec. In extending the increased channel speed to the 7900 semiconductor disk subsystem, NAS expects to halve the mainframe line's I/O response times and double its I/O transaction rates, according to Minh Le, director of the firm's peripherals marketing.

The AS/XL 70, which holds up to 256M bytes of main memory, costs $5.28 million in a minimum configuration of 32 channels and 64M bytes. Customer shipments of the machine will start by the end of the current quarter.

Support for the semiconductor disk subsystem's 6M byte/sec. channel transfers, by contrast, will begin in April. The 7970-3 controller that makes the increased speed possible sells for $87,750.

Wang moves to beef up its application development system

Package easier to use, extends current features

By Rosemary Hamilton

LOWELL, Mass. — Wang Laboratories, Inc. last week rolled out a new release of its Professional Application Creation Environment (PACE) software that increases the package's basic functionality, such as its ability to integrate PACE data with software applications from Wang and other vendors.

PACE 2.0, a set of software application development tools built around a relational data base management system, is available now with license fees starting at $13,000.

Current PACE users under service contracts can upgrade without charge; users without contracts can upgrade for fees starting at $850.

The announcement did not include many new features but concerned extensions of existing features. For instance, the latest release allows users to integrate PACE data into a VS Wang 20/20 spreadsheet — Wang's version of Access Technology, Inc.'s 20/20 tool — with fewer commands than the previous version of PACE.

Chuck Raudonis, director of research and development at Philadelphia-based Fidelity Mutual Life Insurance Co., which was a beta-test site for PACE 2.0, said the new release is easier to use. "Now I can just hop out of PACE and into the host language interface environment."

Raudonis, who develops data base applications with PACE on a Wang VS 300, gave the software high marks. "It enables us to get a data base out in about half the time it would take coding it in Cobol," he claimed.

PACE 2.0 expands integration beyond Wang Word Processing to WP Plus and increases the Wang Office electronic mail functions for the PACE environment, according to Judy Cole, a PACE product manager.

The application development component of PACE has many added programming functions, such as more flexible relationship definitions to define fields.

The data dictionary has an expanded number of rules that can be applied to govern the processing of data and ensure data consistency.

The decision support component of the system now includes such features as the ability to merge a spreadsheet with a query or data file at runtime.

Wang takes offensive

From page 1

sor high-end system, a virtual machine operating system environment and a resource-sharing facility similar to Digital Equipment Corp.'s clustering capability.

The VS 7000 systems include a top-of-the-line VS 7310-300 product comparable to the earlier high-end VS 300 but with room for conversion to a dual-processor 7320 when that product is shipped later this year. The other three VS 7000 systems — the VS 7110, VS 7120 and VS 7150 — reportedly provide gains of up to three times the performance of the VS 85 and VS 100. The older systems will continue to be marketed, according to Wang officials.

During the announcement, Wang President Frederick A. Wang said the firm will expand its sales force, particularly with personnel experienced in vertical markets, and will improve its consulting services. Wang reported that orders for the VS 300 rose in late 1986, but he said that the balance of orders has been tilted too far toward lower end systems such as the VS 5, VS 6 and VS 65.

"What we really have to do is leverage the momentum we have going. I don't mean the lost momentum but the order-rate momentum," Wang said. He charged there is still a misconception on the part of some observers that Wang is a word processing company and said the VS series was designed as a distributed DP system 14 years ago and continues to serve in that role.

The new VS models use the same hardware architecture, based on Wang's CP8 67.7M byte/sec. system bus, and operating system — Wang VS Release 7 — as the VS 300.

Noting that Wang recently eliminated bugs in VS Release 7 in order to let the VS 300 run properly, analyst John McCarthy of Cambridge, Mass.-based Forrester Research, Inc. said, "The announcement is important for Wang because it puts the problems of the VS 300 behind them and lets them show that the architecture does work."

McCarthy and other analysts said the key to Wang's announcement was its message rather than the technical capabilities of the systems. To him, McCarthy said, the message was that Wang wants to differentiate clearly the VS product line from competing DEC and IBM lines. He said the VS 7000 systems appear to be more reliable and easier to produce and upgrade than the earlier systems.

"The most interesting thing from my point of view was the positioning of the products and the way Wang is putting on a new and fresh face and telling the world how they want to be perceived as a DP company. In terms of the VS line, it is rejuvenated but not seriously changed," said Richard Mikita, director of processor programs at International Data Corp., a market research firm in Framingham, Mass.

Van Weathers, director of the business computer group for Dataquest, Inc., a San Jose, Calif.-based market research company, said the significant performance gains in the VS 7000 should help the company boost its lagging high-end sales.

One market research firm that was less positive about the announcement was the Yankee Group in Boston.

"Some of the things they didn't talk about or elaborate on are most important," said industry analyst Irene Costello, noting the most important products are the VS 7320, the resource sharing facility and the VS virtual machine environment. She said one subject Wang should have addressed was a continuing public perception that Wang's service and support are poor.

One Wang customer reported he was pleased with the announcement, even though the new products will have minimal impact on his company. "Now I want to see what comes next," said Neal O'Brien, director of systems and programming at Mony Financial Services in Syracuse, N.Y. O'Brien, whose company uses numerous smaller VS systems, said he hopes the high-end activity signals moves throughout the rest of the Wang product line, particularly with greater minicomputer and personal computer integration.

Unfamiliar with details

Most MIS managers questioned about the announcement said they were unfamiliar with the details. However, Philip D. Dowlin, director of information services for Midcon Services Corp., was present for the introduction and reported his company has received a VS 7150. He said the installation went smoothly.

The three VS 7100 systems are housed in a 36- by 36- by 25-in. cabinet designed for an office environment. Each system features a minimum memory of 4M bytes, with expansion capability to 16M bytes, and supports up to 128 users.

Wang Vice-President Harold P. Ano said the active users supported without performance degradation, depending on the application mix, are 35 to 70 for the VS 7110, 50 to 100 for the VS 7120 and 60 to 120 for the VS 7150.

Ano claimed the VS 7110 provides 1½ to 1¾ times the performance of the VS 85, while the VS 7150 provides up to three times the power of the VS 100. They cost from $90,000 for the entry-level VS 7110 to $232,000 for a fully configured VS 7150.

The VS 7310-300 provides the performance of a VS 300 but is housed in a 36- by 48- by 25-in. cabinet with space for a second processor.

Wang Laboratories, Inc.

VS product line

	[illegible]	[illegible]	[illegible]	VS 7110	[illegible]	[illegible]	[illegible]
Maximum Users	8	16	40	128	128	128	192
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cache (bytes)	None	16K	16K	[illegible]	32K	32K	32K
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cycle Time (nsec.)	480	200	200	240	180	120	120
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Mips*	.4	.7	.7	1.7	2.3	3.4	3.4
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* Million of instructions per second, CW estimates.

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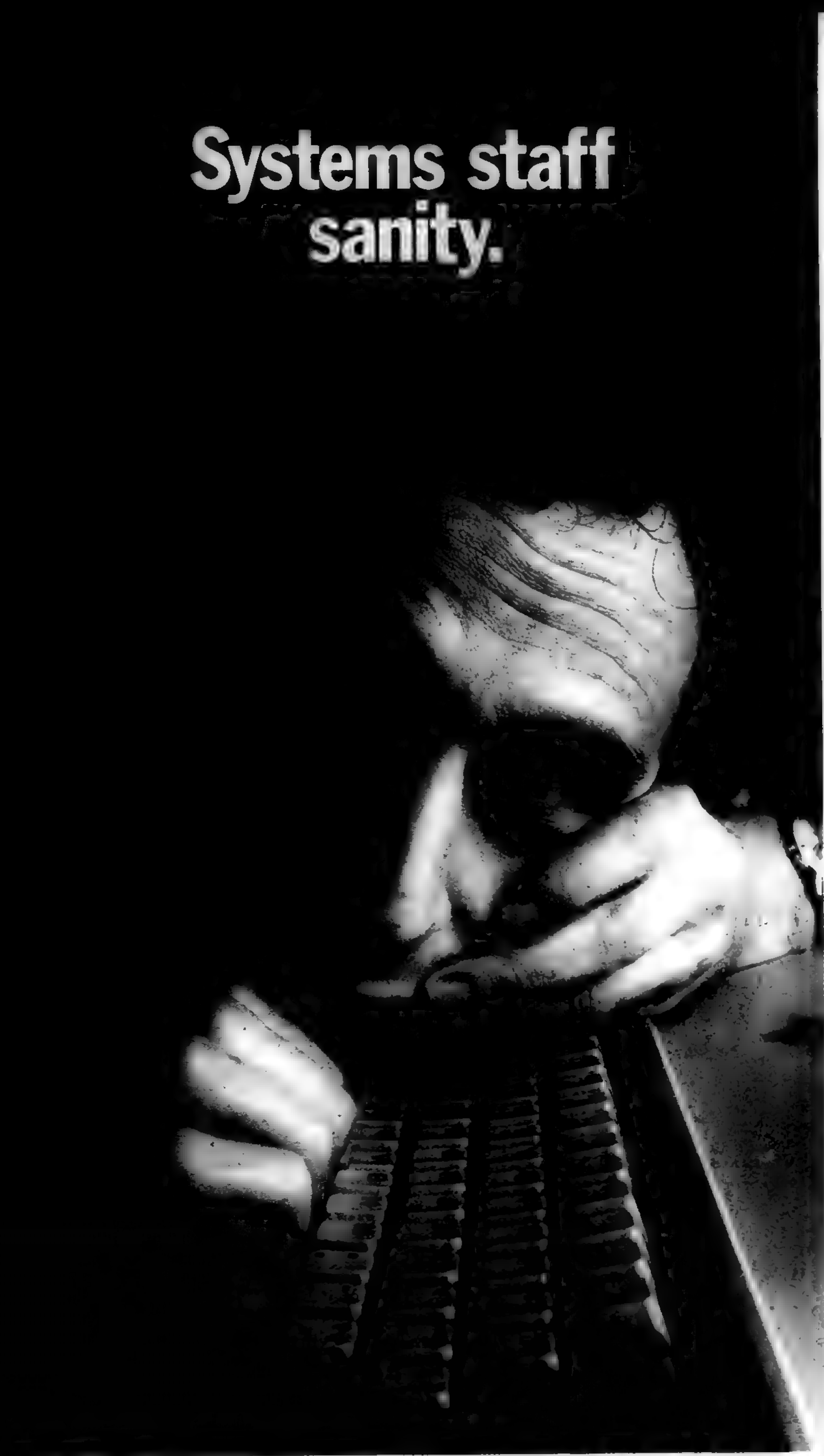

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ANSI's SQL standard differs from IBM's, other versions

By Charles Babcock

The standard for Structured Query Language (SQL) published by the American National Standards Institute (ANSI) differs slightly from IBM's and other marketplace versions of the relational data base access language, according to members of the panel that authored the standard.

SQL is used as the data access and manipulation language for IBM's DB2 and SQL/DS relational products as well as for relational products from Oracle Corp., Relational Technology, Inc., Informix Software, Inc. and Unify Corp.

Applications written in ANSI-standard SQL that take advantage of its extensions could not be run against DB2, said Phil Shaw, editor of the ANSI X.3H2 Committee document that was published as the standard. Shaw is a senior programmer with IBM's General Products Division in San Jose, Calif.

On the other hand, if the application were restricted to the SQL commands common to the ANSI standard and IBM's version, it would execute correctly with DB2, he added.

Standard debated, approved

The publication of the standard in December represented the final step in the approval process that began in October 1982. The X.3H2 panel is a technical committee of the ANSI X.3 Committee, which is responsible for standards supervision. Both committees debated and approved the standard and submitted it for public review before publication.

Publication of an SQL standard, however, will not halt developments in the language, according to X.3H2 Committee Vice-Chairman Carol D. Joyce, data base management system development manager at Relational Technology.

"We are going on with extensions to SQL and will continue to do so for the foreseeable future," Joyce said. These extensions include a scrollable cursor that could go backward to FETCH a previous row as well as forward for the next row, a constraint of the current forms of SQL, she said. When it is approved, the new version of SQL will be announced as SQL2.

Major differences

The major differences cited by Shaw and Joyce between the ANSI standard and IBM SQL are the following:

- IBM SQL requires the words integer and decimal to be spelled out in program statements; the ANSI standard allows them to be abbreviated as INT and DEC, Shaw said.
- In the definition of a character-string data type, IBM SQL requires that a length be specified; the ANSI standard makes the length definition optional.
- In IBM SQL, a column is constrained as unique in a clause in the CREATE INDEX statement; the ANSI standard allows the clause to be specified as unique in the CREATE TABLE statement.
- In IBM SQL, a UNION cannot be performed without first removing duplicates; in the ANSI standard, the UNION can be performed with duplicates by invoking an ALL option.
- Reserved key words differ between IBM and other vendors' implementations and the ANSI standard; users will need to define key words that go beyond those in the standard to take advantage of features in vendors' implementations.

Shaw said most of the differences between IBM SQL and the ANSI standard are no greater than the difference between IBM SQL and another vendor's version of the language.

Joyce said work on an International Standards Organization standard has proceeded in step with the ANSI committee's work and that at this point, the two standards remain identical. Feedback from European users was incorporated into the final version of the ANSI standard, she said.

1-2-3 sue! Lotus vs. clones

From page 1

Software's VP Planner and Mosaic's Twin, which have a look and feel very similar to that of 1-2-3. "While imitation is the sincerest form of flattery, in these two cases it happens to be the sincerest form of theft as well," claims Jim Manzi, Lotus chairman.

But, says Adam Osborne, president of Paperback Software, "1-2-3 was nothing but a copy and extension of Visicalc [the first electronic spreadsheet, produced by the former Software Arts, Inc.], while VP Planner is a massive improvement over 1-2-3." Officials of Mosaic were unavailable for comment.

Osborne says a countersuit will likely be filed. "Clearly, what they are doing is restraint of trade, trying to make sure that nobody can compete and drive down their prices," he charges.

Users undeterred

Despite the charges, users of VP Planner vow to continue with the product. "Lotus should be competing with R&D and not competing in the courts," says Joe Maly, planning officer for California First Bank in San Francisco, who says VP Planner is superior to 1-2-3 for his uses. For Lynne Hughes, a financial analyst with McDonnell Douglas Tymenet in San Jose, Calif., VP Planner is better than 1-2-3. "I don't think Lotus will win. Lotus doesn't have a lot of VP Planner's features," Hughes says.

Although the suits, which seek $10 million from each firm for punitive damages, threaten the survival of the defendants whose sales pale in comparison with Lotus's, the biggest impact may be on the entire software industry and user community.

If Lotus prevails in the suits, observers say, software developers may be forced to make applications different simply to stay out of court, at a major cost to increased end-user training. In fact, if the courts were to have fully protected the look and feel of software, 1-2-3 might never have been developed, some argue.

"Should the world not have had 1-2-3? Should Mitch have been afraid?" asks Dan Bricklin, president of the Software Garden, co-author of Visicalc and former Lotus employee.

According to Bricklin, Mitch Kapor, the former chairman of Lotus and co-author of 1-2-3, was beta-testing versions of Visicalc while developing 1-2-3. Bricklin sold Software Arts, the firm he headed, to Lotus, along with the rights to Visicalc, which is not now marketed by Lotus.

Perhaps most stunning is the potential negative impact on the computer industry, which has been lurching toward software standards. This possibility has touched off a virulent debate over the suits' impact on software innovation. Some fear that such lawsuits could spiral out of control and stifle innovation. Others wonder where and when it will end.

"What they are saying could be interpreted as meaning MS-DOS is an infringement upon CP/M and one Fortan compiler is an infringement on all other Fortran compilers," Bricklin says, referring to operating systems by Microsoft Corp. and Digital Research, Inc, respectively. "The implications are horrendous."

But others, such as Peter Marx, a partner in the Boston law firm Goulston & Storrs, side with Lotus. "Software is one of the last areas where America is dominant, and it is important to protect our innovators," Marx says. And Jeffrey Tarter, publisher of the Cambridge newsletter, "Softletter," agrees. "I want to see the clones squashed like bugs. People like Lotus and Ashton-Tate have done original work, and the clones are not doing original work," Tarter says.

Lotus argues that protecting so-called intellectual property rights encourages innovation. "In the long run, cheap imitations hurt our industry," Manzi says.

Javelin approach

But Javelin Software Corp. tried a different and innovative approach, and hoped its Javelin financial modeling package would succeed at the expense of Lotus. Sales languished, forcing Javelin to lop nearly $600 from the package's price as part of a continuing special promotion.

Users argue that the threat of clones is a situation Lotus itself created. Many users turned to clones of 1-2-3 after Lotus pulled the original version off the market and substituted a version that was not fully compatible with the existing 1-2-3 base.

Many software executives contacted last week say they believe the lawsuits are damaging. "I think it is a bad thing. We should worry about perfecting technology and not worry about suing each other," says Ron Posner, president of Ansa Software.

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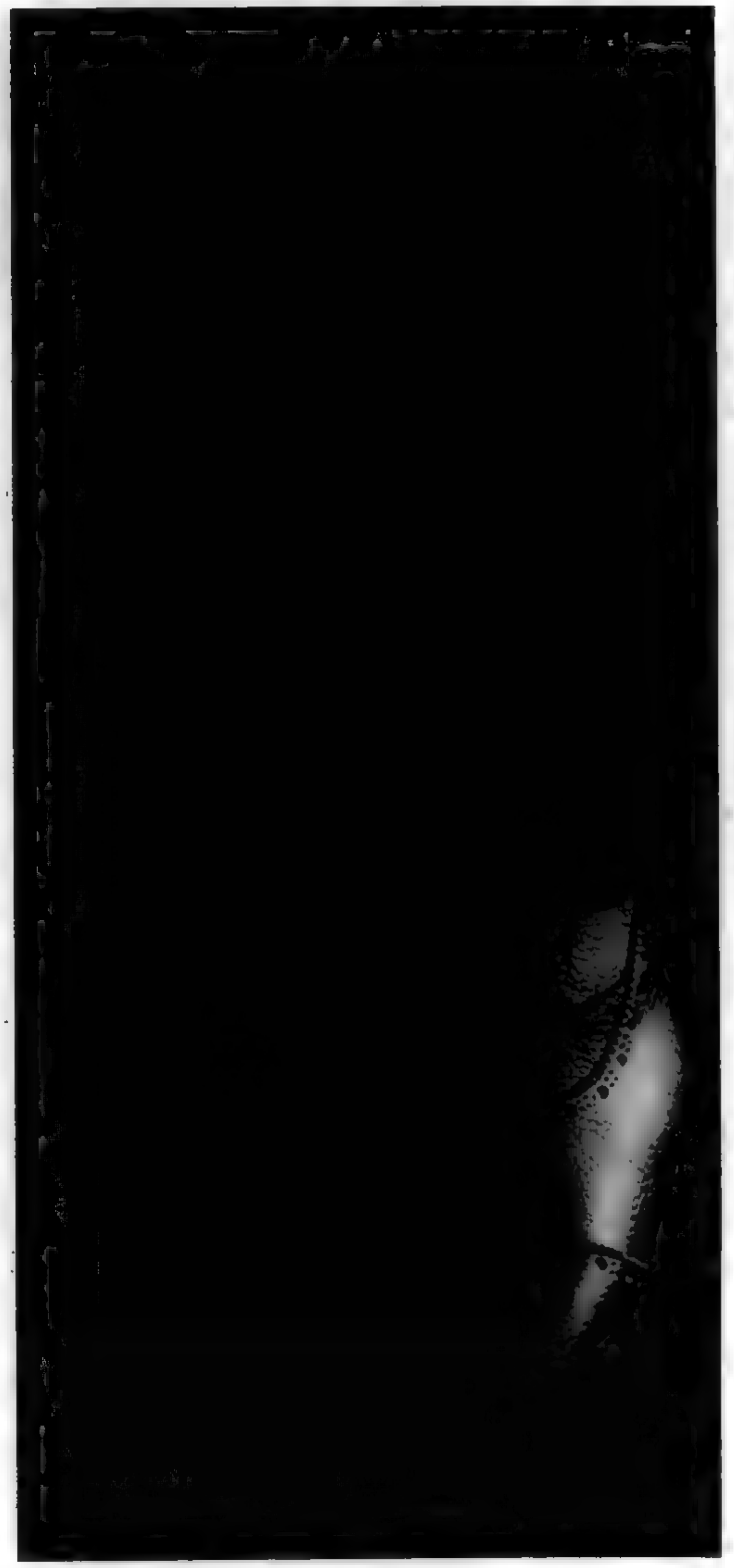

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IBM finds friends in bid to influence

From page 1

Groupe Bull, under the auspices of the French standards organization, will propose that elements of IBM's peer-to-peer networking protocol, LU6.2, become part of OSI transaction processing specifications that the subcommittee hopes to hammer out by June. An earlier IBM proposal to include elements of LU6.2 in the American National Standards Institute's (ANSI) OSI recommendations was rejected.

The subcommittee, an organization of 21 representatives from standards bodies in Europe and North America, will meet in Paris to discuss at least two rival proposals defining basic transaction processing services, such as how to send and receive data, perform updates and send acknowledgements and error messages.

One set of specifications that does not conform to LU6.2 was co-authored by John Neumann, vice-president of Vienna, Va., research firm Omnicom, Inc. and submitted by ANSI; the other, submitted by the IBM-Siemens-Bull triumvirate, is an exact replica of LU6.2, Neumann claimed. "There is going to be a fight," he said.

Short vs. long run

While an IBM victory should benefit users in the short run, in the final analysis, the industry — and ultimately the users — would lose out, according to Connecticut Mutual Life Insurance Co. data processing officer William Burroughs.

"As a business user, I like the idea of LU6.2 becoming an industrywide standard because we want vendors to coordinate around a communications standard and bring standardized products to market as quickly as possible," Burroughs said. "But if the computer industry follows IBM into the fold, this eliminates opportunities for IBM's competitors to bring out products that are *better* than IBM's."

The insurance company has made LU6.2 support a prerequisite for minicomputer systems that are currently being evaluated for a future distributed data base project. "I don't see anything today that's better or more defined," Burroughs admitted. Nevertheless, he expressed concern that LU6.2 incorporation into OSI would "cause trouble for us in the long run, especially if we choose Digital Equipment Corp. systems. Standardization has to be flexible or it stifles."

The outcome of the battle will determine transaction processing protocols that will become the basis for an Open Distributed Architecture (ODA) that would work with OSI protocols. ODA would define peer-to-peer communications protocols that correspond closely to LU6.2 protocols, according to Neumann.

"Right now, nothing in OSI performs application-to-application functions such as data base updating; it provides file transfer only. You can update a file on another system under OSI, but it's a clumsy process," Neumann said. ODA would also pave the way for a multivendor distributed data base system under OSI.

IBM chose to submit its LU6.2-based transaction processing document through France's standards organization only after it tried and failed to get it incorporated into ANSI's submission to ISO, according to Neumann. The European Computer Manufacturers Association (ECMA), a vendor consortium that develops specifications that are often incorporated into the final OSI standards, also declined to implement LU6.2 in its own specifications in May.

ECMA is still willing to incorporate LU6.2 into OSI, however, according to Christopher Cheetham, a manager for business development at European computer manufacturer ICL PLC. Adopting IBM's protocols as part of OSI might avert a situation feared by more than one computer vendor — Big Blue nominally supporting industry standards while putting its weight behind its own proprietary protocols. "IBM is the only vendor that could do that," Cheetham noted.

On the other hand, ECMA wants to ensure that IBM does not retain control of its protocols once they become part of OSI. "ICL would very much welcome early standardization in this area, provided that we can have an open standard under control of the public domain — not of a single supplier," Cheetham emphasized.

"The only reason ECMA rejected the protocol in May was because we couldn't agree with IBM on how to allocate control of the standard," he said. The Paris meeting will be an opportunity for standards bodies such as ECMA to reopen negotiations with IBM on this issue.

Low profile

IBM has carefully maintained a low profile on the LU6.2-standard question ever since the well-publicized ECMA debacle. "ECMA invited us to submit LU6.2; we never proposed it ourselves," IBM spokesman Paul Neuman said. Bull, IBM and Siemens are proposing incorporation of "certain basic LU6.2 communications functions, such as allocating a conversation, confirming receipt of data and requesting to send," Neuman said.

"This would be a positive development for LU6.2," he admitted, adding, however, "There is nothing threatening about LU6.2; it is simply a programming tool that enables communication between two different computers."

The objective of the next meeting of the subcommittee, to be held in Japan in June, will be to define the actual specifications for the transaction processing standard. This may not be a realistic goal, however, Omnicom's Neumann claimed. "But by the end of 1987, we should have the protocol specifications." The next step will be a series of ballots that could take as long as two years before the standard will be finalized, he added.

DEC to go after IBM market with clustered designs

By James Connolly

NEW YORK — Digital Equipment Corp., which three years ago backed out of the mainframe business when it let its Decsystem 20 series die, reportedly will take a new aim at the IBM data center market tomorrow with clusters of its VAX 8700.

DEC has scheduled an announcement for its Wall Street branch office, leading analysts to speculate that the company will introduce clustered configurations of four and possibly eight VAX 8700s. The VAX 8700, rated at about 6 million instructions per second (MIPS), was introduced in August as DEC's second most powerful machine.

DEC reportedly will bill the clustered systems as competitors with the higher end of IBM's 3090 mainframe family, the 3090 Model 200 and the 3090 Model 400.

An executive with a DEC competitor speculated that the clustered VAX 8700s could perform 25 MIPS with four CPUs and 50 MIPS with eight CPUs.

However, Richard Mikita, director of processor programs for the Framingham, Mass.-based market research firm International Data Corp., observed that the MIPS ratings for the new systems will depend on how they are configured.

He said a key factor will be whether DEC modifies its VMS operating system to present a single image — the way IBM does with its multiple-processor systems — rather than having four CPUs running independently. He also questioned whether the configurations would have one CPU acting as a master, with all jobs moving through that CPU before being run by the slave processors, or if all of the CPUs would be symmetrical.

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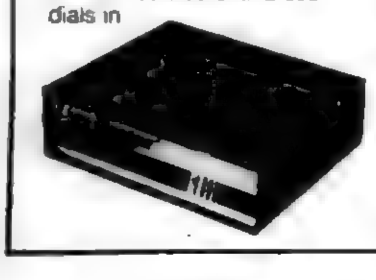

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STC clears tax hurdle

LOUISVILLE, Colo. — Storage Technology Corp. (STC) apparently cleared the final hurdle to emergence from Chapter 11 bankruptcy protection last week when a federal bankruptcy court ruled that STC's maximum federal tax liability was $22.8 million.

The amount was less than the $25.2 million liability projected by STC and much less than the $640 million that the Internal Revenue Service claimed STC owed in back taxes, interest and penalties [CW, Dec. 15].

The $22.8 million includes $20.1 million owed by STC between 1977 and 1984 and $2.7 million owed by its subsidiary, Documation, Inc. STC Chairman Ryal Poppa said the company was pleased with the ruling.

— Clinton Wilder

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Wordstar upgrade bids to win back market

By Peggy Watt

SAN RAFAEL, Calif. — Die-hard Wordstar users say they are glad to get an upgrade after more than three years, but Micropro International Corp.'s efforts may be too late to glean enough new users to return the flagship product to its former status.

Wordstar 4.0, announced last week and scheduled to be available in February, features more than 125 enhancements, including an UNDO command, macros, path support for subdirectories, some calculation features, more printer drivers and some on-screen text formatting, according to Micropro and early evaluators.

The new version also includes a 220,000-word Word Finder thesaurus from Microlytics, Inc., an 87,000-word spelling dictionary, enhanced Mail Merge and indexing programs. Specialized legal, medical and financial dictionaries are available separately.

A single-user version is $495, and a local-area network file server version is $595, with node versions for $150 each.

Upgrades will be available for $89 to Wordstar users, who must report their software's serial number but need not return the disk. Those who bought Wordstar after Dec. 1, 1986, will receive a free upgrade.

Even Micropro President Leon Williams expects the first takers to be the Wordstar faithful rather than new users.

"There are a lot of users out there who haven't gotten much software from us lately," he says. Williams adds that an upgrade will be available for Digital Research, Inc. CP/M versions of Wordstar this year.

Eisen Chao, information center director for Chicago Title & Trust Co., says the company has stayed with Wordstar on more than 200 personal computers.

"It's still on the approved list, even when some of the new, popular programs aren't," Chao says. He adds that he prefers Wordstar's nondocument mode for programming.

The mass upgrade policy is particularly inviting, he adds. "Not having to send back our disks will help," he says. "We're still in the process of getting our Lotus upgrade" from a year ago.

Back in the market

"I think it's going to put them back in the market," says John Conrod, systems analyst for Pacific Bell in San Francisco, which has nearly 3,000 Wordstar users.

"We reluctantly stayed with Wordstar over the past years because, while it lacks some features, it was one of the most compatible for ASCII conversions or imports to and from spreadsheets," he says.

But industry analysts who approve of the new features also say the update may be too late.

"Micropro has a tough row to hoe," says Bill Higgs, software analyst for Infocorp, a Cupertino, Calif., market research firm. "If users are still with Wordstar, they're probably hard-core and will upgrade. I think Micropro will probably have a pretty healthy conversion rate. But the new customers will probably not be enough to vault them back to number one."

Micropro is beckoning new buyers with a rebate offer of $100 cash back or $300 worth of utility programs, including Borland International, Inc.'s Sidekick and Ready from Living Videotext, Inc.

The new features, while substantial, are limited enough to keep from infringing on Wordstar 2000, Micropro's high-end word processing package, Higgs adds. "They don't want to cannibalize that product."

The caution of protecting Micropro's other products cripples Wordstar, according to Tim Bajarin, vice-president of the microcomputer research division of Creative Strategies Research International in San Jose, Calif.

"They haven't really taken it to third-generation word processing" by adding sophisticated page formatting and publishing features, Bajarin adds. "I think that's a mistake. Wordperfect, Microsoft Word and others are leapfrogging Wordstar. We should have had this upgrade a year ago."

CEO deserts Datapoint

By Clinton Wilder

SAN ANTONIO — Struggling Datapoint Corp. suffered another setback last week when President and Chief Executive Officer Edward P. Gistaro resigned unexpectedly, citing personal reasons.

A corporate statement said Gistaro, 51, declined to discuss his future plans.

Gistaro had been with Datapoint for 13 years, and he had also served on the company's the board of directors for 10 years.

Interim CEO named

Executive Vice-President and Chief Operating Officer Doris D. Bencsik, 55, was appointed interim CEO until a permanent replacement is named by Chairman Asher B. Edelman.

Bencsik joined Datapoint in 1982 after holding positions at Data General Corp. and Honeywell, Inc.

Gistaro's departure came less than two months after John L. Hale unexpectedly resigned as president of Intelogic Trace, Inc., which was Datapoint's former service division that Edelman spun off as an independent company in 1985 [CW, Dec. 8].

Datapoint reported a loss of $4.5 million on revenue of $71.4 million in its most recent quarter that ended Nov. 1.

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3317-8783

Enmasse aims Unix systems at commercial DP market

By James Connolly

ACTON, Mass. — Enmasse Computer Corp. is expected to introduce its second generation of Unix-based systems this week with the announcement of a multiprocessor designed to support more than three times as many users as Enmasse's 1-year-old ECS1000.

The Acton-based company is scheduled to announce the ECS2000 at Uniforum 1987, The International Conference of Unix Users in Washington, D.C.

Like the ECS1000, the ECS2000 is based on Motorola, Inc.'s 68020 microprocessor. However, the newer system reportedly features backplane and memory controller modifications designed to provide full 32-bit processing and data flow, rather than the 16-bit data flow of the ECS1000.

Tom Perry, Enmasse vice-president for sales and marketing, said the modifications also allow the addition of up to 120 user connections to each application processor in the ECS2000, compared with 32 connections per application processor in the ECS1000. Application processors and user connections reportedly can be added in increments. With the connection of up to 24 application processors to the central file processor, the ECS2000 supports up to 2,880 users. Enmasse claimed the ECS2000 performs an aggregate of 200 million instructions per second (MIPS), but Perry said the processors perform about 6 to 7 MIPS on a single job.

The ECS1000 reportedly can be upgraded to an ECS2000 in the field. Both systems run EOS, which is Enmasse's version of AT&T Unix System V.2.

An entry-level, eight-user ECS2000 configuration costs $29,900 and includes 6M bytes of memory, a 172M-byte disk drive, a cartridge tape drive and an EOS license. Support for more users can be added in eight-user increments at a cost of $400 per user. Perry said a mid-range system would cost $60,000 to $120,000 and a high-end system could cost more than $1 million.

Uniforum '87

Firm readies automation tool

Targets burgeoning computer-aided mart

By Mitch Betts

WASHINGTON, D.C. — A veteran California software firm will leap into the computer-aided software engineering (CASE) market this week with the first in a family of products for automating the software development process for general business applications.

Caseware, Inc. will introduce Amplify Control, a Unix-based software development environment for large systems, at Uniforum 1987, The International Conference of Unix Users, here.

Officials said the product automates the management and organization of software development and will be followed by integrated modules that automate software design, project management, documentation, support and software building.

The CASE market, which analysts expect to grow to nearly $1 billion in 1990, is predicated on the MIS manager's interest in improving programmer productivity and reducing the costs of software development and maintenance.

David W. Bernhardt, president of the Costa Mesa, Calif.-based firm, said in an interview that Amplify Control is the first CASE product for general business systems, rather than vertical markets.

Initially, Amplify Control will run on Sun Microsystems, Inc. Sun-2 and Sun-3 workstations and is intended for producing software in the C language. It will be modified to run on other workstations and to develop code in other programming languages, the vendor said.

Amplify Control integrates several of the software development tasks — such as the coding, testing and debugging cycles and configuration management — into a uniform environment.

The environment features the use of windows, a mouse and a graphics-oriented user interface so users can graphically navigate through the software system by viewing structure diagrams and then access source code directly through these diagrams, according to the vendor.

Other features include a version control facility, automatic generation of Unix "make files" to update software development information, a structure diagrammer and a security facility, the vendor said.

Version control major concern

Bernhardt said that version control is one of the biggest concerns of MIS managers because of the high cost of distributing software that contains errors.

"It only takes one file that is not updated properly for you to have a bad release. If you've ever been on the receiving end of a bad release, you know how bad it is. If you've ever been on the giving end, it's a nightmare," Bernhardt said.

The next module to be released, Amplify Design, will enable programmers to create and link data flow diagrams and structure diagrams but cannot translate diagrams into code, Bernhardt said. The last module, Amplify Build, is expected to use artificial intelligence techniques to generate code and will be released in two to three years, he said.

Amplify Control will be licensed to end users at a cost of $7,800 per workstation CPU, with volume discounts available. Shipments are scheduled to begin in early April.

Until last month, Caseware was known as Computers West, Inc., an applications software developer founded in 1976. Bernhardt changed the name to reflect the firm's new thrust into the CASE market.

Sun, Applix, Televideo prepare Unix introductions for conference

Major hardware and software vendors are expected to announce significant Unix-oriented products at this week's Uniforum 1987, The International Conference of Unix Users in Washington, D.C. Below are a few announcements unearthed last week.

■

Sun Microsystems, Inc. will introduce an expandable, low-end monochrome workstation and a 141M-byte disk drive on Tuesday at Uniforum 1987.

The Sun-3/140M, with a base price of $12,900, comes with 4M bytes of main memory and can accommodate up to 282M bytes of local mass storage. Less than a year ago, the vendor introduced the Sun-3/50M, a low-end monochrome workstation that could be purchased as a diskless system or as a hard-disk version with a 71M-byte capacity.

Beyond expanded storage capacity, the workstation has been designed to allow users to add up to four optional Sun boards.

The 141M-byte disk drive will be offered with all Sun-3/50 and Sun-3/100 systems and costs $6,900. A mass-storage subsystem version, which would include a 60M-byte ¼-in. cartridge tape, costs $8,900.

Sun will offer a packaged version of its 3/50M with the new disk drive for $15,500. The 71M-byte hard-disk version had been introduced for $13,900 last February.

Rose Hamilton

■

In a move aimed at tapping the software market for the large base of Intel Corp. 8088-based microcomputers, Applix, Inc. will announce PC-Alis this week.

PC-Alis is an optional feature of the Alis system that lets users of IBM PCs and compatibles access Alis's integrated office automation software. "You can run part of Alis on your DOS PC and part of Alis on your host and get access to a full work group computing environment," said John Butler, vice-president of sales and marketing for Applix.

A host system, such as NCR Corp.'s Tower family, Digital Equipment Corp.'s VAX family or a workstation file server, is required to run PC-Alis. The PC is linked to the host through Ethernet.

PC-Alis will be available this week and costs $495. The cost of the Alis host package will begin at $1,945.

■

Televideo Systems, Inc. will announce this week three computers that can act as multi- or single-user systems.

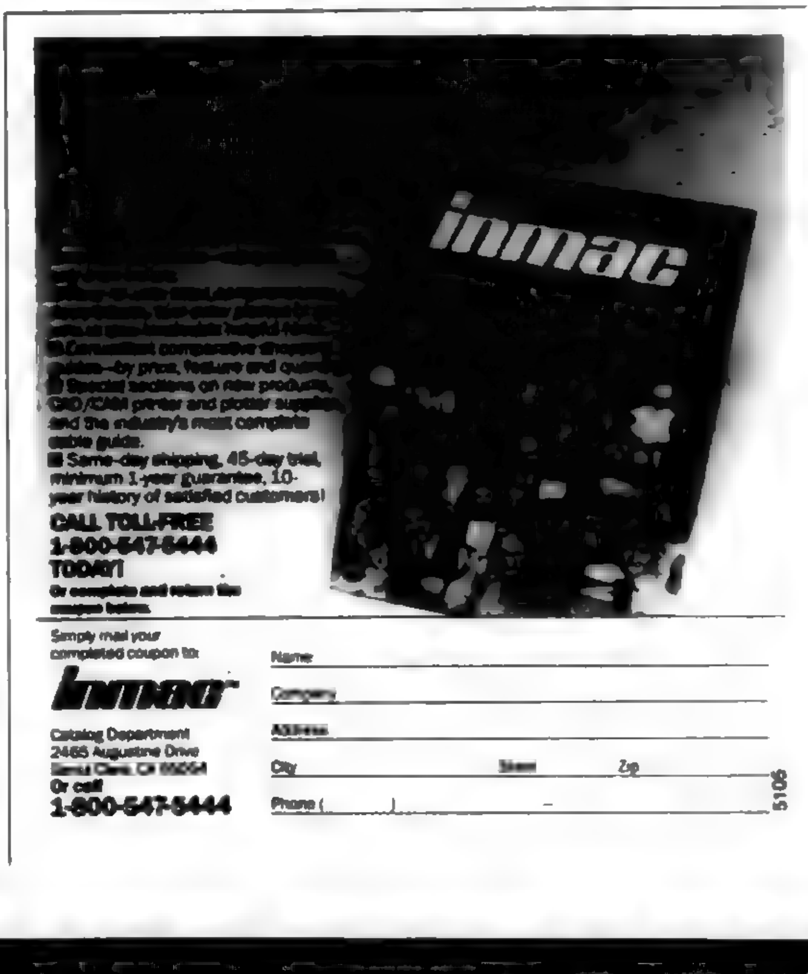
The firm will formally unveil the Telenix 386, which serves eight to 16 users and is three times as fast as the IBM Personal Computer AT, a company spokesman claimed.

Telenix 386 is based on the Intel Corp. 80386 microprocessor and will come standard with 2M bytes of random-access memory, expandable to 16M bytes, and expansion slots, the spokesman said.

The system will also include a version of Unix and Merge 386 from Microport Systems, Inc., which gives the user the ability to toggle between Microsoft Corp.'s MS-DOS and Unix applications and run those applications concurrently.

All three announced systems will come standard with serial and parallel ports, a proprietary controller for hard disks, a 14-in. high-resolution graphics monitor, a 1.2M-byte floppy and MS-DOS 3.1.

Douglas Barney



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Alliant boosts performance with enhancements to FX/8

By Donna Raimondi

LITTLETON, Mass.— Alliant Computer Systems Corp. last week announced enhancements to its FX/8 parallel processing systems that are said to improve performance up to 56% on some applications and to increase disk I/O throughput by 400%.

The 4-year-old firm, which completed a $30 million public common stock offering in December, announced compiler, operating system and hardware enhancements to the FX/8 scientific system. These enhancements include a new version of the FX/Fortran compiler, disk striping, which is a form of parallel I/O, and a four-times-larger — now 512K-byte — and more advanced cache memory, according to Alliant.

The disk-striping feature seems to have generated the most interest in users. "It's very important for image processing applications," said FX/8 user Keith Miller, manager of the computing technology section at The Analytic Sciences Corp. (TASC) in Reading, Mass. The ability to transfer data in parallel will allow overlaying pictures on top of other pictures, he said.

Disk striping is an operating system feature that distributes individual files across up to four disks, each with its own controller, and allows access to all disks in parallel. Alliant said four-way striping provides a 400% improvement in disk I/O throughput over the existing one-disk-controller system. Striping is said to be most advantageous to users with high I/O requirements, as opposed to users whose programs are CPU-intensive.

Chips updated

A new interactive processor — the unit that executes interactive jobs and performs I/O and operating system functions — contains Motorola, Inc. 68020 chips instead of the previous processor's Motorola 68012 chips and will deliver twice the computational performance of the older processor at the same price, Alliant said.

The increased cache allows up to eight computational elements (the parallel processor units) to deliver more of their peak performance when executing a single large job in parallel.

For Miller, whose FX/8 has three computational elements and four interactive processors, the enhancements could speed up jobs. When TASC got the FX/8 in July, it discovered speedups from four to 30 times that of the Digital Equipment Corp. VAX-11/780 it had before. "A 512K-byte cache would help us. If there is a bottleneck in the machine, I think it is still in the cache," Miller said. Analytic Sciences' system has a 128K-byte cache.

Version 3.0 of the FX/Fortran compiler optimizes a broader range of source-code constructs and algorithms, Alliant said. Delivered performance on the Supercomputer Linpack benchmark increased 56% to 25 million floating-point operations per second.

All systems purchased now will ship with the new cache and interactive processors; the software has begun shipping. The company has upgrade packages for the new cache, priced at $30,000 per 256K-byte board, and interactive processors, costing $3,500 each, that will ship in the second quarter.

The FX/Fortran Version 3.0 and Version 3.0 of Alliant's Concentrix operating system, needed for the disk striping, are supplied to current customers at no additional charge under existing software maintenance contracts. To use the disk-striping feature of the operating system, users need a disk controller, priced at $5,000, for each additional stripe.

Prime to premier processor for science market

By Stanley Gibson

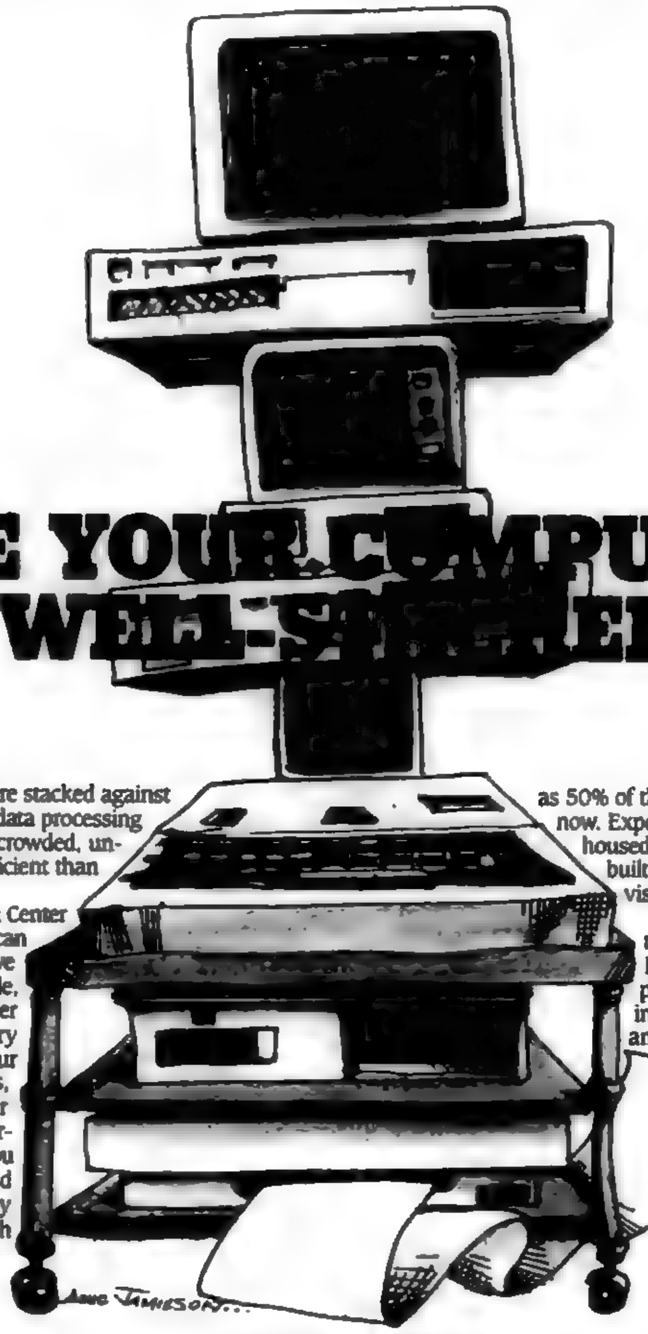
NATICK, Mass. — Seeking to boost its standing in the lucrative scientific and engineering markets, Prime Computer, Inc. will introduce a minisupercomputer that uses parallel and vector processing techniques in the second quarter of this year.

The processor, priced at less than $1 million for a full installation, will go head to head with the machines of Alliant Computer Systems Corp. and Convex Computer Corp. The first customer installations are expected late this year.

"It's a minisupercomputer optimized on numerical performance. It's about 10 times as fast as a superminicomputer but is priced at one-tenth the price of a Cray," said Carl Ledbetter, Prime's vice-president of scientific computing, in a news briefing in advance of the product's formal announcement, referring to Cray Research, Inc. supercomputers.

The machine will run at 40 nsec, will be air-cooled with a fan and will require no exotic parts, Ledbetter said. The computer is now in development test by its manufacturer, Cydrome, Inc., formerly Axiom Computers, Inc., located in Milpitas, Calif.,

Continued on page 14



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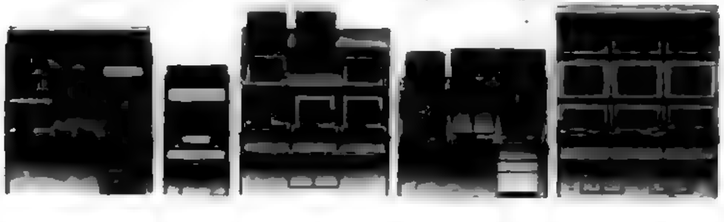

Retailers decentralize with micro-based in-store systems

Use tools to organize schedules, payroll

By Alan Alper

NEW YORK — Decentralization, the buzzword of the data processing industry, is beginning to make its way into the lexicon of retailers, as small and large businesses alike begin adopting microcomputer-based systems to handle everything from point-of-sale (POS) to financial and administrative applications.

At the National Retail Merchants Association (NRMA) Conference held here last week, retailers talked about the virtues of microcomputers, standards in the electronic delivery of documents and the need for better software tools for analyzing data collected by POS systems.

While some smaller retailers were looking for their first POS system, medium-size to large retailers were evaluating second-generation equipment, much of it micro-based, and offering enhanced connectivity to corporate data bases residing on mainframes at headquarters.

'Allow more efficiency'

"In-store processing is the direction more and more retailers are going," noted Kathleen Gette, an MIS consultant with Arthur Young in New York. "Micros allow each store to collect more data and to be more efficient."

Indeed, micros are having an immense impact on productivity at Marshall Field & Co. in Chicago. The mass merchandiser has recently begun using a microcomputer-based system to improve customer service by linking staffing to store traffic.

"Marshall Field believes fervently in the concept that our service level at the point of sale is a crucial element in maintaining and increasing our competitive advantage over other traditional department store retailers within our trading market," said Walter Brown, vice-president of productivity and staffing.

The firm is using a package designed by Garr Consulting Group in Marietta, Ga., which runs on IBM Personal Computer XTs, ATs and compatibles, to set sales agents' work schedules, breaks and revenue goals. By using a computer to handle scheduling, the department store chain hopes to free middle management of mundane tasks, allowing staff members to more effectively manage their departments.

The computerized scheduling system is a signficant and first step in developing an integrated payroll management system within each store, Brown said. Marshall Field expects to install a timekeeping system running on the same micro as the scheduling package at each store, he added.

Encoded badges

The system will use encoded card badges, which when inserted into a card reader will provide daily, weekly, pay period, week-to-date and pay period-to-date information by worker and expense center. This data will be sent to the corporate payroll system via modem.

Other retailers, such as Hechinger Co., a Landover, Md., household goods chain, seek better software packages for in-store POS systems.

"We view that technology as providing us with a competitive edge," said Robert DeMarcos, vice-president of MIS at Hechinger.

DeMarcos also said his company is evaluating the feasibility of using electronic data interchange. "It would enable us to put through purchase orders faster and more accurately," he added.

Continued from page 14

according to Ledbetter.

"I think that they [Cydrome] will be successful. But were it not for their relationship with Prime, they would be too late," offered Jeff Canin, industry analyst with Hambrecht & Quist, Inc. in San Francisco. Canin said the minisupercomputer field is becoming crowded and that Prime's marketing muscle will help the new computer to compete.

A Prime spokesman termed the relationship between Prime and Cydrome a joint development and marketing agreement under which both Prime and Cydrome will sell the product.

Ledbetter said the machine performs between 6 and 20 sustained million floating-point operations per second harmonic on the Livermore Loop and, according to that measurement, outperforms other minisupercomputers currently on the market.

The computer runs AT&T's Unix System V Release 3. The 64-bit computer processor will have a Fortran compiler and will support Ethernet and Transmission Control Protocol/Internet Protocol.

Prime said it hopes to sell the computer to users of Prime computer-aided design and manufacturing (CAD/CAM) systems for testing models created on the CAD/CAM system, in much the same way that Alliant computers are sold with Apollo Computer, Inc. workstations.

Ledbetter also hinted that Prime will introduce an advanced workstation that will complement the product later this year.

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VIEWPOINT

EDITORIAL

Declaration of independents

There's a foul smell emanating from Section 1706 of the Tax Reform Act of 1986. As of this writing, the government is still trying to determine the most politically expedient interpretation of this section. While the drama unfolds, independent programmers and computer consultants are in limbo.

Section 1706 threatens the status of the independents, or so it would seem. The problem is that no one seems to know whether it applies only to independents working through brokers, to those working directly with clients or to both. Since the section took effect Jan. 1, this interpretive uncertainty is causing problems. Reports have surfaced of some employers holding portions of independents' pay in escrow against possible tax payments. Others are simply putting contractual arrangements on hold until the government can make up its mind.

No matter how one slices it, Section 1706 was ill conceived at best. To begin with, it is unclear just how it got into the tax code. The more closely its genesis is viewed, the more it looks like Section 1706 was thrown into the reform hopper the way one tosses *TV Guide* into a shopping cart at the checkout counter. It's just another item.

Further, Section 1706 is curiously selective in terms of whose loopholes it attempts to close. Specifically, it applies to "an engineer, designer, computer programmer, systems analyst, or other similarly skilled worker." Independents working in nontechnical fields are safe from its grasp.

It is likely the tax reformers had it in mind to deal with the scores of programmers who, while functioning for all intents and purposes like permanent, full-time employees of one primary employer, exploited so-called safe harbor provisions and reaped the tax benefits of independent businessmen.

There is no questioning the merit of tax reform that brings scofflaws in line. But there are thousands of innocent independents who may get sucked under by a reform undertow originally intended to close select loopholes.

National politics being what they are, it appears the development of Section 1706 involved cloakroom antics as much as anything else. During the long debate on the sweeping Reform Act, Democrats sought tax cuts for certain groups in their constituencies. The Republicans essentially said, "Sure, you can have some cuts. Just make sure they are matched by increases in other areas so we don't embarrass our president with even larger deficits."

If there was one group to exploit, it was the hundreds of thousands of independents who seldom speak, that is, lobby, with a common voice. The problem is they are speaking up loudly now. So Sen. Daniel P. Moynihan (D-N.Y.) last month summoned a special task force composed of congressional, treasury and Internal Revenue Service folk to arrive at an equitable intepretation of their own rules.

After all is said and done, what does the government estimate it will reap in extra taxes from Section 1706? An average of about $12 million a year over the next five years. That's what the federal government spends every eight minutes of every day, 24 hours a day, seven days a week. So it's small potatoes to congressional reformers — unless the independents squawk loudly enough.

LETTERS TO THE EDITOR

What VAX programmer shortage?

With regard to the article, "VAX boom triggers hiring war" [CW, Dec. 1], will someone please tell me where this shortage of VAX programmers is?

In 1980, I entered the University of Oklahoma as an electrical engineering major. My first electrical engineering class was in Fortran, and I punched cards for six weeks before I was given an account on the Digital Equipment Corp. PDP-11/70, which was the heart of the engineering computer network (ECN).

From then on, I did all of my classwork on the 11/70 or one of the two VAXs available to me and, except for the semester I took Cobol, having since changed majors to computer science, I never again had to deal with IBM. (My Cobol work was submitted through an remote job-entry link from the 11/70.) During my sophomore year, I was hired as a student applications analyst on ECN, working on what became an 11/70 and 11/780 network serving more than 80 terminals.

I left the university in 1984 for Southeastern Oklahoma State University, where I once again worked on an 11/70, this time running RSTS/E. In 1985, I was hired as a systems programmer by SOSU and was involved in the installation and configuration of the school's new VAX 11/785 with VMS. I was in charge of installing and maintaining Eunice, a layered product that emulates the Unix environment, and worked on both hardware and software until my graduation in December 1985.

The purpose of the above educational history is not to blow my own horn but to give an idea of what type of training goes into a bachelor's degree in computer science these days. I have applied again and again to shops using DEC equipment, only to be turned down because I lack "experience." More than five years' work on DEC systems doesn't even qualify me as a VAX operator, according to one firm. There's always someone else who is better qualified for the position.

So, if there is really a shortage of VAX programmers out there somewhere, could you let us know where it is? I'm certain that I am not alone in this situation, and we would welcome the opportunity to apply and expand upon our DEC skills before they are allowed to atrophy. Give us a chance — you'll find that "entry level" has taken on a whole new meaning.

Brad J. Southers
Kawneer Co.
Denison, Texas

AT&T Mail offers editable E-mail . . .

The article, "MCI, Lotus to co-announce editable E-mail" [CW, Dec. 1], citing a communications project manager, claims that the companies' joint offering is "the first time a public electronic mail service will be able to handle anything beyond plain ASCII text."

This statement is inaccurate. AT&T's electronic mail service, AT&T Mail, has always had this capability, up to and including the delivery of executable binary files.

Mark Siegel
Manager, Media Relations
AT&T
Basking Ridge, N.J.

. . . as does GE's Quik-Comm System

The story, "MCI, Lotus to co-announce editable E-mail," reported that the introduction of Lotus Express allows, for the first time, "a public electronic mail service to handle anything beyond plain ASCII text."

In comments before the Electronic Mail Association's annual meeting in Washington, D.C., on Dec. 3, General Electric Information Services Co. Vice-President John Sidgmore reminded attendees that GE Information Services, in January 1985, offered the ability to simply and easily transmit binary files, including Lotus Development Corp. 1-2-3 spreadsheets, over its Quik-Comm System global electronic mailbox service.

David M. Page
Manager, Business Communications
General Electric Information Services Co.
Rockville, Md.

Quality is productivity's wellspring

Gopal Kapur's article, "Productivity tools betray promises of MIS nirvana" [CW, Dec. 1], was absolutely on target. The current euphoria focusing on faster code generation really does strike me as confusing quantity and quality in programming.

As any manufacturing shop that has embraced statistical quality control will attest, focusing on quality is the real wellspring of productivity. Yet computer-aided software engineering (CASE) tools that incorporate early life-cycle error detection and address program quality are extremely underrecognized in MIS shops today.

Continued on page 18

VIEWPOINT

Learning how to profit from the EDP audit experience

By EFREM MALLACH

Honestly, now. When an electronic data processing (EDP) auditor walks into your office, you:

(a) panic and dash for the exit.
(b) grin and bear it.
(c) welcome the visit.
(d) don't know — never happens in your organization.

Anyone who checked (c) can turn the page. Unfortunately, I imagine most of you are still reading.

If you checked (a), you can turn the page, too. In fact, you can close the whole paper. You've got bigger things to worry about. Like the name of a good lawyer.

Now we've got the "grin and bear its" and the "don't knows." A "don't know" answer isn't your problem. It's your management's. Unless they're asleep, you won't be able to say "never happens here" for long.

The managerial majority

That leaves the "grin and bear its." You are the majority. Most MIS managers rank an EDP audit with a bad case of hives or having a tooth pulled. That's too bad, because it doesn't have to be that way.

An audit is a review with a fancy name. The focus of an EDP audit is on control of the computer system. Can management be certain it is under control? Do applications work the way the business should run? Is access to sensitive data restricted? Is shipment data seen by different managers consistent? Surely no MIS manager can object to any of these. If an audit helps reach these ends, it should be welcome.

"EDP audits should be of value, both to the MIS manager and to the business unit the system serves," says Polaroid Corp. assistant manufacturing controller Peg Gavenonis of her own experience as an auditor. She continues, "The time dedicated to an EDP audit must have profitable results that yield a more efficient and effective system and one that will provide information fit for management's use."

MIS managers are human, though. Nobody likes good advice no matter how useful it ought to be. Hence, much of the resentment of the audit. Sure, it's good for you. So is cod liver oil. But being good for you doesn't make it taste good.

To make an audit more palatable, Phelps Dodge Corp.'s Corporate Vice-President for MIS Michael Cangemi suggests looking at the example of accountants. Accountants know their work will be audited because it has been for the better part of a century, he points out. They know what auditors want. They set up their systems to be auditable and to pass audits.

Cangemi, who is a past president of the EDP Auditors Association and previously headed EDP auditing for Phelps Dodge, says MIS personnel must take on the conceptual responsibilities that accountants have assumed for decades. "DP management has to realize that they are responsible for computer controls," he says. "If they accept that, they will welcome the auditor as the second best way to see if their systems are well controlled. The best way is for them to do it themselves."

Once MIS managers accept this responsibility, an audit will be a chance to exchange thoughts, show off a little and pick up a few new ideas. Looking at it this way, an audit can hardly be compared with a visit to the dentist.

A wish list

No doubt, everyone has a wish list of what they would like to see happen on the way to this nirvana:

- All auditors must be able to carry out a basic test of EDP operations, which will free the more specialized EDP auditors to function in a more consultative role.
- EDP auditors, in turn, must think like managers and apply their skill to management problems.
- MIS managers must get up to speed on control, security and quality assurance topics.

Doing so is tough, as there is never enough time. The list of topics on which MIS managers must get up to speed is long. Training is hard to find. EDP Auditors Association programs are good, though they are usually aimed at auditors themselves. Learning what is required, however, is not an impossible dream.

With an attitude shift and the learning, EDP audits would be less of a nightmare. They could move up from "barely tolerable" to "well worth the time."

Compared with much of what we do at work, that's pretty good.

Mallach is associate professor of computer science at the Boston College School of Management and a consultant to top managers of vendor and user organizations.

Federal rebuttal: Security policy won't affect private sector

READER'S PLATFORM

By DONALD LATHAM

A news article and editorial that appeared in the Nov. 24 issue of *Computerworld* contain several inaccuracies I would like to correct and clarify. The statements in question appeared in the front-page article entitled, "Feds sound Red alert on data," and in the accompanying editorial entitled, "For our eyes only."

The news article, in an apparent reference to National Telecommunications and Information Systems Security Policy No. 2, "Protection of sensitive, but unclassified information in federal government and automated information systems," erroneously claims that, "In essence, the National Security Decision Directive (NSDD) 145 created a security level below the national security classifications of top secret, secret and confidential."

Neither the policy nor NSDD 145 establishes a new category of classified information. Indeed, the foreword to the policy states that the definition and requirements to safeguard classified information are addressed in Executive Order 12356, signed by President Reagan on April 2, 1982.

Moreover, the policy does not specifically identify sensitive but unclassified information to be protected.

Federal department and agency heads are responsible for identifying such information that pertains to national security or other federal government interests and ensuring that telecommunication and automated information systems processing of such sensitive but unclassified information is protected against unauthorized access.

The editorial described the Reagan administration's efforts to ensure the security of computer systems that process classified and sensitive information as "chilling" and claimed that "the issue is too critical, too comprehensive and too basic to both the nation and to the practice of technology to leave it in the hands of those within the defense establishment."

> **"**
>
> ***'It is essential for, and incumbent upon, the government to initiate measures to prevent the abuse or misuse of [sensitive but unclassified] information by those who would seek to invade the privacy of U.S. citizens, to obtain an unfair advantage in business dealings, to avoid law enforcement efforts or circumvent the intent and purpose of laws passed by the Congress.'***

The interdepartmental structure established by NSDD 145 ensures that the problems of computer security are not left solely in those hands.

In point of fact, the policy protecting government systems that process sensitive information was developed over a two-year period by subcommittees and the working groups of a 26-member interagency government committee — the National Telecommunications and Information Systems Security Committee (NTISSC).

The NTISSC is charged with implementing NSDD 145. A substantial majority of the NTISSC's membership (13 of its 21 members) come from civilian agencies, and even the military departments represented on the committee are, of course, headed by civilian secretaries, in keeping with the American tradition of civilian control of the military.

After the policy was developed and approved by the NTISSC, it was thoroughly coordinated and approved by the Systems Security Steering Group, a Cabinet-level body that was charged by the president with overseeing the implementation of NSDD 145.

The Steering Group is chaired by the assistant to the president for national security affairs and composed of the secretaries of state, defense and the treasury, the director of the Office of Management and Budget, the Attorney General and the director of the Central Intelligence Agency.

The policy reflects a recognition that technological advances have greatly increased the opportunity for unauthorized access to and, thereby, abuse of information.

We believe it is essential for, and incumbent upon, the government to initiate measures to prevent the abuse or misuse of this information by those who would seek to invade the privacy of U.S. citizens, to obtain an unfair advantage in business dealings, to avoid law enforcement efforts or to circumvent the intent and purpose of laws passed by the Congress.

The policy is not intended to and will not affect authorized access to government or government-derived information.

For example, the releasability of information to the media or individuals in response to requests submitted under the Freedom of Information Act is not affected by this policy.

Let me assure you that the policy does not apply to systems in the private sector.

The intent of NSDD 145 and the policies that flow from it is to encourage, advise and assist those in the private sector who want and need to protect their data, but only if that help is wanted.

Latham is the chairman of the National Telecommunications and Information Systems Security Committee.

Continued from page 16

Current-generation CASE tools that integrate analysis, modular design, program specifications and source-code generation, along with early life-cycle error detection, are the solution to the software productivity problem.

CASE tools eliminate much of the dollar- and time-consuming defect-removal process in the test and maintenance phase. They also address such critical issues as design and maintenance backlogs by allowing resources to work efficiently.

Corporations are increasingly dependent on MIS functions to execute critical strategy. MIS directors can ease their resource burdens through CASE tool use.

Forward-thinking MIS directors who use these tools can find real recognition in fulfilling the strategic potential that MIS offers.

Peter M. Craig
President
Promod, Inc.
Laguna Hills, Calif.

On discretionary security

Your article, "System break-ins raise concern over electronic terrorism" [CW, Nov. 24], demonstrates a lack of understanding of computer security. Unix may be insecure, but not "because it is an open architecture."

The problems with Unix have nothing to do with open architecture. The existing Unix security system has serious holes in it, such as allowing users access to security data sets. Even if the security mechanism were tightened, Unix does not provide for discretionary security.

Consider the Multics operating system, which was developed, with Advanced Research Projects Agency funding, by the troika of General Electric Co., Bell Laboratories (which dropped out) and MIT.

Among its design goals was the ability for the user to selectively share data without compromising the data that he wished to withhold and without risking unauthorized changes to data he shared.

In order to satisfy this goal, the early design had to provide for security. The source code for Multics was available to the MIT student body, and students were encouraged to find and report bugs.

Far from compromising Multics security, this openness caused Multics to have much tighter security than it would otherwise have had.

The National Security Agency has certified it as a B level on a scale running from D (most insecure) to A (tightest).

The IBM OS/VS2 MVS operating system, the latest incarnation of OS/360, is also an open architecture, although IBM has announced that future enhancements will be closed.

MVS with a security package was certified at the C level (either C1 or C2, depending on the particular security package). At the time of certification, full source code was available to the public for MVS and Resource Access Control Facility, including the program product versions of MVS, MVS/SP V1 and V2.

The security certifications that Multics and MVS received were not easy — most operating systems have not been or cannot be certified. These systems were among the first to be certified.

I am aware that publicly readable security data, for example, passwords, are scrambled, but in the case of Unix, that turns out not to be much of an obstacle.

I am also aware of the three-level access code for files, but the ability to specify World, Group or Private access does not constitute discretionary access control.

You cannot make the file available to a specific user or to a specific group but only to yourself and the group to which you belong.

Seymour J. Metz
Annandale, Va.

Updating Mother Goose

Many years ago, I invented a Snow White simile.

IBM, under Tom Watson Jr., was the pure little central figure. General Electric Co., still fumbling around in Phoenix, was Dopey. Control Data Corp., founded not long before by William Norris and featuring Surly Seymour as head designer, was Grumpy. It seems to me NCR Corp. was Sleepy, but I'd have to look into my archives to be sure.

Later on, I described Univac as "snatching defeat from the jaws of victory," and Burroughs Corp. as "the secret computer company." And over here I said naughty, naughty things about poor dear ICL PLC.

Time wore on. An ironist with an excessive regard for initials came up with BUNCH, which left out Digital Equipment Corp. And now B and U have eaten each other up, and H, like a fatally wounded brontosaurus, has realized it was killed a decade ago and has made novel arrangements for an Oriental interment.

We need a new simile.

The dwarfs have marched off, singing something a lot less cheerful than, "Hi ho, hi ho! It's off to work we go."

Snow White has hired a thousand lawyers and grown up to be something like the Wicked Queen, intoning, "Mirror, mirror on the wall, who's the toughest of them all?"

I suggest we forget about our Japanese friends and replace the nice Disney tale with a slightly edited nursery rhyme about the five little piggies:

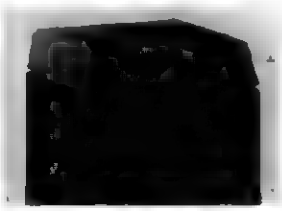
This little pig went to the market [Unisys],
This little pig stayed home [NCR],
This little pig had roast beef [DEC],
This little pig had none [CDC],
And the biggest pig cried, "Sue, sue, sue!" all the way home.

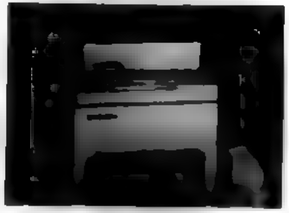
Herb Grosch
Mies, Switzerland

QMS-PS 800

ITT Qume ScripTEN

Texas Instruments OmniLaser 2108


Linotype Linotronic 300


QMS-PS 2400

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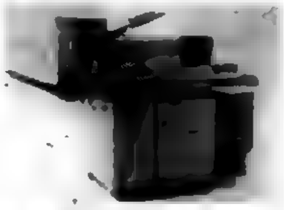
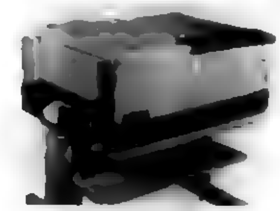

DEC PrintServer 40

NEC SilentWriter LC-890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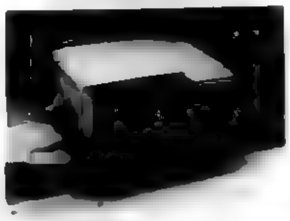
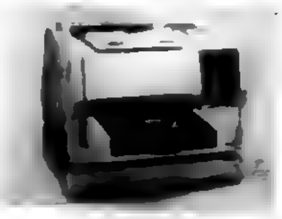
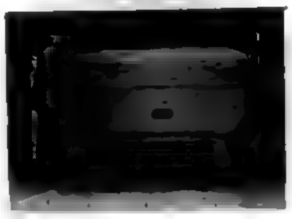
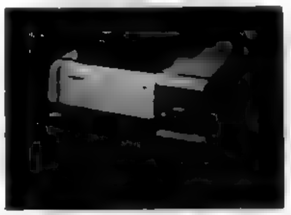
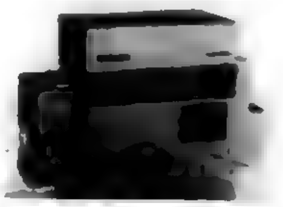

Apollo Domain/Laser 26


NBI Model 908


Apple LaserWriter/LaserWriter Plus

Dataproducts LZR-2665


Texas Instruments OmniLaser 2115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NETWORKING

MAP, TOP standards gain fresh recruits

By Rosemary Hamilton and Elisabeth Horwitt

PHOENIX — Communication Machinery Corp. and Industrial Networking, Inc. were among the few vendors making product introductions at the Manufacturing Automation Protocol/Technical Office Protocol (MAP/TOP) Users Group Meeting here last week.

Communication Machinery introduced software that implements TOP Version 1.0 protocols on VMEbus- and Multibus-based engineering workstations and on the IBM Personal Computer AT.

Communication Machinery is making available software packages that implement physical, link-level internetworking and transport layers of TOP on existing intelligent on-board 802.3 Ethernet interfaces.

The TOP software runs on Communication Machinery's Ethernet Node Processor (ENP) hardware that also supports Xerox Corp. Network Services and Transmission Control Protocol/Internet Protocol (TCP/IP). The common hardware base provides a migration path to TOP for customers that already have installed networks using the older, multivendor communications protocols, Communication Machinery product marketing manager James Soriano said.

The ENP 10 with International Standards Organization (ISO) Lower Level Protocols implements TOP on VMEbus engineering workstations. The ENP 30 with ISO Lower Level Protocols implements TOP on Multibus workstations. Software for both products is priced at $3,500. For both products, TOP lower layers can be interfaced with upper layers of TOP, including applications such as File Transfer and Access Method (FTAM).

The ISO Protocol Software for ENP 60 implements the first four layers of TOP on an IBM Personal Computer AT running Microsoft Corp. MS-DOS. Priced at $450, The software includes FTAM software and an interface to the IBM PC networking interface Netbios. This enables software pack-

See STANDARDS page 21

PC tied to Xenix, VAX

Excelan forms alliances, broadens TCP/IP support

By Elisabeth Horwitt

WASHINGTON, D.C. — Two vendor alliances involving Excelan Corp. are expected to soon release products that allow multiple Microsoft Corp. Xenix System V and Digital Equipment Corp. VAX/VMS systems to act as network file servers for Microsoft MS-DOS workstations.

Scheduled for release by the end of this quarter, the products integrate Excelan's Transmission Control Protocol/Internet Protocol (TCP/IP) Ethernet boards with networking products based on Microsoft's Server Message Block (SMB).

Initially developed for IBM's PC Network, SMB is "a distributed file system that allows users to access and manipulate files transparently on a network without needing to designate which server and what type of operating system they reside on," according to Excelan Vice-President Subhash Bal.

Excelan's boards will be integrated with Santa Cruz Operation, Inc.'s (SCO) Xenix-Net, which implements SMB on Xenix systems, and Syntax Systems, Inc.'s SMB Server/VMS, which implements SMB on VAX/VMS systems. Xenix-Net also enables Xenix systems to act as servers for Xenix-based workstations.

Workstation-to-server file transfer and terminal-to-host communications can be performed using TCP/IP applications File Transfer Protocol and Telnet, respectively. The SMB implementation also allows users to copy files from the server to their workstations. SCO and Syntax's server programs perform format conversion necessary to transfer files from a Xenix or VAX to an MS-DOS workstation.

Excelan's networking board will interface TCP/IP with the IBM PC Network software interface Netbios, enabling software applications written for that interface to communicate using SMB or TCP/IP. Protocols used will conform to the Netbios-

See XENIX page 21

Gate links X.25, SNA on net

By Elisabeth Horwitt

CALABASAS, Calif. — Tekeleck, Inc. recently unveiled a multiprotocol translator and an Integrated Services Digital Network (ISDN) Basic Rate interface for its Chameleon 32 Multiprotocol Test and Development System.

The Translator is a multifunctional communications processor that can act as a gateway among a variety of computer and communications environments, including X.25, Ethernet 802.3 and a variety of host protocols, according to Tekeleck.

Support of X.3, X.28 and X.29 terminal controller protocols enables the Translator to act as a packet assembler/disassembler for groups of asynchronous terminals, which can then communicate with hosts over the X.25 packet-switching network,

See GATE page 21

PC package runs remote job entry in background mode

By Donna Raimondi

LAGUNA HILLS, Calif.— Network Software Associates, Inc. has announced communications software, named RJE/Background, that allows remote job entry micro-to-mainframe communications and file transfers to take place in background mode while another application runs concurrently in the foreground on an IBM Personal Computer.

RJE/Background allows IBM PC users to connect with a remote mainframe, initiate a remote job entry file transfer operation and continue to use their PCs to run an IBM PC-DOS application or other PC-DOS functions. The requested data is automatically transmitted to the PC's disk or

See PC page 20

INSIDE

Baybanks files suit against Yankee 24 ATM network/**20**

Proteon adds token-ring router/**21**

NEW THIS WEEK

- CDC announces its XN line for networks on IBM mainframes
- For more on this and other new products, see pp. 59-68.

INSTANT ANALYSIS

"We have made LU6.2 support a requirement for the minicomputer systems we are evaluating; but we're still not sure why we need peer-to-peer communications, although we recognize that LU6.2 does more than just move files."

— **William Burroughs, data processing officer at Connecticut Mutual Life Insurance Co.**

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Bank files suit against owner of proposed ATM network

Says competitors trying to monopolize market

By Stanley Gibson

BOSTON — A change in electronic funds transfer switching charges is the cause of a lawsuit between the owners of two major automated teller machine (ATM) networks in New England.

Claiming unfair competition, Baybanks, Inc., a Massachusetts bank holding company, has filed a complaint in U.S. District Court here against Connecticut Switch, Inc., the operator of a proposed ATM network.

The complaint alleges that five banks structured switching charges "with the specific intent of monopolizing the market for electronic funds transfer services in Massachusetts."

Regional bank network

In November, five of New England's largest banks — Bank of Boston Corp.; Bank of New England, N. A.; Fleet National Bank; Shawmut Bank, N. A.; and State Street Bank and Trust Co. — announced they would band together to form a regional network under the name Yankee 24 that would be composed of 1,300 ATMs.

Baybanks currently operates more than 1,200 machines in its Express 24 network. Baybanks claims the larger banks are joining forces to squeeze it out of the market, despite the fact that the five banks invited Baybanks to join the network.

"It's like being invited to a potluck supper. Our competitors are bringing spinach, and we are bringing the steak," said William Sandalls, Baybanks' vice-chairman.

"They're trying to call it a licensing fee. They're restructuring the processing charge," Sandalls continued. He explained that if an independent bank were to join both Express 24 and Yankee 24 networks, it would have to pay a charge to Yankee 24 on all transactions, even those switched through another network.

"It's like a tax," Sandalls maintained. "It puts other networks at a disadvantage. The motivation for smaller banks will be for them to use Yankee 24 only."

In a three-year period, the charge for transactions carried out at a Yankee 24 ATM but switched to another network would increase to four cents per transaction, Sandalls said.

"There are hundreds of smaller banks affected by this. They have the desire to stay independent. Big banks have conspired to route all their transactions through the Yankee 24 switch and not others," Sandalls claimed.

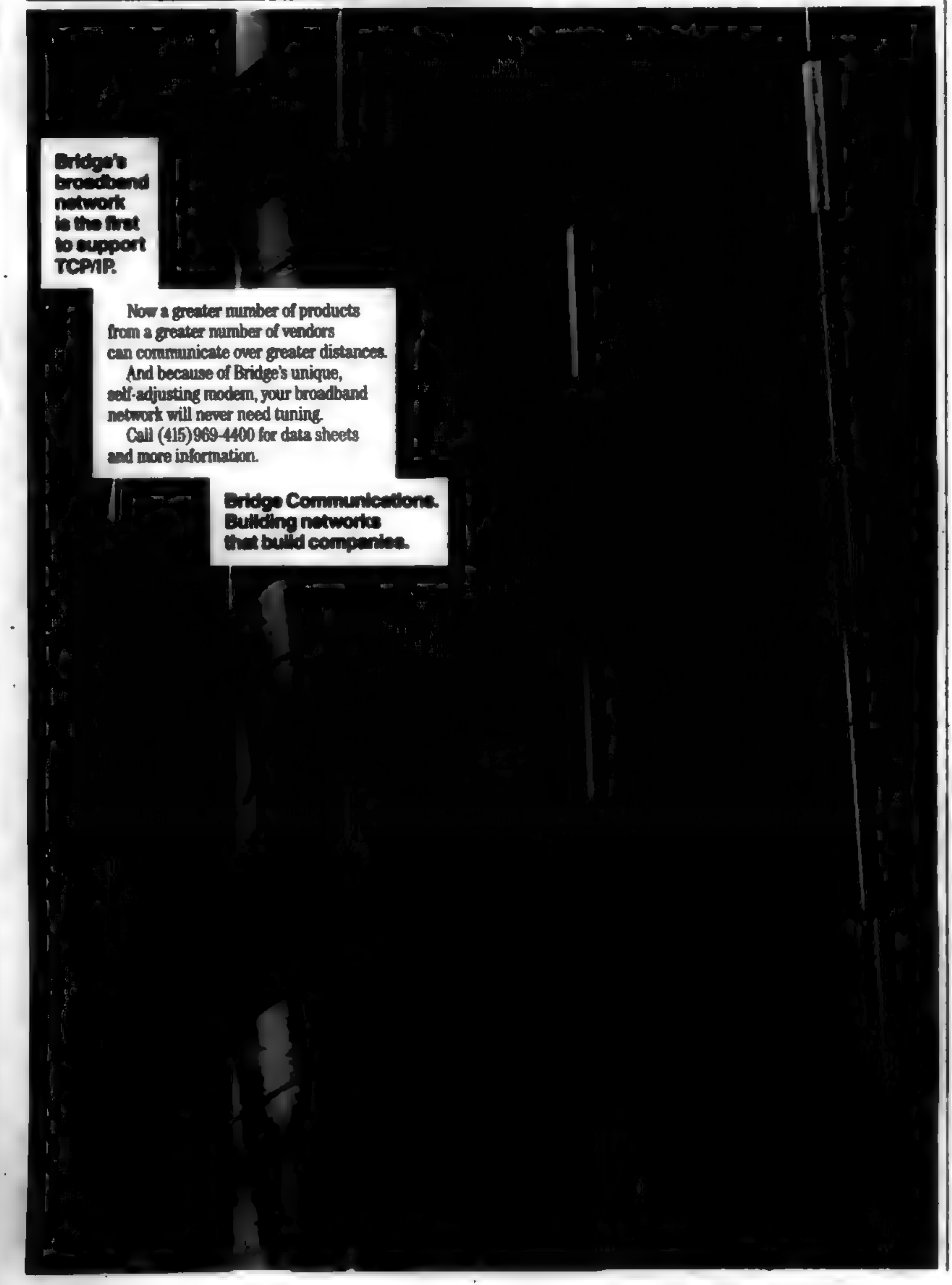
Disinterest

Defending his bank's disinterest in joining Yankee 24, he said, "We provide the finest electronic banking in New England. It's not beneficial for us to open up to customers of any old bank."

Mitchell St. Thomas, president of Connecticut Switch, responded, "We unbundled the switch fee, which is 18 cents. The decision was part operations and part marketing."

He said the overall fee was not changed despite its restructuring and claimed other network operators, whom he declined to name, are similarly altering their switching charges.

"The reason they're so agitated is that they're so dominant," St. Thomas said. However, he added that Yankee 24's initial 1,300-terminal network will exceed Baybanks' current terminal installation and that Yankee 24 expects to rapidly add to that number.



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PC package runs remote job entry

From page 19

printed on a local printer.

There are a number of benefits for users who communicate regularly with the mainframe in remote job entry mode, according to beta-test user Charlie Janssen, project manager at Safety-Kleen Corp. in Elgin, Ill. Such a user could receive reports or send data while doing Lotus Development Corp. 1-2-3 or word processing applications. "Someone with those requirements can get a lot more work done," he said.

While Janssen's company has not used the program extensively yet, he said he expects it will become an important benefit as Safety-Kleen's fledgling companywide network grows. The product can also transfer data to a mainframe.

The $785 software includes Network Software Associates' existing PC-to-mainframe communications link, which is called Adaptana RJE. Host communications are accomplished via emulation of an IBM 3770 remote job entry workstation in an IBM Systems Network Architecture/Synchronous Data Link Control (SDLC) environment, the vendor said.

RJE/Background requires an SDLC adapter board. The product also requires one copy of the software for each PC.

Gate links X.25, SNA on net

From page 19

according to Dave Farkin, Tekeleck director of sales.

The Translator also acts as an IBM Systems Network Architecture (SNA) 3274 Cluster Controller, allowing asynchronous terminals to access IBM hosts either directly or over an X.25 network. Primary and secondary Burroughs Poll Select protocols also are supported by the Translator.

Support of Ethernet 802.3 permits multiple Translators to share the same local-area network so that "you can have 40 or 50 users with terminals and personal computers" accessing various networking environments via the Translators, Farkin said. A Translator can support multiple protocols and up to eight ports.

'Cost-effective'

Available now, Translator has a suggested list price of $6,900 with one protocol option. Software packages supporting additional protocols cost between $150 and $350. "The Translator is not meant to be a plain network terminal server; it's cost-effective for companies that need to support bisynchronous, SNA and X.25 protocols on one premise," Farkin said.

The Chameleon 32 has been enhanced so that it can be used to test both customer-premise and carriers' central office equipment for conformance with the ISDN Basic Rate, particularly the 16K bit/sec. D channel that carries message sets for setting up call circuits, error recovery and alarm messages, according to Anders Hultin, Tekeleck's director of ISDN pulse-code modulation technologies.

The product will initially target manufacturers and carriers that want to test equipment for ISDN conformance.

The Chameleon 32 with Basic Rate interface monitors transmissions along the D channel to ensure conformance to ISDN norms, Hultin said.

D channel messaging specifications are still not firm, so Chameleon 32 only incorporates those protocols already approved by the Consultative Committee on International Telephone & Telegraph and will add features as manufacturers agree on specifications. "Two months from now they could change the whole thing, so our product remains a general tool that can test for individual functions that differ between carriers," Hultin said.

The suggested retail price for the Basic Rate interface for the Chameleon 32 is $3,500. It is available now.

Xenix, VAX tied to PC

From page 19

to-TCP/IP interface standard that is currently being finalized by an industry task force, Bal said.

The SCO-Excelan and Syntax-Excelan joint offering is intended to allow VAX/VMS- and Xenix-based systems to coexist as file servers on the same TCP/IP-based network, according to Bal.

Standards gain fresh recruits

From page 19

ages written for Netbios to run on top of TOP protocols, creating a plug-and-play system that requires no additional code to work, Soriano said. A version of the product designed for IBM PC ATs running Microsoft Xenix includes FTAM and session-layer software. It costs $600.

Industrial Networking introduced the MQ-400, a MAP subsystem for the Digital Equipment Corp. Microvax II.

Industrial Networking's MAP/One Applications Services software product will sell for $2,000 for IBM PC-DOS systems, $4,500 for DEC Microvaxes and $10,000 for DEC minis.

Proteon adds router, says it supports token-ring standard

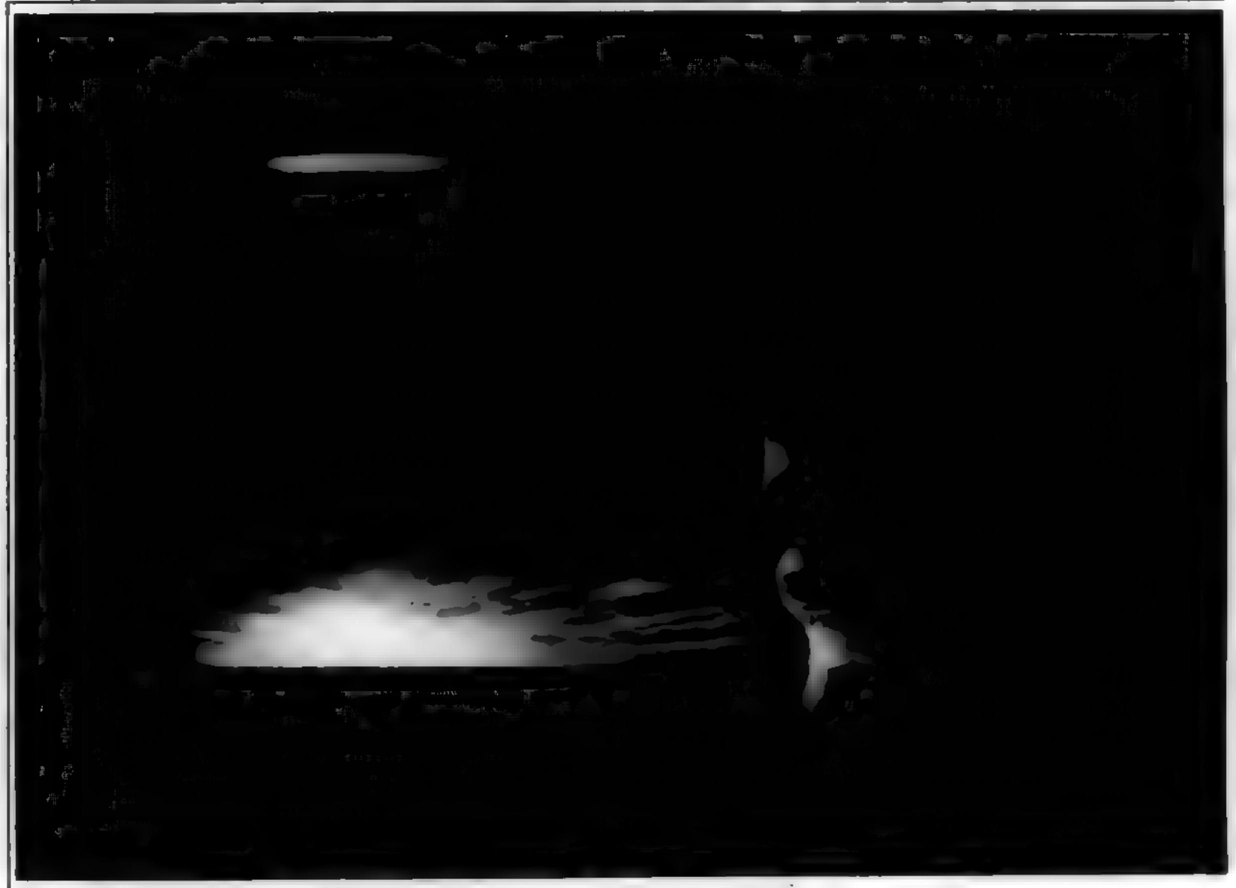
By Elisabeth Horwitt

WESTBORO, Mass. — Proteon, Inc. announced last week that its P4200 Gateway now supports the IEEE 802.5 token-ring standard. The P4200 passes transmissions between local-area networks (LAN), enabling workstations on different LANs to exchange information and share resources, according to Nancy Kratora, Proteon marketing communications manager.

The P4200 is not a gateway but a router that handles internetwork transmissions only for nodes that are using the same upper-level protocol, such as Transmission Control Protocol/Internet Protocol, Krakora explained.

However, the P4200 does pass transmissions between dissimilar networking environments, including Ethernet 802.3, T1 and 56K bit/sec. wide-area networks, Proteon's proprietary Pronet 10 and Pronet 80 token-ring networks and now both the IBM Token-Ring Network and Proteon's 802.5-compatible Pronet-4.

The P4210 Pronet-4/IEEE 802.5 interface for the P4200 Gateway costs $3,590, software included. It is expected to be available this month.



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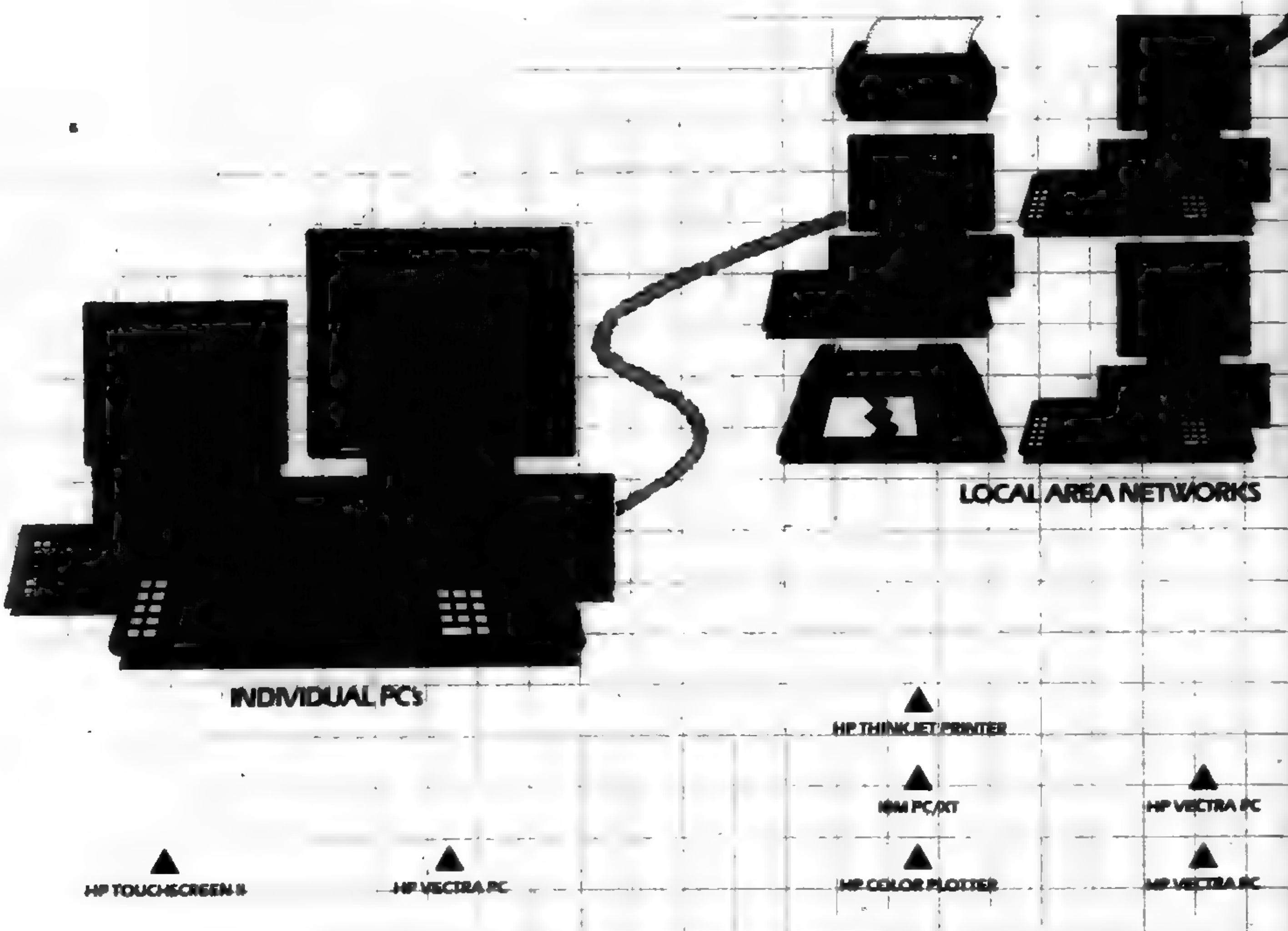

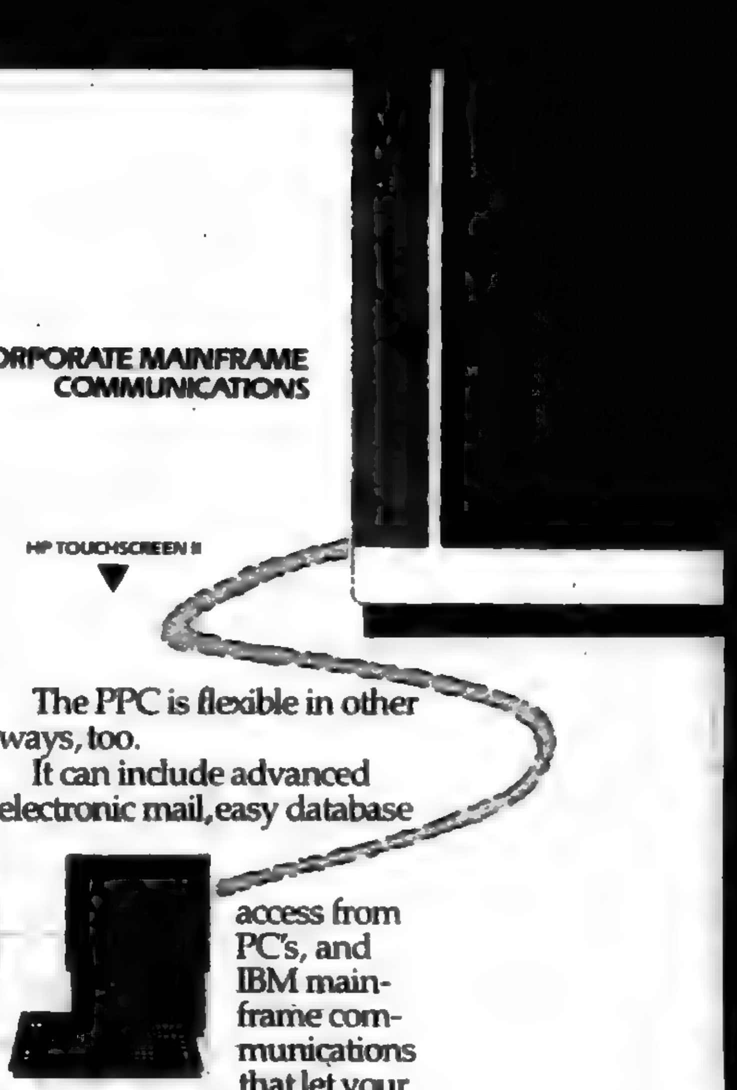

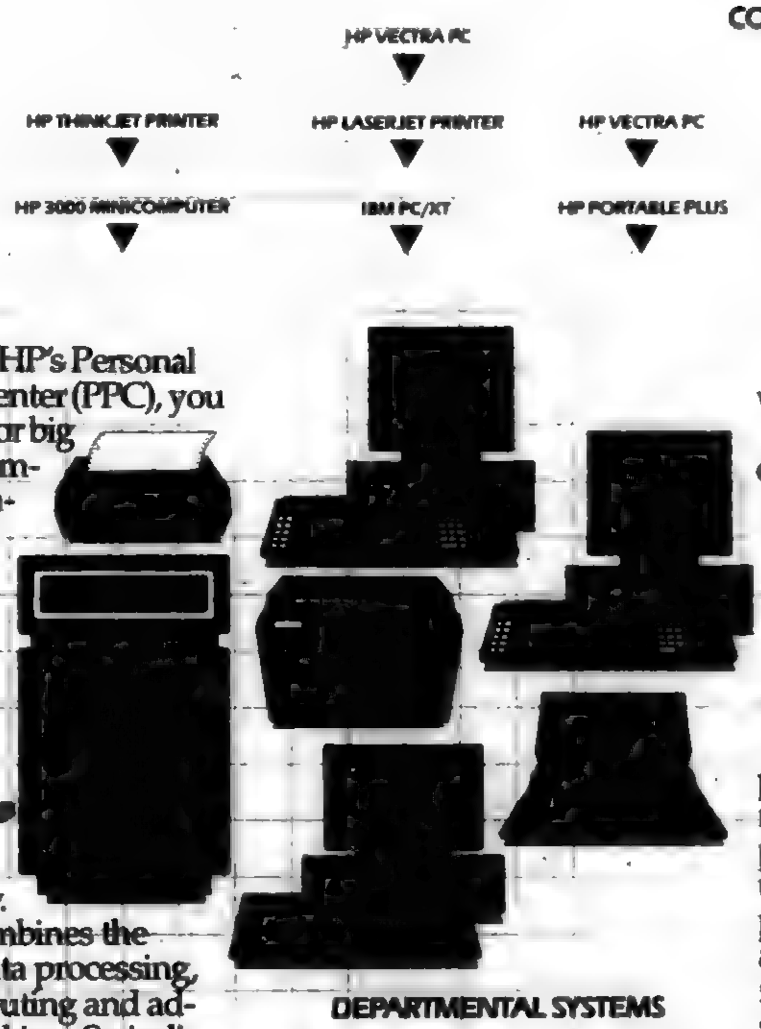

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SOFTALK
Anthony Reed

Cutting the apron strings

The managers had just completed ranking their programmers for the performance reviews when someone suggested that the staff review and rank their managers.

There was nervous laughter in the room, but the idea of having programmers and analysts rate their managers was an interesting concept. After the meeting, I began an informal, behind-the-scenes review of how the staff would conduct the reviews and what criteria they would use.

The one type of manager that always received the lowest ranking was the "apron strings" manager. This type of manager started out as a programmer but never learned to let go of his programming responsibilities — his mother's apron strings.

We all know him — the manager who is three levels removed from the highest programming position but who insists on writing a program or attending a programming class just to let the troops know that he can still perform at his old level; who insists on redesigning the entire system just to let the troops know that he hasn't lost his flare for systems design.

The apron strings manager has the very good intentions of creating a good product; however, in the process, he is destroying the morale of his staff. The staff frequently feels that it is not growing because its members are not allowed to learn by doing. They also feel that they cannot criticize the quality of the design, even though they may have strong objections, because the apron strings manager's pride and ego are stamped on the design and the workers' performance reviews.

This manager also suffers from memory lapses when setting project dead-

See **CUTTING** page 31

Reed is a senior systems analyst with the Federal Reserve Bank of Dallas, Texas.

Cobol restructuring debated

Experts say styles are unlike due to lack of standards

By Charles Babcock

CHICAGO — Three authors of software that restructures Cobol programs met here last week to advocate the use of restructuring techniques. They acknowledged, however, that the differences among their products reflect a lack of a standard restructuring approach.

Meeting head to head for the first time last Monday were J. Cris Miller, principal of Peat, Marwick, Mitchell & Co.'s Catalyst Group in Chicago and author of Structured Retrofit, the Big Eight accounting firm's restructuring product; Eric Bush, chairman of Language Technology, Inc. in Salem, Mass., and author of Recoder; and Henry W. Morgan, vice-president of Group Operations, Inc. in Washington, D.C., and author of Superstructure. The three were invited to a three-hour debate on the merits of their products before members of the Software Maintenance Association.

IBM, which also offers a restructuring product called Cobol Structure Facility, or Cobol/SF, declined to send a representative to the debate. Cobol/SF is used in conjunction with IBM's VS Cobol II, but the new version of IBM Cobol has not yet been widely implemented, the debaters noted.

Each of the restructuring tools reorganizes a Cobol application to eliminate backward jumps in the logic path, recursive or wandering logic or GOTO loops within a paragraph. After restructuring, the logic path either moves forward through the program or moves out laterally like a branch off a tree trunk, "making it easier for maintenance programmers to understand," noted Garish Parikh, software maintenance consultant, author and a moderator of the event.

A program whose logic is so convoluted that it jumps both forward and backward, sometimes from the center of paragraphs, will remain a poor program even after restructuring, but the comprehensibility of many programs can be improved through restructuring, Parikh noted.

With different products and no single recommended way to restructure, the maintenance programming manager faces a quandry. "It boils down to a Pepsi taste

See **COBOL** page 30

Pansophic offers Telon on PC

By Charles Babcock

Pansophic Systems, Inc. is offering its Telon mainframe application development environment on the personal computer at a price of $9,500 for two copies.

The PC system is memory-hungry; it requires a 640K-byte random-access memory, 5M to 7M bytes of hard-disk space and one double-density 360K-byte floppy disk drive or a high-density 1.2M-byte floppy disk drive.

The design tool is aimed at current and potential Telon mainframe users who are seeking to off-load some of their mainframe development costs, company spokesmen said. Off-loading development to the micro also speeds response time to the development programmer, the spokesmen added.

Telon is among the largest applications development generators available. It competes with systems including Sage Systems, Inc.'s APS; CGI Systems, Inc.'s Pacbase; Higher Order Software, Inc.'s Use-It; and Tarkenton Software, Inc.'s Gamma, now part of Knowledgeware Systems, Inc.

The development systems are able to capture design specifications including screen layouts, report formats and program descriptions and generate a working application from them. The systems typically retail for $150,000 and up.

The personal computer version incorporates all mainframe Telon functions, capturing design information and generating a Cobol or PL/1 source program that can run on the mainframe. The PC version also provides integrated testing of the generated application in IBM's IMS and CICS or batch environments, Pansophic spokesmen said.

Telon PC utilizes the PC architecture by using a short Help message at the bottom of each screen. Developers may choose from 16 screen colors or select improved field intensity.

A built-in DOS command processor allows the developer to exit DOS and execute other IBM PC-DOS commands or run a PC application. It operates on the IBM Personal Computer XT, AT, AT 3270 Model 6, XT 3270 Model 6 or any compatible model running PC-DOS 2.1 or above, according to company spokesmen.

INSIDE

Tool keeps DB2 users informed about DBMS operation/**28**

Goal Systems introduces development system for CICS applications/**28**

NEW THIS WEEK

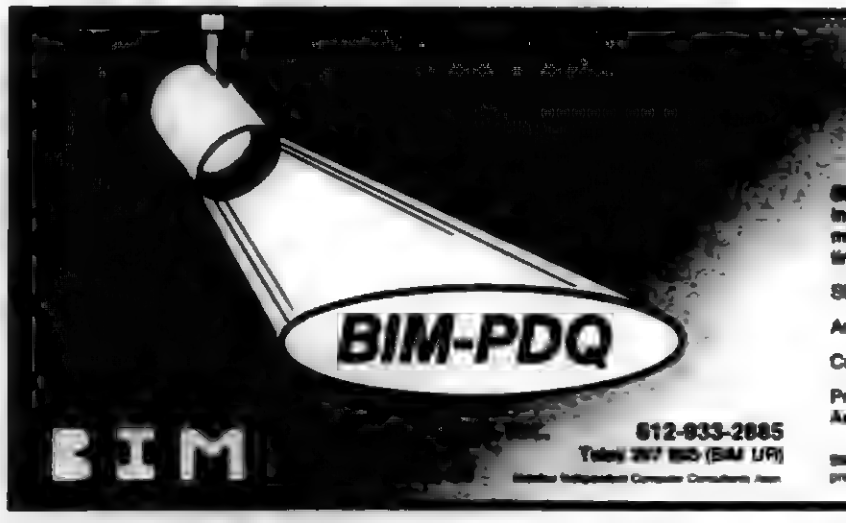
- Oracle ports SQLCalc to VAX/VMS
- Cincom Systems releases Version 1.4 of its Mantext mainframe text processing system

■ For more on these and other new products, see pp. 59-58.

INSTANT ANALYSIS

"We have three products. There is no standard definition of structure. . . . What we really have is a situation where you have to mix and match. It boils down to a Pepsi taste test."

— **Henry W. Morgan, vice-president of Group Operations, Inc., commenting on three competing Cobol restructuring products to the Software Maintenance Association**



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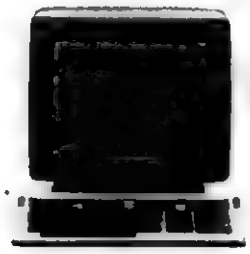

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Tool explains DB2 operation

By Charles Babcock

HOUSTON — A source of information on the operation of IBM's DB2, called Let's See DB2, is available in the form of a tool from CDB Software, Inc.

The data base administration tool runs as an application under IBM's ISPF Dialog Manager and Time Sharing Option teleprocessing monitor. During normal operation, the tool requires no I/O, making for quick response time, according to Michael Burman, a principal of CDB Software.

Let's See DB2 attempts to address three areas of DB2: management of proliferating DB2 objects, management of direct-access storage devices (DASD) and management of utilities, he said.

In addition, reducing contention for the DB2 catalog can improve the data base management system's performance. The CDB Software product removes user queries to the catalog seeking to determine the state of the system, Burman claimed.

The catalog contains tables defining views of DB2 objects — table spaces, tables, indexes and index spaces — that are the logical resources of the DBMS. The views are defined in order to provide users with access to data about objects within their authority while restricting them from other objects. The authorization system of Let's See DB2 eliminates both the need to define such views and the catalog contention associated with them, Burman said.

Let's See DB2 identifies DB2 objects and the relationships among them and allows the user to view pages from table spaces and index spaces on DASDs, he added.

It also provides graphs, maps and numerical summaries of DB2 table spaces and index spaces. These "snapshots" display the amount of free space for table spaces, update status for table spaces and usage for index spaces at a particular time, Burman said.

In addition, the product allows a user to display DB2 table spaces, Burman said.

The product uses 40 menus and information screens backed by 100 Help screens.

Let's See DB2 is available immediately, with an initial license charge of $4,800 and an annual fee of $4,800. It is being offered with a 30-day free trial, Burman said.

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Goal introduces on-line system for CICS applications

COLUMBUS, Ohio — Goal Systems International, Inc. has announced the release of Quiktask, an on-line, interactive application development system for IBM CICS applications.

The system uses a Cobol-like procedural language employing commonly used verbs, which allows batch programmers to work in it using their Cobol language skills, Goal spokesman Jim Crossley said.

The system includes 10 integrated subsystems: on-line Help, on-line training, dictionary, screen painter, language, editor, translation, test and debug, execution and utilities.

Quiktask can interface to existing Cobol-callable routines, subroutines and copybooks, company spokesmen said.

Quiktask is designed to run on IBM mainframes under CICS 1.5 or above with IBM's DOS/VSE or MVS.

It costs $44,800 for MVS and $35,000 for DOS/VSE.

The execution subsystem is available as a separate option for DP centers that do not need the full development system. It costs $22,400 under MVS and $17,500 under DOS/VSE.

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Cobol restructure debated by pros

From page 25

test," Group Operations' Morgan said, urging users to try all three restructuring products.

Language Technology's Bush maintained that Recoder, unlike its competitors, uses an approach to restructuring that can be measured by McCabe Metrics. By pursuing a complexity measure of one by the McCabe standard, the results of Recoder are both predictable and measurable across applications, he said.

Peat, Marwick's Miller attacked the McCabe measures, asserting that they "have never been empirically established."

Bush responded that the McCabe standard has been written about frequently and is an accepted measure of program complexity.

Miller and Morgan said that Bush's product sometimes creates new paragraphs in the process of restructuring, including replicated code. "We have an ironclad rule with our product: No fragmentation, no replication," Morgan said.

Much of the debate revolved around how each product simplified GO TO loops and PERFORM statements.

Richard G. Harrison, director of the Federal Software Management Support Center, part of the General Services Administration (GSA) in Falls Church, Va., said the Group Operations and Peat, Marwick products tend to "adjust the semantics of the program," creating a simpler loop.

For example, he said, instead of allowing a GOTO to transfer program control outside a particular procedure, Superstructure tends to restructure the program so the transfer goes back to the initialization or mainline of the procedure and starts over. By resorting to such a simple device, Superstructure simplifies the maintenance programmer's task, Harrison said.

'Eliminates GOTOs'

The Language Technology product, on the other hand, analyzes a program, "eliminates GOTOs and PERFORMS and automatically replaces them with new code," Harrison said. Harrison had compared all three products for the GSA, which selected Peat, Marwick's Retrofit.

All three vendors claimed that their products yield restructured programs that are the functional equivalent of the original.

Group Operations' Morgan claimed his product yields a program that most resembles the original, making it easier for experienced programmers to navigate through it.

Those programs most heavily involved in maintenance efforts should be the first candidates for restructuring, Morgan said, in response to a question on what gets targeted for restructuring.

Parikh asked the panel the size of the largest program each had restructured.

Miller said the largest program restructured with Retrofit was 45,000 lines. Morgan said Superstructure could restructure a program up to 30,000 lines long. Bush said Recoder's limit was 32,000 lines, a limitation imposed by IBM Cobol 68/74 compilers. He added that he expects the constraint to be lifted with VS Cobol II compilers.

The restructuring products have been available through commercial services, such as the former Catalyst Corp. — which was acquired by Peat, Marwick and became the Catalyst Group — and Language Technology, since the early 1980s. They have been available as independent software products for two years or less. Retrofit is priced from $59,000 to $89,000; Superstructure is priced from $28,000 to $45,000; Recoder is priced from $40,000 for a short-term lease to $150,000.

A total of 35 copies of Recoder have been sold, Bush said. Fifty copies of Retrofit have been sold, according to Miller. Morgan said about 115 copies of Superstructure have been sold.

SOFTWARE NOTES

Cortex, DEC weave units

Cortex Corp. in Waltham, Mass., will interface its **Application Factory 4.0** and Corvision diagramming front end to **Digital Equipment Corp.'s** relational data base management system, **Rdb**. The development system produces applications for the VAX, and the Rdb interface can be used in conjunction with the existing record management system file-management interface, the firm said.

■

The **Cambridge Systems Group** of Santa Clara, Calif., now part of **Uccel Corp.**, has announced a 10% price increase on its popular IBM MVS security package, **ACF2**. Effective Feb. 16, the price of a single CPU license will be increased from $33,000 to $36,300, spokesmen said.

■

Symbolics, Inc. has introduced a **CommonLISP Cross-Compiler** that allows users to port expert systems developed on Symbolics 3600-family machines to general-purpose workstations. The compiler was written by **Lucid, Inc.** Currently supported workstations are **Motorola, Inc.** MC68000-based units from Sun Microsystems, Inc. and Apollo Computer, Inc.

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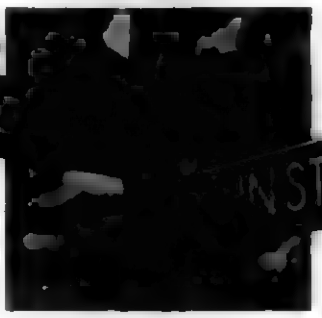
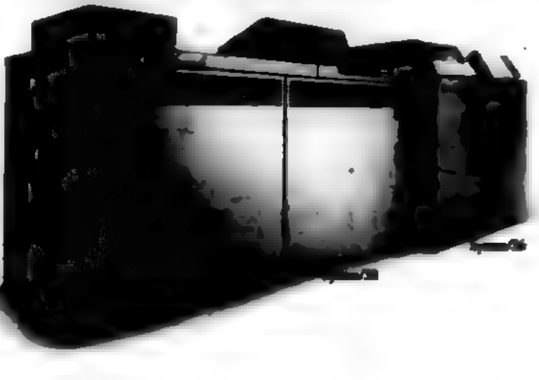
The System/3X family members function equally well





Cutting the apron strings

From page 25

lines. Since he's been away from real programming for a number of years, he tends to suffer from the "we did it in two days" syndrome.

You know the situation. Your project plan states that it will take you 18 months to complete the new online accounting system using structured programming and to write the documentation before you write the code.

But your manager recalls it took them mere days to design, write and install the old accounting system back in the 1800s. If he could do it in two days, so can you. Why, he'll even volunteer to write the design and code one of the 287 programs for you.

Characteristics

We began to recall previous apron strings managers (they were the reasons we were no longer with our former companies) and to identify their characteristics. We found that:

- Their secret desire was to get out of management and back into programming, but with the same money.
- They were the technical gurus of their day and were rewarded with promotions.
- They usually couldn't write very well, so they delegated that task to subordinates.
- They usually didn't have enough work to keep them busy, so they hopped at the chance to design a system that required their approval.
- They always felt that they knew what the user wanted.
- They had inflated egos, yet they always wondered why you didn't tell them you needed more time to work on the project after they set the project deadline.
- They'd worked in data processing for 193 years and could remember the first computer the company ever purchased.
- They remembered when the northeast corner of the dining room was the DP department.
- They wondered why your marriage was on the rocks when you had worked 80 hours a week for the past year.
- They would rewrite one of your programs or make the same maintenance change just to see if you both did it the same way.

After we finished naming the traits, we tried to develop a plan of action to help the manager cut the strings. After all, we could not continue to change jobs eight times in six years without running out of employers. These are the steps that we decided to take:

1. Before you define the user requirements, ask the manager if he has something that should be built into the design to keep him satisfied. This gives him the feeling that he's a project leader, but you are really the person in control.

2. Give him weekly status reports. This keeps him from coming to your office, snooping around on your desk and finding a problem that he can "help" you resolve.

3. Offer to let him work on a noncritical part of the project. If you assign a task to him, he will feel honored that you think he can still do the job.

4. Ask him for advice — even if you don't need it — on a noncritical problem.

5. Try to keep him too busy to interfere with the individual members on your staff. If they mistakenly mention a problem they are having, he may be more than willing to help.

6. Identify all of your project tasks, prepare a critical-path chart and indicate the length of time required to complete each task. If he says the project deadline is too long, ask him to select which tasks you should skip. Hopefully, he will realize that cutting corners can cut his own throat.

7. Never tell him he is getting in your way — unless you have your resume updated.

8. As a last resort, talk to his manager (especially if he's not an apron strings manager) and let him know how you feel. They may be able to keep your manager too busy to get in your way.

We realized that apron strings managers will not lose their desire to be programmers; however, hopefully, if they stay busy with their own work, they won't do yours.

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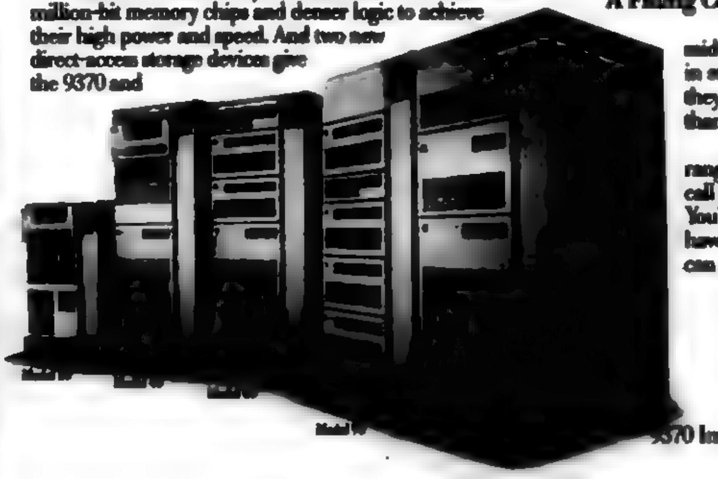

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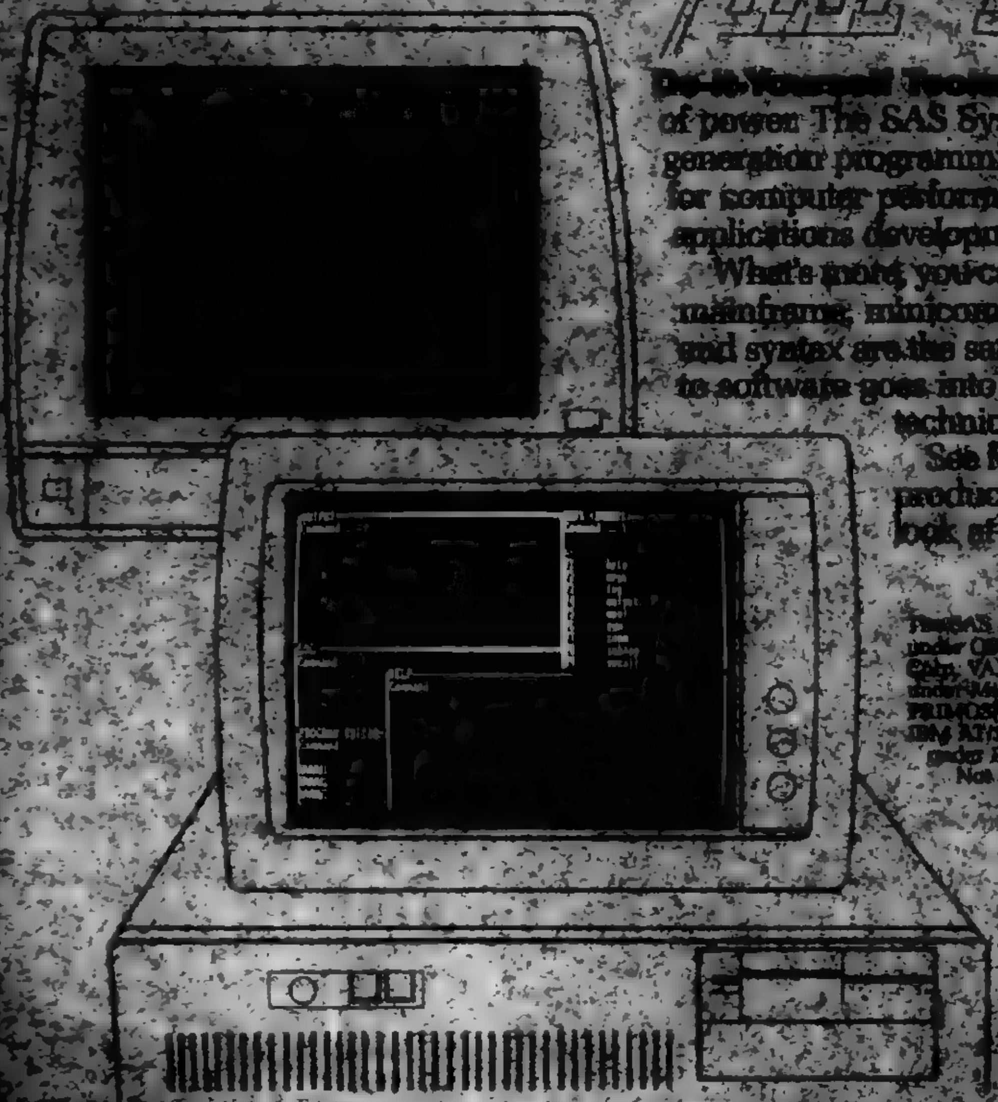

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MICROCOMPUTING

MICRO BITS
William Zachmann

Toshiba laptop means business

Early projections of the market for laptop computer sales were excessively optimistic. Except for the Tandy Corp. Model 100, an inexpensive unit with built-in software but without built-in disk drives, none of the first wave of systems were very successful. And more capable systems offering IBM Personal Computer compatibility were just too expensive to gain broad acceptance.

But during the past year, Toshiba Corp.'s 1100+ has done a lot to bring affordable IBM PC compatibility to the laps of corporate users. At $2,399 with 640K bytes of memory and two 3½-in. 720K-byte diskette drives, the 1100+ is an attractively priced product.

Parallel, serial, red-green-blue monitor and composite video ports are built in as standard features. These are often separately priced features on laptops from other vendors. The effect is to make the Toshiba 1100+'s pricing highly competitive. This is undoubtedly a major reason why, according to Framingham, Mass.-based market research firm International Data Corp.'s preliminary estimates, the 1100+ was the best selling IBM PC-compatible laptop in 1986 despite being sold for only the last six months of the year.

In fact, even more 1100+ systems would have been sold in 1986 had Toshiba been able to supply enough to meet the demand. Despite supply limitations, however, Toshiba appears to have sold more 1100+ systems in the last six months of 1986 than IBM sold

See LAPTOP page 34

Zachmann is vice-president of research at International Data Corp.

Software Link gains support

Language developers to supplement 80386 PCs

By David Bright

ATLANTA — The Software Link, Inc. last week announced that two language developers will support its PC-MOS/386 multitasking, multiuser operating system for Intel Corp. 80386-based personal computers.

Software Link describes PC-MOS/386 as a superset of Microsoft Corp.'s MS-DOS operating system that achieves compatibility with existing MS-DOS programs and also supports the 80386 chip's 32-bit native mode.

A Software Link spokeswoman reported that the availability of the development tools would give developers incentive for creating applications that have the ability to take advantage of the 80386's 32-bit native mode.

The two developers are Phar Lap Software, Inc., based in Cambridge, Mass., and Metaware, Inc. in Santa Cruz, Calif. Phar Lap offers the 386/ASM assembler and 386/Link linkage editor for $495 together, while Metaware provides High C and Professional Pascal compilers priced at $895 each.

Officials at the two companies could not say for sure how long it would take for 32-bit native mode applications to become available.

Bob Moote, vice-president of software at Phar Lap, predicted some applications could appear in six months.

Memory and other features

While maintaining MS-DOS compatibility, PC-MOS/386 is said to support huge amounts of random-access memory, including the 80386's limit of 4G bytes, and features such as record and file locking, print spooling and remote modem access. "The 640K-byte barrier is gone," Metaware Vice-President Tom Pennello said.

A version of Basic is also available for PC-MOS/386. Last November, Software Link agreed to bundle Summit Software Technology, Inc.'s Betterbasic/386 with the operating system.

Software Link said it plans to have the full version of PC-MOS/386 available next month. The company also offers a programmers' guide for 32-bit application software under PC-MOS/386.

INSIDE

North Edge releases time and billing software package for IBM-compatible microcomputers/**34**

NEW THIS WEEK

- Micromain Software offers a CICS screen painting and design facility for personal computers
- For more on this and other new products, see pp. 59-68.

INSTANT ANALYSIS

"The next real Dbase IV, according to Dbase aficionados, is going to come from Wayne Ratliff, the man who wrote Dbase II and did the direction for Dbase III."

— Dbase aficionado who asked not to be identified

Desktop tools headline expo

By Peggy Watt

SAN FRANCISCO — Product announcements at the recent Macworld Conference and Exposition focused on desktop publishing, with desktop accessories and storage products rounding out the offerings.

Graphic-design supply veteran Letraset USA will finally enter the desktop publishing market and sell Ready, Set, Go, a page layout program established by Manhattan Graphics in Valhalla, N.Y.

Borland International, Inc.'s Sidekick 2.0 desktop accessories package included updated features of Outlook, an outline processor; Macplan, a limited spread-

See DESKTOP page 35

Macworld attendees want connectivity, graphics options

By Peggy Watt

SAN FRANCISCO — Apple Computer, Inc.'s priorities of publishing, general graphics applications and connections to other systems were on the minds of many attendees at the Macworld Conference and Exhibition here this month.

"We want to use the Macintosh to open windows to the map libraries stored remotely on minicomputers," said Barnaby F. Guthrie, computer systems specialist for Coast Forest Management Ltd., a Victoria, B.C., logging and engineering firm.

See MACWORLD page 35

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Laptop means business

From page 33

of its laptop, the IBM PC Convertible, all year long.

Using the 1100+, however, makes it clear that more than just aggressive pricing has contributed to its success. It is a well-built, solid system with the quality construction and performance you would expect of a first-class product from a first-rate vendor.

The 640- by 200-pixel LCD built into the unit is large enough, at 9.1 by 4.7 in., to be comfortably readable. Its adjustable angle and variable contrast-control go a long way toward overcoming the inherent limitations of an LCD display. With the ability to display a full 25 lines of 80 characters each, as well as IBM PC monochrome graphics, it offers compatibility with standard software.

The 81-key keyboard is full-size. It has nicely sculpted keys, yet is remarkably compact. It includes large typewriter-size Shift, Enter (Return) and Backspace keys. There is no separate numeric keypad, but one is available on the right side of the alphabetic keyboard via the Number Lock key. Cursor keys are located in an inverted "T" at the bottom right corner of the keyboard. Ten function keys are lined up across the top of the keyboard.

Light, compact

Despite the full-function display and keyboard, the whole unit is built into a very light and compact package. Weighing an ounce less than 10 pounds, the 1100+ is one of the lightest laptops available. It is 12.1 by 12 in. around and just more than 2.6 in. high.

The 80C86 microprocessor driving the 1100+ is a complementary metal oxide semiconductor device, which gives it very low power consumption. This, combined with an efficient design for powering the display and disk drives, gives an operating time of more than seven hours from the built-in rechargeable battery.

In addition, the 80C86 in the 1100+ operates at two speeds. The standard 7.16-MHz mode gives performance about 50% faster than the standard IBM PC or Personal Computer XT. By means of a keyboard soft switch (pressing the Control, Alternate and Page Down keys simultaneously), it can also be made to run at 4.77 MHz to ensure compatibility for timing-sensitive software.

A handy and attractive black carrying case is included with the system at the basic price, along with a battery charger/AC adapter and Microsoft Corp. MS-DOS 2.11. A copy of Borland International's popular Sidekick desktop organizer program is included on 3½-in. disks with the system.

Options

Optional features include an internal 300/1,200 bit/sec. modem, an expansion chassis and interface providing five IBM PC-compatible slots, an external 5¼-in. disk drive, an automobile power adapter and a floppy link. The last is a card that fits into an IBM or compatible PC expansion slot and makes it possible to use a 5¼-in. drive on the desktop system as an extension of the 1100+.

The Toshiba 1100+ delivers the full function of an IBM PC-compatible system in a remarkably small and light laptop package. Like many others, I've hesitated to settle for the compromises most laptops have required, but the 1100+ has what it takes to make me a confirmed laptop user.

SCIENCE/SCOPE®

A proposed satellite system for mobile and remote communications would use different frequencies for different needs. The mobile satellite network would relay two-way voice and data communications services from airplanes, cars, trains, or remote locations. The system would use two Hughes Aircraft Company HS 393 spacecraft, one operated by the United States and another by Canada. UHF, a low frequency band that can be picked up by small antennas, would be reserved for trucks and cars. A higher frequency that requires larger antennas, L band, would be dedicated to remote telephone service. A third frequency, Ku band, would provide a gateway to local telephone systems, preserving scarce capacity on L band and UHF frequencies. Hughes Communications Mobile Satellite Services, Inc. is seeking authorization from the Federal Communications Commission to operate the system.

Military commanders at separate headquarters can share up-to-the-minute information, thanks to a new automated message processing system for Command and Control Information Systems (CCIS). The system, developed by Hughes, handles a wide range of formatted and unformatted messages as specified in the joint US/NATO military reporting system. It will dramatically lessen the time needed to update planning, intelligence, and force status information in command and control systems. The system can receive messages over a variety of digital links. Messages can be drawn automatically from complex relational databases, or be used to update information automatically. Information can be displayed on screens in a variety of formats, and be modified by commanders.

Helping to trim energy consumption is one major use of a hand-held infrared viewer. The device is a Hughes Probeye® viewer, which senses heat and displays images through an eyepiece. Mining officials use the device to inspect electrical systems and mechanical equipment because it detects potentially dangerous short circuits and overheating hardware. Real estate owners, developers, and appraisers use the viewer to determine the structural and thermal integrity of buildings. The unit reveals moisture spots in roofing and spots where buildings might be gaining or losing heat.

In pioneering work with applications for space-based defense systems and the next generation of missile seekers, Hughes has demonstrated an advanced infrared sensor. The device is believed to be the world's first high-density, staring, long-wavelength infrared focal plane array (FPA). The hybrid chip, smaller than a fingernail, is integrated with optics and electronics to create TV-like images of a scene, even in total darkness. Unlike conventional infrared sensors, which mechanically scan a scene by means of oscillating or rotating mirrors, the FPA stares at a scene in its view at one time. It promises significant performance, size, weight, and cost benefits over ordinary sensors. The device was developed for the Defense Advanced Research Projects Agency as part of Strategic Defense Initiative efforts.

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Billing tool out for small firms

ESSEX, Mass. — North Edge Software Corp. recently unveiled Timeslips III, a $199 random-access memory-resident time and billing system for IBM-compatible microcomputers.

Timeslips III is aimed at medium-size firms, such as law, consulting and accounting firms, that charge for time. The software handles time and billing for firms with three to 25 employees and provides for 3,400 clients and 250 activities.

The package also includes improved speed, transaction reports, summary billing, work sheet and contingency and flat fee billing.

Macworld goers want connectivity

From page 33

Guthrie said he had not been very successful in finding sophisticated language tools for development but called the show the best one-stop shopping opportunity he has found.

Graphic artists Gwen Revino and Kathy Gallion, of California Eastern Labs in Santa Clara, Calif., wanted the latest graphics tools. They said their firm, a sales agency for NEC Corp. Microwave Semiconductor, currently designs only part of its catalog on its computer but plans to convert entirely to electronic publishing. "I like Pagemaker," Gallion added, referring to Aldus Corp.'s desktop publishing package.

Revino said, "Macdraw pales as an illustration tool compared to recent releases, particularly the Adobe [Systems, Inc.] Illustrator."

A computer store sales representative said he shopped not only for wares to sell but also ideas for inhouse use. Joseph H. Kress, with Pactel Info Systems in San Francisco, said more than 100 Macs at Pactel stores on the West Coast run spreadsheets, word processing and graphics programs for the business.

"We try lots of things, because we want to stay on top of what people are buying," he explained.

Apple did not announce any newproducts at the show, but company President John Sculley hinted of communications capabilities that build "industrial strength" onto Appletalk to satisfy a growing cadre of corporate users. Sculley declined to be more specific but repeated that the Macintosh would have to communicate with other systems to make it in the business world.

Apple did not deliver on an earlier promise that the Macintosh would eventually accommodate other operating systems, including Microsoft Corp.'s MS-DOS and Unix. Sculley said only that Apple would "coexist with the vast majority of MS-DOS machines" with hooks into those other systems. One year ago, Apple executives stated that these hooks would be unveiled within a year.

Sculley praised desktop publishing, a dominant application at the show, for enabling Apple "to crack corporate America. . . . We have firmly gotten our feet into many major corporations thanks to desktop publishing," Sculley said. He added that Macintoshes in art departments are prompting installations in other corporate departments.

Microsoft Corp. Chairman Bill Gates illustrated the influence of the Macintosh on the entire microcomputer industry by recalling how the system's ability to display multiple fonts as they would finally be printed was once considered novel. Now this capability is becoming commonplace on IBM Personal Computers and compatibles.

"The nature of the show has changed," said Paul Brainerd, president of Aldus Corp., which showed its unreleased upgrade of Pagemaker design program. "Professionals are looking at the Mac for business. We saw that at the Boston Macworld show, too. On Saturday, the ties and suits were off, but they were still business-oriented users."

Desktop tools headline expo

From page 33

sheet; and communications protocols to the pop-up desk accessory package.

Among the other Macworld announcements:

- Mass-storage products including a fault-tolerant option for the Data Frame XP hard disk, Data Stream tape back-up and combined hard disk with tape from Supermac Technology in Mountain View, Calif.
- Quark Xpress, a $695 desktop publishing system that comes equipped with spell check and a word processor, from Quark, based in Denver.
- Page One, a page-layout program designed specifically for book publishing with a selection of 60 templates, a joint development project from FTL Systems, Inc. and McCutcheon Graphics, Inc., both in Toronto.
- Full Write Professional, a $295 word processing program from Ann Arbor Softworks in Newbury Park, Calif., that includes desktop publishing formatting features such as columns, kerning and the ability to move documents on a page.
- Mind Write, a word processor with multiple windows, graphics import capabilities and Search and Move functions that do not require the clipboard, from Mindwork Software in Carmel, Calif.
- MSC/pal, an engineering-analysis package from MacNeal-Schwendler Corp. in Los Angeles, which performs static and dynamic finite element analysis within the Macintosh interface.
- Hyperdrive FX40, a 40M-byte external hard disk drive from General Computer in Cambridge, Mass., which connects through the Small Computer Systems Interface port.
- The Rodime 201 Plus and 451 Plus, 20- and 45M-byte internal hard disk drives from Rodime, Inc.'s peripheral systems division in Pepper Pike, Ohio.
- Mac Enhancer, jointly developed by Microsoft Corp. and Softstyle, Inc., which converts a single Macintosh port to four ports and includes driver software for more than 20 printers. Priced at $245, it is available now and is also an upgrade to Microsoft's original Mac Enhancer.

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

Proof of PCs' gains on 3270

After several years of speculation by industry observers and users, evidence is appearing of a serious impact on the 15-year-old IBM 3270 market by personal computers.

There continues to be a growing number of workstations performing 3270-type communications, but the PC impact starts to show when one looks at how those communications are accomplished. It appears much of the growth will be on the part of PCs with 3270 emulation boards.

The evidence is presented by International Data Corp. (IDC), a Framingham, Mass.-based market research firm, in its annual study of the terminals industry. The IDC study predicts minimal, if any, growth of traditional 3270 displays during the rest of the 1980s. That compares with 26% annual growth from 1980 to 1985.

It was 1985 that "represented a critical turning point" for the overall 3270 market, according to IDC. The company predicts future 3270 business — which includes the current generation of 3270 devices, such as the IBM 3170 and 3190 terminals — will be predominantly add-on and replacement business.

Looking at 1985 shipment figures, IDC estimates there were 974,000 new workstations performing 3270 communications. Traditional 3270-type terminals still made up 68.8% of those shipments but, by accounting for 19.8% of the shipments, PCs with emulation boards were gaining momentum as an alternative. IDC concludes, "The 3270

See **PCS** page 39

Connolly is Computerworld's *senior editor, systems & peripherals.*

Fog around 9370 clears

Analysts forecast strength as departmental CPU

By James Connolly

The picture that was so cloudy three months ago, when IBM introduced its 9370 Information System, seems to be clearing.

As information drifts out of IBM and users and analysts take a closer look at the 9370's specifications, answers are more apparent for some of the questions that greeted the Oct. 7 product announcement. People finally seem to have a sense of how the mid-range computer — the subject of many consultants' reports, competitive vendor analyses and MIS managers' casual comments — can be used, how it will perform and what it will cost.

Interviews with various analysts indicate they believe the 9370 can provide the price/performance benefits that IBM's System/36 and 4361 could not offer in competing with Digital Equipment Corp.'s VAX line. Analysts also remarked that the 9370's strength will be as a departmental data processing machine running IBM's VM, rather than IBM's MVS, and that the machine's potential is far greater than has been announced so far.

"My feeling is that the 9370 is far from complete. It is more a statement of direction than a finished product. This one product probably will do more than anything else to define IBM's direction in the computer business," said IBM analyst Thomas Henkel of The Yankee Group, a Boston-based market research firm.

Henkel said that in the past, IBM's goal was to drive all customers up to mainframes. "Even if you bought a personal computer, somewhere down the road they expected to sell you a mainframe. Now IBM has had to admit that there are customers out there who don't want a mainframe under any circumstances," he said.

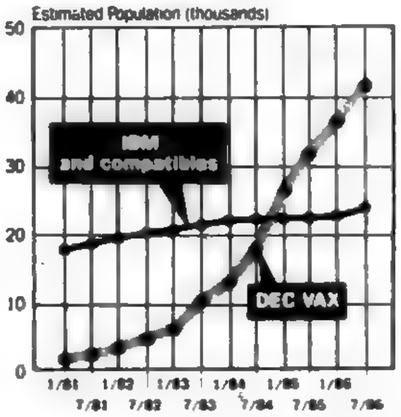
Henkel added that the 9370 has "received a lot of attention for a lot of rea-

See FOG page 38

•DATA VIEW

VAX vs. IBM

Digital Equipment Corp. VAX systems pass IBM and compatible mainframe installations in U.S.



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE CORP.

Unix supermini hits tech marts

By David Bright

FT. LAUDERDALE, Fla. — Harris Corp.'s Computer Systems Division is expected to introduce a high-end, Unix-based superminicomputer for technical markets today.

According to Harris, the HCX-9 performs 7.5 million instructions per second (MIPS), provides the fastest response time of any superminicomputer in its price range and offers higher performance in a smaller package than Harris's earlier systems.

Harris will sell the system to end users but will place a new emphasis on OEMs and value-added resellers. This is because the system uses an open architecture based on the VMEbus, the firm said.

Targeted environments include the aerospace and defense industries, comput-

See SUPERMINI page 39

NEW THIS WEEK

- Lexi Computer offers an IBM-compatible laser printer
- EMC introduces a fault-tolerant subsystem for Prime computers
- For more on these and other new products, see pp. 59-68.

INSTANT ANALYSIS

"The press says everyone with a telephone will have a CRT within 10 years. We have 12,000 telephoned workers, and the initial hardware, communications and operating software costs alone for a terminal connected to the mainframe run from $12,000 to $25,000. The cost of that would be shocking."

— An MIS manager with a U.S. conglomerate

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Fog around 9370 clears

From page 37

sons. The first being that IBM has done such a bad job in the mid-range market." He observed that the confusion that previously centered on IBM's minicomputer offerings, particularly the System/36, means the 9370 "won't be an easy sell." But, he added, the 9370 eases concerns of Fortune 500 customers who want a departmental system but do not want to undertake the software development needed to shift from IBM systems to VAXs.

Another analyst, Executive Director Robert G. Simko of the Los Altos, Calif.-based market research firm International Technology Group, said the first four models of the 9370 — the 9373 Model 20, the 9375 Model 40 and 60 and the 9377 Model 90 — are only the start of the product line.

He said the 9370's price/performance figures will be in line with IBM's policy of providing 30% to 40% price cuts with each generation. He predicted IBM will address the growth needs of existing IBM 4381 customers by introducing a higher-performance replacement for that processor family this year.

Comparison

Noting that the 9370 is an outgrowth of the 4300s, Simko compared it with that older product family. He said the 9373 Model 20 compares with the 4361 Model 3 in power for a lower price and the high-end 9377 Model 90 compares with the 4381 Model 1. The unannounced systems will drive the 9370's performance levels past the 4381 Model 3 while keeping prices a step below the older system's cost. However, Simko and other analysts said the 9370 will not replace the 4381s, which will be replaced by a line of more powerful systems.

Simko said he sees an IBM product line that includes the System/36 and 38 small-business families, the 9370, the 4381's successor and the IBM 3090-class mainframe family.

He said the 9370 offers an upward migration path. He also observed that while the 9370's performance and communications capabilities are comparable with the 4361, what sets it apart for the Fortune 500 marketplace is the way IBM is promoting it as part of a top-to-bottom, host-down-to-PC solution. "What IBM is saying is that they aren't just selling a box," Simko said.

Without a good, low-end 370-architecture machine, IBM has missed opportunities for new business, with DEC taking advantage of that failing, Simko said. However, he defended the 1983 introduction of the System/36 by IBM's System Product Division (SPD), saying the minicomputer "has been a good holding action for IBM" that has kept traditional IBM customers from jumping to DEC before the release of the 9370. He said the 9370 provides customers with a "clear-cut statement of direction for SPD," which has been a division in flux for several years.

Too early to tell

Both Henkel and Simko said it is too early to tell how easy it will be to use the 9370. Simko observed that IBM has been working to make key VM applications easier to use and more affordable. Henkel said office automation software designed for the 9370 may be two years away and that there is no assurance that a simplified version of VM, currently under development and known unofficially as VM Desk, will satisfy the unsophisticated user.

Analyst Craig Symons of the market research firm Gartner Group, Inc. in Stamford, Conn., agreed that the 9370 fails to provide the unsophisticated user with an uncomplicated machine. He differed with the analysts who said the 9370's role is becoming clear, and he said the software issue raises more questions.

"IBM has billed it as a departmental computer, but I don't see it as a departmental computer. It's a small mainframe," Symons said. Pointing out that IBM claims users can move mainframe applications to the departmental level, Symons said the 9370 will not support many mainframe users' applications because it does not run MVS/XA, even though it runs MVS. "The fact of the matter is that the 9370 is still a VM machine," Symons declared.

However, Symons added that the 9370 offers dramatically lower prices than the 4361 and allows long-time IBM MIS shops to stay with IBM, rather than switching to DEC if they want to implement departmental computing.

An analyst who admits he is "bullish on the 9370" is Rick Martin, research analyst for Sanford C. Bernstein & Co., a New York investment firm. Martin, a former IBM product manager for the 4300 line, said he expects "a lot of spiffy office automation software" to come out of a development project IBM is doing for its first 9370 customer, United Air Lines.

Martin said customers running VM on the 9370 can have a clerical worker operate it and an MIS professional handle the troubleshooting. But he said MVS, even on a 9370, will continue to need professional operators.

However, Martin, like the other analysts, pointed to price and performance as the key differentiation for the 9370.

"IBM is slowly releasing information about it, and the price/performance is better than it looked at first in commercial applications. In scientific [applications], it is significantly better than anything out there," Martin asserted.

He also claimed the pricing structure gets even better when one con-

See FOG page 39

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CPW-1-19-87

Supermini hits tech marts

From page 37

er-aided design (CAD), computer-aided manufacturing, computer-aided engineering, universities and technical administration.

Typical applications in those environments include data acquisition and reduction, research, product design, real-time simulation and software development, the vendor said.

For example, an HCX-9 system will be used for Unix software development at the University of California at Berkeley.

Updating Unix

That school's Computer Systems Research Group is creating an updated version of Unix, according to Harris.

The system is built around a proprietary processor that reportedly operates at 7.5 MIPS with Fortran programs and at 8 MIPS using the C language.

The system's dual VMEbus architecture is said to provide 40M byte/sec. of throughput per I/O bus, giving it almost four times the total I/O throughput of the earlier HCX-7.

Supports 256 users

According to Harris, the high-performance I/O bus enables the system to support as many as 256 users without significant performance degradation, particularly in disk-intensive applications such as CAD, software engineering and data base management.

The system runs Harris's HCX/UX operating system.

This system embraces both AT&T's Unix System V.2 and the University of California at Berkeley Unix Version 4.2.

HCX/UX uses a switch that enables the two Unix versions to access the other version's libraries and utilities.

Base configuration

The base configuration of the system costs $195,500.

This configuration includes 4M bytes of random-access memory, an eight-slot VMEbus, an I/O controller with eight asynchronous serial ports, a 32-user Unix license and a C compiler.

Shipments are scheduled to begin in March.

PCs gaining on 3270

From page 37

display's current dominance is shifting and is proceeding into a slower-growth, commodity-pricing phase of its life cycle."

IDC says ASCII terminals with protocol converters and IBM 3270 Personal Computers hold their shares of the market, but PCs with emulation boards and increasingly better software represent a higher-growth market than those alternatives.

However, it should be noted that a variety of factors are responsible for this market shift. IDC points to the maturation of the 3270 market itself, the decline in large-scale system growth, eroding margins in the display business, commoditization of the PC and the availability and popularity of micro-to-mainframe links.

"Singularly, none of these factors completely explain 3270 market dynamics as they exist today. Only taken together can these topics begin to make sense of the erratic and volatile state of 3270 display business," the report says.

Fog around 9370 clears

From page 38

siders IBM's tendency to offer discounts. "The list price is almost meaningless when you're buying 10, 20 or 100 of these. Then you get into the 30% discount range," he added.

Martin said a final cost benefit for the customer will be in the area of peripherals, particularly products such as the IBM 9335 and 9332 disk drives, which can be attached directly to the 9370 system bus rather than through channel attachments. He said the disk drives, announced in June, are "incredibly cheap," and that discounts on those products will run deeper as customers buy more.

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SPOTLIGHT

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The phrase "dumb terminal" has lost most of its meaning. Competing hard, VDT vendors are producing more capable products at a fraction of the price.

JANUARY 19, 1987/SPOTLIGHT NO. 1

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5. When the recording says, "Enter magazine code and issue code," enter these numbers and symbols:

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6. You will be prompted to enter the DIAL-INQ number, including the symbols, for the first product/service you've identified below. You will be prompted to repeat this step as needed to input additional DIAL-INQ numbers.

To key in more than 17 inquiries, simply make another telephone call once you've signed off from the first.

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2. ☐ ☐ ☐ # #
3. ☐ ☐ ☐ # #
4. ☐ ☐ ☐ # #
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16. ☐ ☐ ☐ # #
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7. Complete your phone call by entering the following symbols:

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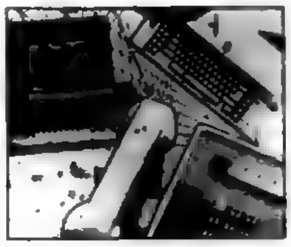
INSIDE



Voice and Data

Integrated voice/data terminals are gaining entry to the executive level with new convenience and efficiency features like hands-free dialing, appointment calendar and reminder list functions and electronic mail. Page S8.

Campus Connection

The University of Massachusetts considered versatility a primary requirement when it looked for a product to provide access across its several separate campuses. Page S7.

Ask the Vendor

Users get answers they need about availability, capability and service. Ranges from advice for owners of discontinued products to upgrade suggestions for the protocol-deficient. Page S2.

VDTs at a Glance

A comprehensive chart of who offers what in video display terminals, arranged for easy comparison of features, compatibility and pricing. Page S10.

SENIOR EDITOR
Joanne Kelleher

ASSOCIATE EDITOR
Penny Janzen

RESEARCHER
Sally Cusack

DESIGN CONSULTANT
Ronn Campisi

DESIGN EDITOR
Marjorie Magowan

Cover photo:
O'Connell/Ladouceur

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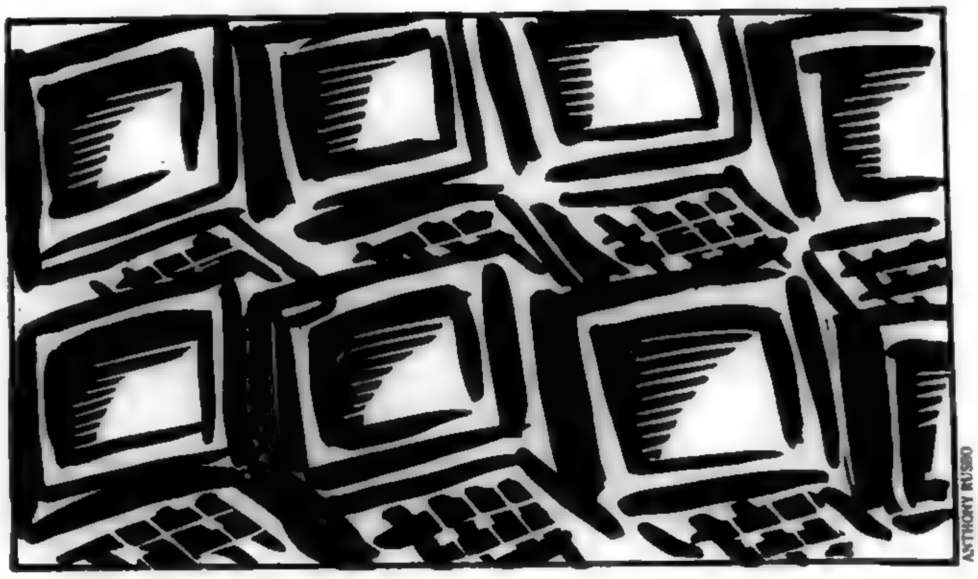
As microcomputers develop terminal-like capabilities, VDT makers are enhancing, price cutting, merging or dropping out

VDTs: DOING MORE FOR LESS

BY JOANN M. GRANGER



ANTHONY RUSSO

The current state of the display terminal market can be summed up in one word — competitive. From without, corporate acceptance of microcomputers, fueled by declining prices, is eroding the high end. From within, terminal vendors are scrambling to attract users and capture market share with a steady stream of new products and enhancements.

A number of firms are using micros as multipurpose workstations that duplicate some of the functions traditionally performed by terminals. As links to mainframes improve, more micros will be able to perform terminal-like tasks.

However, with an estimated 10 million units currently installed throughout the U.S., the video display terminal industry will remain an important part of the office environment for the forseeable future.

Many manufacturers have found that to maintain a competitive edge and still offer a quality product, they have had to go to offshore manufacturing — primarily in South Korea and Taiwan. Because labor costs in these environments are kept to a minimum and quality remains consistent, the customer benefits in terms of more functionality per terminal dollar.

Lower prices have reduced profit margins for terminal vendors and have stiffened competition. This situation has prompted some vendors to bolster their financial situation through mergers and acquisitions.

Among firms choosing this route are Zentec Corp., which acquired Lear Siegler, Inc.'s Data Products Division late last summer; Phaze Information Machines Corp., maker of IBM 3270-compatible terminals and workstations, which became a wholly owned subsidiary of Lee Data Corp. in 1985; Hazeltine Corp. which agreed in 1983 to sell its computer terminal equipment product line to a group of its management employees who formed Esprit Systems, Inc.; and NCR Corp. which acquired Applied Digital Data Systems, Inc. (ADDS) in 1981.

The major focus in this market is on functional capabilities. These include editing, highlighting, protected field, split-screen functions, color screen and ergonomic housing, to name a few.

Independent vendors tend to follow the lead of the larger vendors when offering such improvements. In a few instances, however, independents have taken the initiative to introduce terminal enhancements to major systems before the original manufacturer does.

This action, of course, pressures the original manufacturer to beef up the parent system, leading to a volleying back and forth to see which company can top the others by offering, in one package, the most features and functions at the lowest cost.

The display terminal market is divided into two distinct segments: the ASCII side and the IBM 3270 side.

The larger of the two is the ASCII, with regard to the number of vendors, units marketed and quantity sold.

The ASCII standard of communication is a coded character set introduced by the American

---

Granger is a research associate for *Datapro Reports on Data Communications*, published by Datapro Research Corp. in Delran, N.J.

VDT vendor competition

CONTINUED FROM PAGE S1

Standard Code for Information Interchange. It consists of 7-bit coded characters — 8 bits including parity check — used for information exchange among data processing systems, data communications systems and associated equipment. The ASCII set consists of alphanumeric characters, control characters and graphics characters.

The ANSI X3.64 standard, which is a subset of the ASCII character code, is a transmission code set forth by the American National Standards Institute. Both ASCII and ANSI devices transmit data asynchronously.

The primary contender in the ASCII/ANSI marketplace is Digital Equipment Corp. with the VT100 family and its successor, VT200 terminals. Prior to its recent discontinuance, the VT100 was the most widely emulated ASCII terminal with more than one million units sold.

This terminal, which is used chiefly with DEC's VAX line of computers, created an emulation market second only to the IBM 3270 market in size.

The VT100 offered what the business public was looking for. In its basic configuration, it displayed 24 lines of 80 characters or 14 lines of 132 characters. It featured a 12-in. (diagonal) display screen and detachable typewriter-style keyboard.

When the VT100 was introduced, DEC had not anticipated, and was unable to meet, the huge demand for the terminal. Lead time for delivery was often three to five months. This delay provided a window of opportunity into which several competitors slipped with VT100 emulators. Having apparently learned from this experience, DEC made sure the VT200 family of terminals was readily available upon its introduction.

In November 1983, DEC introduced the VT200 family of video display terminals intended to replace the VT100 models. These terminals, of which there are currently three versions, feature full VT100 compatibility and provide the user with an improved price/performance ratio over that found on the VT100 terminals.

Because of their compact, modular design, the VT200 terminals require less desk space than their predecessors.

The most popular member of the VT200 family is the VT220, which, like the VT100 before it, has acquired a large following of independent emulators. Because of the initial demand for the VT220, DEC raised the terminal's price from $1,295 to $1,395.

However, confronted with competitors offering clones for as little as $795, DEC reversed the increase and knocked $200 off the original price of this model. The VT220 was reduced another $300 in November of last year, bringing the current list price down to $795.

The VT220 is a general-purpose interactive display that features a 12-in. monochrome display, 80- or 132-char. column display capability and a detached keyboard. The VT240 offers both text functions and graphics capabilities, with two graphics protocols available: DEC's Regis and Tektronix, Inc.'s 4010/4014.

DEC's VT241 is a color text and graphics terminal combining the features found on the VT220 and VT240 with color display capability. All models in the DEC VT200 family conform to the ANSI X3.64 standard of communications.

The current leaders in the ASCII/ANSI field include DEC, Wyse Technology, Inc., Televideo Systems, Inc., ADDS, Esprit Systems and ITT's Qume Corp.

For years, Televideo, Lear Siegler, ADDS and Esprit Systems (then Hazeltine) dominated the ASCII terminal market. In August 1981, Wyse Technology was formed and began shipping its first product, the WY-100 smart terminal, in April the following year.

Attention to such considerations as ease of use, quality, compact design, competitive price and attractive styling have helped Wyse capture what is generally considered the No. 1 spot.

Despite being a relative newcomer to the industry, Wyse has managed to carve out a healthy share by combining advanced features with low prices. When Qume, an ITT subsidiary, broke the $400 price barrier by introducing the QVT 101 in 1985, Wyse quickly responded with the WY-30.

This entry-level smart terminal emulates the ADDS Viewpoint A2 and Regent 15; Lear Siegler ADM3A/5 and ADM 31; Televideo 910, 910+, 925 and 925E; and the Wyse WY-50 and WY-100.

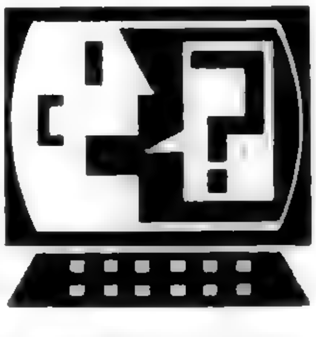
Wyse offers the WY-50 smart terminal and an enhanced version, the WY-50+. Terminal emulations available on these models include the Lear Siegler ADM 31 (native mode); Televideo 910, 920, and 925; ADDS Viewpoint; Hazeltine 1500; and WY-100.The WY-50+ further emulates the Data General Corp. Dasher D200, IBM 3101, and Televideo 950.

The WY-60 is a smart, flat-screen terminal that offers the widest array of enhancement features incorporated into a Wyse terminal. An added bonus

Continued on page S6

ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.



The Applied Digital Data Systems, Inc. 2020 terminals we use have block-mode capability, but they cannot do edit checks on fields like some of the more expensive terminals. Why is this capability not included in this type of terminal?

James Mercer
Manager of MIS
CMP Publications, Inc.
Manhasset, N.Y.

ADDS: The vast majority of users who would likely be in the market to purchase a 2020 are not utilizing block-mode transmission. Whereas this feature would be a perceived advantage to a block-mode user, the number of people who would benefit from its incorporation would be minimal.

In addition, software developers tend not to write code for block-mode transmission, but rather they prefer conversational mode, thereby allowing maximum control via the host computer.

Will a future release of the Digital Equipment Corp. VT220 include graphics capability?

Dave Duitscher
Hardware manager
Salisbury State College
Salisbury, Md.

DEC: Digital has pursued a strategy of providing a high-quality text terminal, designed especially for text applications, choosing not to integrate the additional functionality and cost that would accompany a graphics product.

If a customer does need graphics capability, Digital has products available to meet those requirements in different and higher price ranges.

By pursuing this strategy, Digital can minimise the cost for those who have text-only requirements.

Is there any way to obtain graphics capability on Hewlett-Packard Co. 2392A terminals without having go to the expense of replacing them completely?

Also, when will the price of color monitors be reduced to a more accessible level? For example, will they ever be as inexpensive as monochrome monitors?

Michelle Johnson
Information systems specialist
Cathedral City, Calif.

HP: Although there is not graphics capability on the HP 2392A, a 64-char. line drawing set is standard on this product. This can be used for simple graphics and to emulate forms.

The HP solution for graphics is the 2393A graphics terminal or the 2397A color graphics terminal. Due to the relative difference in complexity of design and cost of materials required to build color and monochrome monitors, there is a difference in price between the two.

We will, however, see the cost of color and monochrome monitors fall over time, resulting in a narrowing of the color/monochrome price delta.

With the plan to discontinue HPWord, what alternative will users of HP 2392A terminals have for word and text processing?

Darlene Litcher
Manager MIS branch
U.S. Department of Energy
San Francisco

HP: Hewlett-Packard has no plans to discontinue HPWord. The HPWord terminals, 2626W and 2628A have been discontinued; however, customers with installed bases of these terminals using HPWord on our current family of HP 3000 systems can continue using HPWord for many years.

Additionally, the HP 150 Touchscreen PC is supported as an HPWord/3000 terminal. The 2392 terminal has never supported HPWord, but two products are available for text processing for the 2392 — HPSlate and Text and Document Processor.

HP's direction with word processing is to move the functionality to the personal computer. Today we have HPWord/150 for the HP Touchscreen PC. The PC versions work stand-alone, and documents can be easily exchanged with terminal-based HPWord users.

Why did the supply of 3178 terminals suddenly disappear in September 1986? And why was there no warning that they would not be available?

Alen Baker
Manager of distributed systems
Duke Power Co.
Charlotte, N.C.

IBM: Ongoing demand for the 3178 has exceeded expectations, so we have had to put them on limited availability. The "roll-your-own" keyboard option first announced with the 3178 allows users to design keyboards for specfic applications, and some apparently are so comfortable with these keyboards that they have been slow to opt for the upgrade — the new IBM 3191 display, which offers more function, better ergonomics and a lower price.

I'm getting better response time for 40% to 60% less cost than IBM on third-party service contracts for the 3000 series terminals. Because of this, I'm switching over to third-party service vendors. Why can't IBM's prices for maintenance contracts be competitive with the third-party service industry?

Bob Adams
Corporate workstation administrator
Chevron Corp.
San Ramon, Calif.

IBM: There are a lot of factors involved in competitive pricing of service contracts, so we can't speculate with regard to the contract mentioned.

IBM seeks at all times to keep our customers' service and repair costs as low as possible. This is one reason why we have introduced three-year warranties on our new display stations.

Why don't the Wyse Technology, Inc. WY-50 terminals we use incorporate standard screen-handling protocols, such as those recommended by the American National Standards Institute?

James Mercer
Manager of MIS
CMP Publications, Inc.
Manhasset, N.Y.

Wyse: The WY-50 is a full-function terminal designed for the general-purpose ASCII market. As a result, it does not incorporate ANSI protocols.

The most sophisticated terminal in the Wyse product line, the WY-60, incorporates both ASCII and ANSI standards.

The ANSI X3.64 specification provides for standardised display protocols and command sets. Screen handling commands such as video attributes and cursor-positioning sequences are included in this specification.

WY-60 users can select from among 17 different ASCII modes or one of three ANSI/DEC compatible modes — such as the WY-75 ANSI, DEC VT52, or DEC VT100 — depending on which mode is best suited for their application.

Introducing the most reliable DEC™-compatible terminal ever built. The TeleVideo 9220.

"Why do we want thousands of TeleVideo® terminals? Because we can't afford thousands of problems."

Susan Kennedy should know. She's a product analyst at Leasametric, a company that rents, sells, and services DP equipment all over the country. Including thousands of terminals. And since reliability is crucial to Leasametric, they tear each evaluation unit apart piece by piece. Then, they give it a series of tests that make MIT exams look easy.

"Too many terminals just don't measure up," says Susan. "I've seen machines with questionable ergonomics… keyboards that flex in the middle when you type… even cheap little diodes that could drop off.

"But TeleVideo starts with solid engineering, and follows through with every detail. Overall, they've built the same quality into the 9220 that's made all their other terminals last so long."

And there's more to the 9220 than quality and reliability. There's also an extended feature set, including full VT-220 compatibility. A super-dark 14" amber screen. A tilt and swivel base. 30 programmable function keys. Plus the best thought-out ergonomics around. All for exactly $619.

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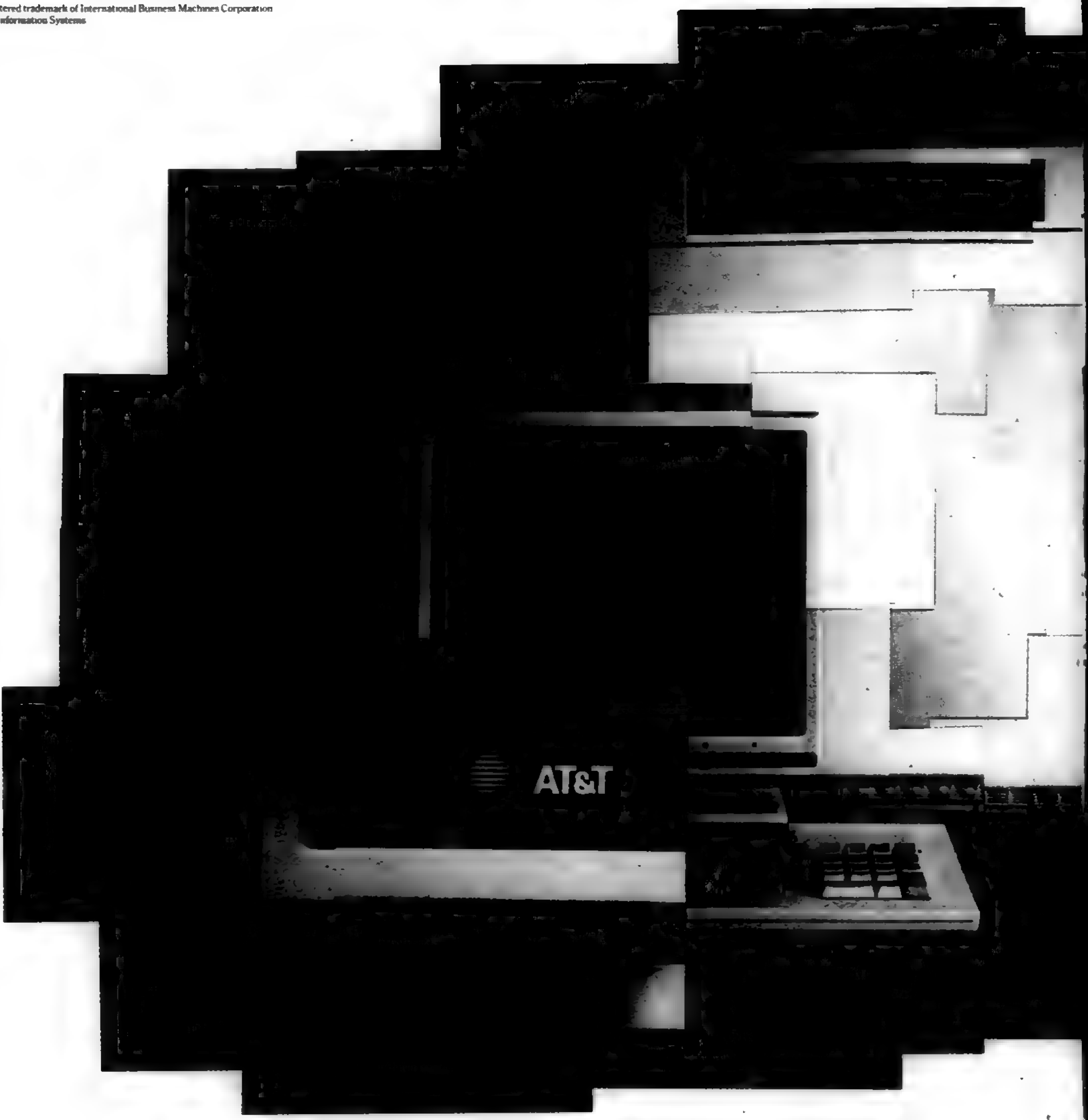

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COMPLETE COMPATIBILITY.

That's what you get with the AT&T 6500 Multifunction Communication System. And you get it in both SNA/SDLC and BSC protocols.

Which means for the first time, you have a real choice in 3270 Systems. From a company every bit as solid as Big Blue.

SYNCH. AND ASYNCH.

The AT&T 6500 will tie together data and applications from up to three synchronous and 16 asynchronous hosts. Not to mention allowing PCs to work as terminals.

What's more, you can switch between synchronous and asynchronous hosts with a single keystroke.

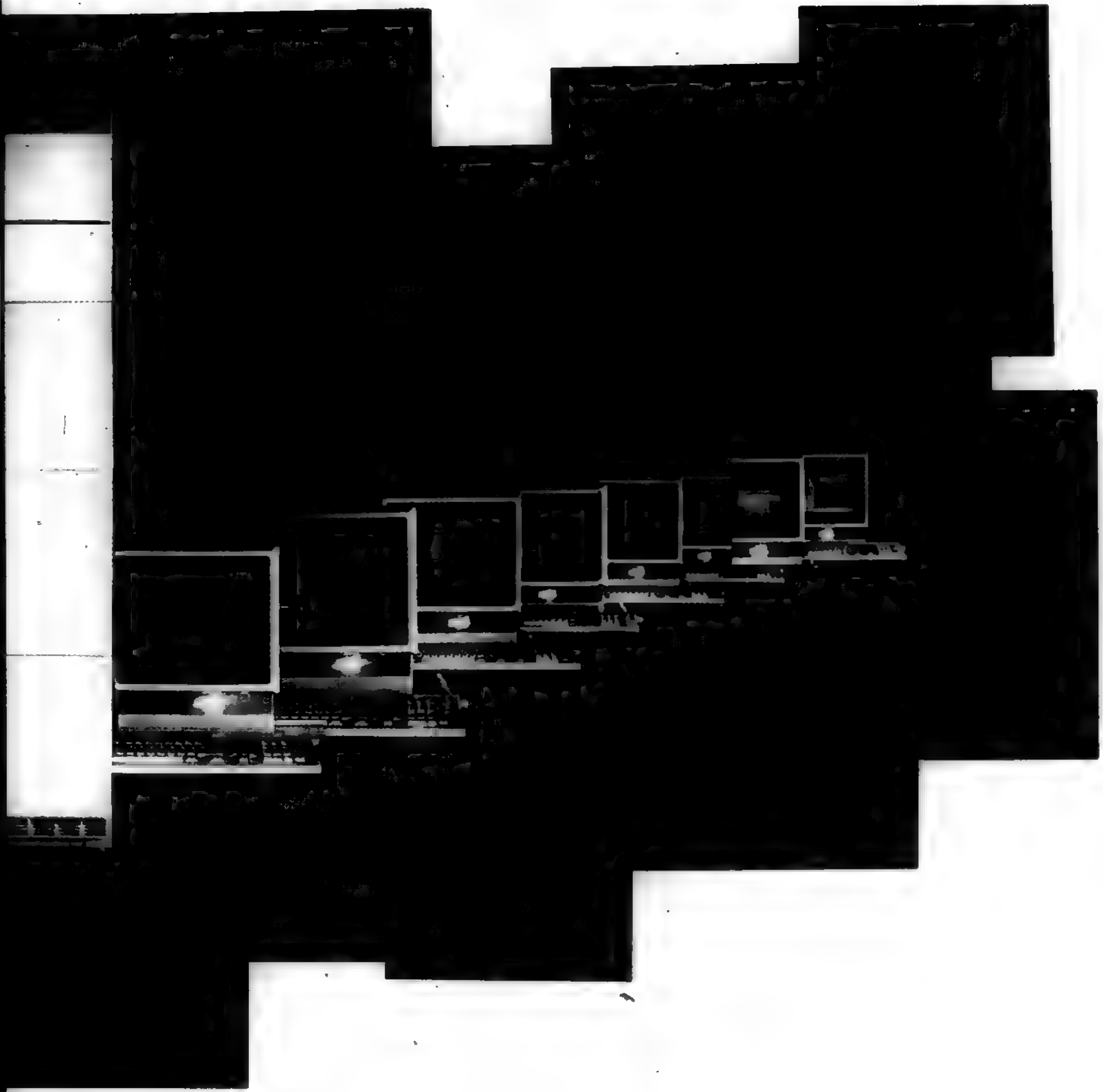
FOUR WINDOWS.

The 6500 lets you create up to four windows at the same time—into both synchronous and asynchronous hosts—and freely pass information among databases.

For example, an inside salesperson taking an order could access: the customer's credit status in one host; relevant inventory information from another host at a completely different location; and the order form to fulfill the request from yet a third host.

All on a single screen.

That kind of power means big productivity gains with no outlay for costly systems and applications development.



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PEACE OF MIND.

The 6500 incorporates AT&T's experience with three previous generations of 3270 equipment. Plus the kind of service that smaller companies just can't provide.

And we make the pieces fit. Modular architecture assures you of smooth system evolution: upgrading doesn't even require a new communications controller; and you can easily reconfigure your system with almost no disruption.

That's what you'd expect from the company that makes "The Computers With The Future Built In."

AND VALUE.

Even with performance that matches or surpasses comparable IBM* equipment, the AT&T 6500 looks a lot better on your balance sheet.

So before you decide on 3270 compatibles, call your AT&T Account Executive, or simply dial 1 800 247-1212.

We'll get you a lot to look at.

AT&T
The right choice.

CONTINUED FROM PAGE S2

is that Wyse dropped the list price of this model in November from $699 to $599.

Standard emulation modes available include Dasher D200; Lear Siegler ADM 3A/5/31; Televideo 910, 920, 925 and 950; ADDS A2/60; Hazeltine 1500; and IBM 3161. The WY-60 also includes ANSI modes. The WY-75 is a version of the WY-50 that emulates the DEC VT100 and conforms to the ANSI X3.64 standard.

Also compatible with ANSI X3.64 is the WY-85, which emulates the DEC VT220. Rounding out the Wyse offerings is the WY-350 color display with smart terminal features. Up to 64 different colors can be displayed using this model.

Televideo Systems, founded in 1975, began commercial shipping of video display terminals in March 1979. Within a year's time, the company propelled its way to the front of the line of independent suppliers, a position it retained for the next five years.

Market position slipping

During the past year, Televideo has found its competitive position in the display terminal market slipping, due largely to the company's foray into the microcomputer market. During its recent periods of declining sales, its competitors have been active in their attempts to increase market shares.

In an effort to regain the spotlight, Televideo signed a five-year joint marketing accord with Ambi Corp. and purchased slightly less than 10% of Ambi stock. Ambi is a manufacturer of integrated voice/data terminals (see story page S8).

The display terminal product line now offered by Televideo consists of four models, each featuring improved ergonomics, editing capabilities and graphics characters. The Model 955 and Model 905 smart terminals are designed for the general-purpose ASCII market. The 905 is compatible with the Lear Siegler 3A/5A, Hazeltine 1410/1500, ADDS A2, ITT Qume QVT 101 and Televideo 925 and 910.

The remaining two models offer compliance with the ANSI X3.64 standard. Of these ANSI units, the Model 9220 is DEC VT220-compatible, and the Model pT100 is DEC VT100-compatible.

Founded in 1969, ADDS has been a long-time leader in the ASCII terminal market. In 1981, it was acquired by NCR and since has been considerably strengthened by the backing of this computer giant.

The introduction of the Viewpoint series in March 1981 proved to have a sharp impact on the ASCII terminal market. With a unit price of $650 (currently $595), the Viewpoint was priced significantly lower than any comparable terminal on the market at that time. ADDS' competitors responded by adding new models or reducing prices on established models.

The Viewpoint terminals replaced ADDS' highly successful Regent terminal line. In addition to conversational and smart terminals, ADDS has introduced low-price color models as well as terminals that are IBM compatible when used in conjunction with a protocol converter.

Three new models in the series offer tilt display and a detached keyboard, with a small footprint design. The ADDS 1010, introduced a few months ago, is an entry-level display terminal priced at $395. This terminal features a built-in parallel printer port.

The Viewpoint +, a version of the original Viewpoint, provides emulation of three older Viewpoint models: A1, A2 and 3A+. The Viewpoint/Color is a smart editing terminal that is capable of displaying eight colors. Also a smart editing terminal, the Viewpoint/60+ is an enhanced version of the Viewpoint/60.

The Viewpoint/78 is a conversational terminal that provides IBM 3278 emulation when used in conjunction with a protocol converter, and Viewpoint/78 Color is a color version of the Viewpoint/78 that offers display in four colors on a black background. The smart Viewpoint/90 offers mosaic graphics and line drawing graphic capabilities and Viewpoint 122 is an ANSI terminal that is compatible with DEC VT220, VT100 and VT52.

Esprit product line

Esprit System's product line currently consists of five models. The ESP 6110+ is a smart terminal that offers full editing features and a variety of emulations. The terminal's most impressive feature however, is its price — $395.

The ESP 6515 ANSI model emulates the VT220 and operates with DEC's Decsystem-10 and Decsystem-20 accounting/data base package and the DEC PDP-11 RSTA data inquiry application. The ESP 6310 includes all the features of the 6110+ as well as additional emulations.

Featuring eight displayable colors, the Esprit III Color is priced lower, at $995, than comparable models by ADDS and Wyse. Esprit's Opus 2 mid-range ASCII terminal provides advanced design and system enhancements. It incorporates a 14-in. flat screen with a touch-tilt and swivel mechanism. It emulates the WY-50, Televideo 925 and 910, ADDS Viewpoint and Esprit ESP 6110+ Hazeltine mode.

ITT Qume Corp., a leader in the printer market for the last several years, entered the general-purpose ASCII terminal market in 1982 with the introduction of the QVT product line. In early 1985, the company shook the market with the introduction of the $395 QVT 101. This smart terminal became the first product of its kind to break the $400 price barrier.

The price war was on again. In a few months, Lear Siegler and Wyse countered

"Within 10 days we had the names of the best distributors in three foreign countries."

For nearly two decades, Land Grant has been involved with high tech in a variety of capacities. He is president of Land Grant & Company — a business devoted to export consulting and profitable concepts in global trade for high technology producers.

Land realizes the importance of networking in international business. And, he's been using CW International Marketing Services to help him expand his list of distributor contacts. *"CW's worldwide offices are nodes on a network — in touch with current trends as well as the customers and international middlemen U.S. manufacturers are seeking,"* he explains.

Land discusses how CW International Marketing Services helped his client, Phoenix Technology: *"Locating qualified candidates was one of our first steps in helping Phoenix select the right distributors. Within 10 days, we had the names of the best distributors in The United Kingdom, West Germany and France."*

CW International Marketing Services is the only source, aside from the Commerce Department, that provides comprehensive distributor information broken down by country and product line. *"For years, we had to gather and cross-reference distributor information from a hodge-podge of government and international trade sources. Now, CW provides us with a better source of fast, top-drawer information,"* says Land.

In fact, selected international market information is so scarce, Land is currently writing a guide entitled the *High-Tech Exporter's Sourcebook.* And he plans to continue relying on CW International Marketing Services for distributor contacts. He explains, *"The real added value of CW is its people and expertise in-place around the world."* He adds, *"Because CW Communications is a network of international offices, CW International Marketing Services has worldwide contacts and marketing information unavailable elsewhere."*

To find out how CW International Marketing Services can work for you, call Frank Cutitta, Managing Director, at 800-343-6474 (in MA, 617-879-0700).

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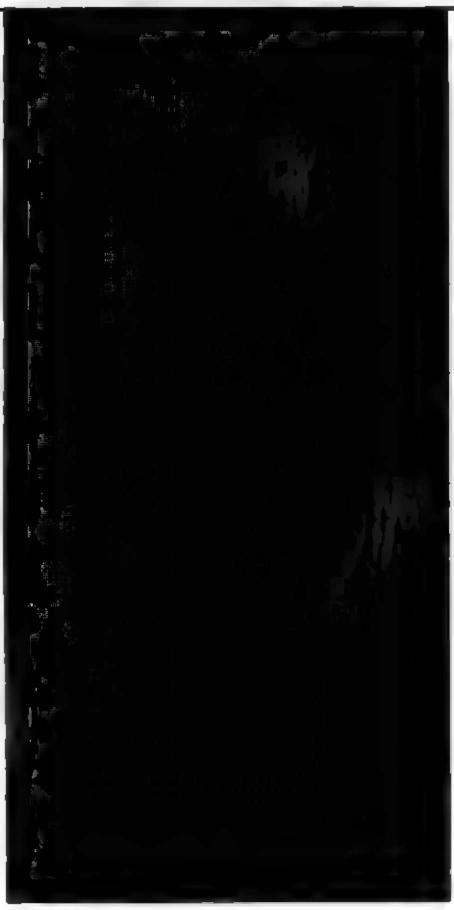


Land Grant
President
Land Grant & Company
Brooklyn, NY

Qume's QVT 101 with new sub-$400 units of their own.

Other members in this family include the QVT 103, QVT 201 and QVT 202, all of which are compatible with the ANSI X3.64 command and emulate DEC VT100 and/or VT200.

Featuring emulation of Televideo's 925, 920 and 912 is the QVT 108 smart editing terminal. The QVT 109, another smart terminal, provides menu-selectable emulation of the ADDS Viewpoint A2.

No conquest for IBM

Despite competitors' fears, IBM's 1979 entrance into the ASCII terminal market did not herald yet another conquest for Big Blue. IBM's first offering, the 3101 terminal, was priced about 20% higher than the competition and was made available for purchase only, with quantity discounts available for high-volume orders. As of today, the 3101 has not achieved the popularity enjoyed by some of the older, established lines of ASCII terminals or even many of the new start-up companies.

IBM tried again in 1985 when it introduced the 3160 family of display stations. More competitively priced, the 3160 terminals offer emulation of other popular ASCII terminals. The 3161 provides emulation of terminals from ADDS, Lear Siegler, Esprit and Televideo. The 3163, via its optional plug-in cartridge, puts IBM in the DEC-compatible market with VT100 and VT52 compatibility.

The second significant market segment is the IBM 3270-compatible market, the single largest subset of the display terminal market. The current installed base of 3270-type terminals consists of more than three million units. Of that, approximately half are IBM terminals; the rest are 3270-compatible models from independent manufacturers.

IBM's major competitors in this market include Telex Computer Products, Inc., ITT Courier Terminal Systems, Inc., AT&T, Lee Data and Memorex Corp. Telex Computer Products, Inc. provides plug-compatible replacements of various members of the 3270 family. This compatibility allows Telex terminals to be attached to IBM controllers or vice versa. Memorex Corp. also makes plug-compatible replacements for various 3270 components. AT&T and Lee Data provide functional compatibility via their 3270-compatible product lines.

The families of display terminals now available as a part of the IBM 3270 Information Display System include the 3276 Controller/Display Station, the 3278, 3178 3180, 3179, 3191, 3193 and 3194 Display Stations and the 3279 Color Display Station.

Lee Data was the first of the 3270-compatible vendors to offer multiple-host — asynchronous and synchronous — access from a single cluster controller along with windowing and partitioning features on its 3270 display stations. AT&T followed suit by offering the 6500 Multifunction Communication System. Now, IBM offers these features via the 3174 controller and the 3193 and 3194 display stations. IBM has gone one step farther by providing imaging capability on the 3193.

Currently, the No. 1 competitor in the IBM 3270 market is Telex. In 1976, Telex purchased Terminal Communications, Inc. and entered the 3270-compatible terminal business. In June 1984, the company reached an agreement with Raytheon Corp. to purchase the installed base, receivables and inventory of Raytheon Data Systems.

Like all of the independents who must compete with IBM, Telex offers a broad line of competitive products priced somewhat lower than those of IBM. One of the results of the stiff competition in the 3270 market is a trend toward display terminals with not only lower prices, but a more compact design.

Telex's 270 Information Display System is a family of plug-compatible replacements that compete directly with corresponding IBM models. The display terminals included in this system are the 078, 079, 080, 179, 180-1, 279-3A, 1186, 1260 and 1280. The 078 contains a 12-in. display screen with a 1,920-char. screen capacity. It is a plug-compatible replacement for the IBM 3178. The 079 color terminal is the color counterpart to the 078 and displays in red, green, blue, yellow, turquoise and pink. The 079 is an alternative to the IBM 3179 color terminal.

Offering four character screen sizes, the 080 is a 15-in. monochrome display supporting the direct attachment of light pen and message printer. It attaches directly to an IBM 3274/3276 controller or comparable Telex control unit. The 179 color terminal displays seven colors on a 14-inch monitor and offers three selectable screen sizes. It is a plug-compatible alternative to the IBM 3179-2.

An alternative to the IBM 3180 is the Telex 180-1. It features four user-selectable screen sises on a 15-in. monitor.

Last is the 279-3A Color Graphics Terminal, featuring a 14-in. screen with a 2,560-char. display capacity. It is a plug-compatible replacement for the IBM 3279-S3G.

Courier Terminal Systems became ITT Courier Terminal Systems Inc., a wholly owned subsidiary of ITT, in March 1978. Since that time, it has gained a significant presence in the computer industry. In April

Continued on page S9

USER PROFILE

Campuses access UMass MIS

BY STANLEY GIBSON

Although its main campus in Amherst, Mass., sits amid the rolling hills of the Connecticut River Valley, the University of Massachusetts resides in other locations in Worcester, downtown Boston and in Dorchester, overlooking Boston Harbor.

The university's MIS department must give its users at any of the locations across the state access to computers in other sites, particularly at the university's computing center in Amherst, which is where all student records are stored on a National Advanced Systems Corp. (NAS) 9040 mainframe.

Since January a year ago, the two Boston campuses have both used Lee Data Corp. terminals to carry out IBM 3270 sessions as well as asynchronous transactions. "Lee Data was the only one that offered 3270 and async," says Charles Boland, the university's director of computing services at the Boston Harbor campus.

Users of the terminals can log on to four systems at once, consisting of up to four 3270 sessions and one asynchronous session and one PC session. The terminals also have the capability to create windows of the various sessions, and information can be copied from a 3270 screen to a personal computer program via the terminals' notepad function.

"It's a godsend to our users. It makes life easy," Boland says, praising the functionality of the Lee Data terminals. "The users have a lot of 3270-type work going to a NAS 9040. But they also have Digital Equipment Corp. VAX needs," Boland says.

Meanwhile, other users with primarily asynchronous needs use Televideo Systems, Inc. 925 terminals that communicate with the mainframe 3270 controller through a protocol converter. "The goal was to make it as comfortable as possible for a high portion of a user's work," Boland says.

Physical comfort for the users was also a factor in product selection, according to Boland, who points out that the Lee Data terminals are equipped with a detachable keyboard in addition to a tilt-and-swivel monitor. "At that time, the legislature had a bill mandating ergonomic features in state computer equipment purchases," Boland explains. Although that bill was never passed, selecting terminals with better ergonomic features appeared to be a good idea, he recounts.

> THE goal was to make it as comfortable as possible for a high portion of a user's work.
>
> Charles Boland
> University of Massachusetts

The initial Lee Data contract specified 60 terminals, five controllers, five printers and three IBM Personal Computer clones, at a price of $175,000. Boland has since added controllers, printers and some 40 terminals to the system.

Boland aims to increase response time in the Boston location by purchasing a new Lee Data product, the 525 terminal controller. The 525 will increase the controller-to-terminal speed to 56K bit/sec. from the present 9.6K bit/sec. The reason for the increase, he says, is that "when users travel to Amherst, they notice a faster response time." The faster speed, he says, is not a necessity but a convenience that should make people more productive.

Terminals such as Lee Data's, with a variety of capabilities, are particularly welcome, because, Boland says, he is committed to being a multivendor shop. "We don't want to be tied to one vendor and locked in," he says.

Further, because the university is run by the state, Boland is obligated to select the lowest bidder that meets the contract's specifications; he cannot choose a vendor for the sake of consistency or for intangible reasons.

But Boland says he enjoys selecting the best bidder from many different vendors, regardless of state purchasing guidelines. "It's not so much the state process, but just trying to get the university the biggest bang for the buck."

Gibson is a Computerworld senior writer.

Checking a ledger file: *UMass staff members make use of a Lee Data VDT*

Integrated voice/data terminals make appearances in offices by capitalizing on business's reliance on the telephone

VOICE FOR MANAGERS

BY JOANN M. GRANGER

Integrated voice/data terminals are beginning to win friends in high places, but the corporate ladder has proved to be a tough climb. With tasks such as typing and report generation still regarded as clerical work, many executives have been reluctant to admit these machines into their own offices.

However, taking advantage of corporate America's reliance on the telephone, Northern Telecom, Inc. was able to get its foot in the door with the introduction of the Displayphone, and through that opening other vendors have followed.

The Displayphone integrates data and voice capabilities using a conventional telephone handset and accompanying telephony features. The addition of these telephony features to a conventional display station makes the resultant products much more attractive to the executive.

Last September, five years after introducing the Displayphone, Northern Telecom announced its second generation, comprising four models. Each model features basic data and voice capabilities as well as electronic mail.

The Displayphone 220 and Displayphone Plus are standalone units, the SL-1 Displayphone is designed for use with the Meridian SL-1 integrated services network, and the fourth unit is designed for the international market.

Rolm Corp., now a subsidiary of IBM, entered the integrated voice/data terminal market with its Cypress terminal in 1983. This unit provides IBM 3270 compatibility — via the Rolm IBM Gateway — and Digital Equipment Corp. compatibility as well as one-button access to Rolm Phone Mail.

Rolm's Cedar and Juniper I arrived in November 1984. The Cedar is an IBM Personal Computer-compatible version of the Cypress. The Juniper I offers compatibility with the IBM PC and PC XT.

The Juniper II, announced in October 1985, features all of the capabilities of the Juniper I plus compatibility with the IBM PC XT and compatibles.

AT&T's three integrated voice/data terminals are designed for use with the company's System 75 and System 85 private automatic branch exchange (PABX).

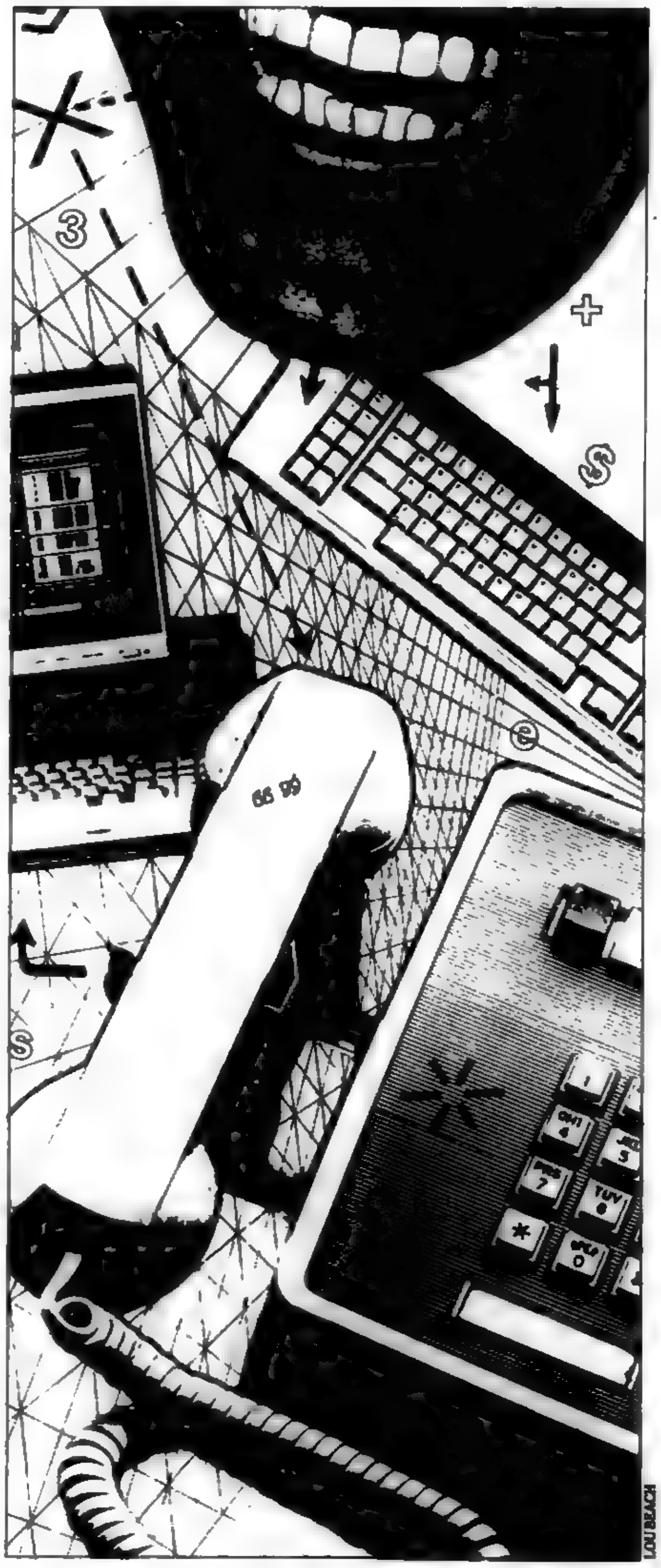
The BCT 515 debuted in June 1983 and offers synchronous and asynchronous communications capability. The Personal Terminal 510A, which is analog, and 510D, which is digital, announced in June 1985, were the first voice/data terminals to incorporate a touch-sensitive screen.

Intecom, maker of the IBX family of PABXs, produced the Keystone integrated terminals in 1985. This unit provides all of the voice features of the IBX, plus data features including IBM and DEC terminal emulation and Wang Laboratories, Inc. Professional Computer attachment capability.

GTE Communication Systems brought to market the XT300 Actionstation in September 1982, which was replaced with the XT300E in August 1984. This integrated terminal provides full voice and data capabilities as well as access to GTE Telemail.

ITT Telecom Products Corp., a division of ITT Telecommunications Corp., unveiled the ITT Infostation in late 1984. The Infostation is a personal information terminal that provides electronic messaging and two-line voice/data transmission.

Davox Communications Corp. offers three cluster, multiprotocol workstations: the Series 1921, Davox 4900 and Davox 5900. The Series 1921



LOU BEACH

Managers' voice

CONTINUED FROM PAGE S8

targets the IBM 3270 market. In addition to IBM emulation, Davox also offers ASCII and DEC emulation, as well as IBM PC capabilities and IBM PC attachability.

Ambi Corp. provides the Ambiset, which features either an eight-line LCD or a full 9-in. display and an integral keyboard. Full voice capabilities are standard on the Ambiset.

Cygnet Technologies' Communications Cosystem is a computer phone with a built-in modem and 92K bytes of internal memory that connects directly to an IBM PC or compatible.

Tymshare, Inc. unveiled the Scanset XL in November 1982. In September 1984, Matra Communications, Inc. was formed to market and service the product line in the U.S. The Scanset series of data base access terminals is designed primarily to access data via single- or dual-button operation.

Zaisan, Inc. announced its ES.1 in November 1983 and its software-enhanced version, the ES.2, in July 1985. The ES.3 model, announced in August 1984, was the first integrated voice/data terminal with IBM-compatible local processing.

Liberty Electronics USA, Inc. introduced the Freedom 212 and Freedom 222 Remote Information Stations in June 1984. These units are the company's basic display terminals with an integral 1,200 bit/sec. modem.

Compaq Telecommunications Corp. announced the Telecompaq family of integrated terminals in March 1985. A unique feature of this family is its ability to interface six standard electromechanical telephone lines — five lines plus a hold line.

C. Itoh Communication Systems, Inc. recently introduced Executive/Secretary Communication System (Escom) as a new Centrex add-on. Escom enhances a company's current Centrex system with integrated voice/data capabilities.

Panasonic Industrial Co.'s KX-D4985 Infocenter was introduced last April. In addition to two telephone lines, a diskette drive is also included with the system. The KX-D4985 allows local storage of ASCII text information formatted under the Microsoft Corp. MS-DOS protocol and has a full 128-character ASCII keyboard.

Telex Computer Products, Inc. unveiled the C078 Combined Function Terminal in November 1986. It is the only integrated terminal that is plug-compatible with the IBM 3270 system. The C078 also supports ASCII communications, DEC VT220 emulation and up to seven user-defined windows.

CONTINUED FROM PAGE S7

1984, ITT Courier introduced the ITT 9000 series of 3270-compatible products. The company expanded into plug-compatibility in February 1985 with the introduction of the ITT 1778.

This 3270 plug-compatible display terminal is compatible with the IBM 3178 and 3278 displays. The ITT 1778 is designed to attach to an IBM 3274 or 3276 controller.All other ITT terminals attach to ITT Series 9000 controllers. The ITT 1778 joins the ITT 170 and ITT 1900 as an entry-level member of the ITT 9000 series display family.

The ITT 1700 display terminal is functionally equivalent to the IBM 3178. It features a 12-in. monochrome display screen with a 1,920-char. capacity. The ITT 1900 color terminal is functionally equivalent to the IBM 3179 color station. This terminal displays seven colors on a 14-in. display screen.

ITT offers three Basic Function Display Terminals. The first two, the ITT 9210 and ITT 9212, are functionally equivalent to the IBM 3178 and are equipped with a 14-in. display screen.

The third member of the Basic Function Display Terminals is the ITT 9216. This IBM 3179 equivalent is a color terminal that offers the seven basic terminal colors. It features a 14-in. display screen with a 1,920-char. capacity.

There are also three Extended Function Display Terminals featured as part of ITT's 9000 series. The ITT 9230 and ITT 9232 are functionally equivalent to the IBM 3180 Model 1 and 3278 Models 2 through 5 display stations.

Both terminals are equipped with a 15-in. display screen and four user-selectable screen sizes. Characters are displayed in green phosphor on the ITT 9230 and in amber phosphor on the ITT 9232.

The ITT 9236 Extended Function Color Display Terminal is the functional equivalent to the IBM 3279 color display station. Seven colors are displayed on the terminal's 14-in. display screen that offers two user-selectable screen sizes.

Major contender: Lee Data

Lee Data is another major contender in the market for 3270-compatible equipment. Since its formation in 1979, the company has risen to compete as one of the top five independent vendors in this lucrative terminal area with the Series 300 and Series 4BB Display Systems.

Although it stands as a relative newcomer to the IBM 3270-compatible terminal market, Lee Data has carved out a significant market share and a high degree of user acceptance.

Since its entrance into the 3270 field, Lee Data has been an innovator, integrating multifunctional capabilities into its terminal systems.

Its Series 400 offers 3270 and asynchronous communications, dual-host capability on a single control unit and an IBM 3270-PC emulator. Products such as these give Lee Data the first truly multifunctional product line in the 3270 world.

Among the many components of the Lee Data Series 300 and Series 400 are three display terminals. The Model 1214 is an entry level unit that features a 14-in. tilt/swivel display screen. It attaches to the Series 300 and Series 480 controllers in 3270 mode operation only.

DUE primarily to deregulation, AT&T terminal prices have fallen to reflect the more competitive market in which the company finds itself.

The Model 1222 Open Window Display Terminal combines four selectable screen sizes with window capabilities. Up to four windows can be displayed simultaneously on the 15-in. tilt/swivel display screen. The Model 1222 provides emulation of the IBM 3180.

The Model 2131 Open Window color terminal emulates the IBM 3279 Model S3G and is compatible with the IBM 3179. This model includes a 14-in. tilt-and-swivel display screen with eight-color capability. Up to four windows can be displayed simultaneously, representing four interactive sessions.

Reformed AT&T

The AT&T divestiture and deregulation have changed the way AT&T does business. The Teletype Division, once responsible for manufacturing and supplying computer display terminals and printers to the Bell operating companies, has been absorbed into the Computer Systems Division of AT&T Information Systems.

Recently, AT&T dropped all reference to its individual subdivisions and now prefers to be known simply as AT&T.

AT&T's products gained a reputation for functionality and reliability as well as for rather high price tags. However, due primarily to deregulation, AT&T terminal prices have fallen to reflect the more competitive market in which the company finds itself.

AT&T offers the AT&T E4540 series display terminals, which replace the older Teletype 4540 series and the AT&T 6500 Multifunction Communication System. Both of these feature 3270-compatible replacement products, none of which are plug-compatible.

The E4540 series is AT&T's third generation of 3270-compatible display terminal products. Among its components are four display terminals. The E4548-12 is a 12-in. monochrome display that is compatible with the IBM 3178 and 3278 Model 12.

The second terminal in this series is the E4548-25, also a monochrome display terminal. It is compatible with the IBM 3278 Model 5 and includes a 13-in. display screen with two user-selectable screen sizes. The E4549-42 offers four-color display on a 13-in. screen. It is functionally compatible with the IBM 3279 Model S2A.

The last of the terminals in this series is the E4549-43. This model provides the user with the same features as the E4548-25 with the addition of four-color display.

In November 1985, AT&T introduced the multiple-host 6500 Multifunction Communication System, a family of products that provides compatibility with both a synchronous host and an asynchronous host.

The 6500 family can communicate with a variety of host computers, including the IBM 360, 370, 3030, 3080 and 4300 series and IBM plug-compatible mainframes from various vendors.

Asynchronous hosts such as the AT&T 3B family and the DEC VAX series can also be accessed.

AT&T's alternative to the IBM 3179 display station is the 6529 Standard Display. This unit features four- to seven-color display capability on a 14-in. screen and also offers four user-selectable screen sizes. The 6529 is functionally compatible with IBM in synchronous mode and with the DEC VT200 in asynchronous mode.

Two multitasking displays are offered as part of this system. The 6538 is a 15-in. monochrome display with four user-selectable screen sizes. It provides up to four multitasking windows in any combination of synchronous and asynchronous sessions. The 6538 is functionally compatible with the IBM 3180 in synchronous mode and with the DEC VT220 in asynchronous mode.

The second multitasking display is the 6539 color display, which also features up to four multitasking windows in any combination of synchronous and asynchronous sessions on a 14-in. display screen. Display capability of four or seven colors is provided.

Four screen formats are available, including 3270 operation, VT220 operation, full extended attributing and input and edit. The 6539 is functionally compatible with the IBM 3279-S3G in synchronous mode and with the VT220 in asynchronous mode. All of the above terminals can be connected only to the 6544 controller.

The 6528, 6538 and 6539 displays are modularly designed and can be upgraded or downgraded by switching logic bases and display monitors.

No. 5: Memorex

Memorex, a subsidiary of Unisys — the partnership of former Burroughs Corp. and Sperry Corp. — ranks fifth among the independent suppliers of 3270-compatible vendors.

Like Telex, Memorex products are plug-compatible with IBM rather than functionally compatible as are Lee Data and AT&T. This allows Memorex products to be sold into IBM shops without making a company's investment obsolete.

Memorex entered the IBM plug-compatible market in 1976 with the introduction of the 1370 series product line, replacements for the first-generation IBM components.

Five display stations are currently provided as part of the Memorex 3270 Plug-Compatible Display System. Each attaches to the Memorex 2174-8, 2274 series and 2076 Cluster Controllers, as well as to the IBM 3274 and 3276 series.

The 2078 Display Station is an alternative to the IBM 3278. It is available in four models, all of which include a 15-in. tilt/swivel display screen.

The 2079 Color Display Station provides seven-color display capability on a 14-in. monitor. The 2079, a replacement for IBM's 3279 color display, features a graphics option and is available in two models, providing either 1,920- or 2,560-char. display capacity. It combines all the features of the 2078, including four display capacities, into one model that allows the user to select screen formats and operate control settings through the keyboard.

Memorex's counterpart to the IBM 3178 is the 2178 Display Station. It features a 12-in. monitor that displays characters in green or amber phosphor.

A replacement for the IBM 3179 or 3279 is Memorex's 2179 Color Display Station. This unit combines modular design with seven-color display capability and includes a 14-in. removable tilt-and-swivel monitor.

There is no indication that this onslaught of products and features will abate anytime soon. As vendors continue to squeeze more features and functions into less and less expensive products, users will continue to reap the results of this competition — more capability for less money.

Display Terminals

COMPANY	PRODUCT	COMPATIBILITY (EMULATION MODE)	DISPLAY CAPACITY (NUMBER OF CHARACTERS/PAGE)	MEMORY CAPACITY (NUMBER OF PAGES)	SCREEN AREA (DIAGONAL INCHES)	COLOR OR MONOCHROME	SPLIT SCREEN/ WINDOWS	PROGRAM FUNCTION KEYS	TRANSMISSION MODE	TRANSMISSION (ASYNCHRONOUS/ SYNCHRONOUS)	CODE	BIT/SEC. RATE	FORMAT	PRICE	READER SERVICE NUMBER
Altos Computer Systems, Inc. 2641 Orchard Pkwy. San Jose, Calif. 95134 (408) 946-6700	Altos III	Televideo	3,432	NA	14	Mono	NA	16	Full	A	ANSI	110-19.2K	Block	$795	500
	Altos IV	Televideo, ADDS Viewpoint	2,080	NA	14	Mono	NA	16	Full	A	ASCII	110-19.2K	Block	$495	
Ampex Corp. 200 N. Nash St. El Segundo, Calif. 90245 (213) 640-0150	Ampex 210 Plus	ADDS Regent, Viewpoint	3,168	1	14	Mono	NA	14	Full, half	A	ASCII	19.2K	Block, line	$419	501
	Ampex 230 Plus	ADDS Viewpoint, Televideo, Wyse	3,168	4	14	Mono	NA	16	Full, Half	A	ASCII	38.4K	Block	$519	
	Ampex 220	DEC VT220, VT100/102, VT52	3,168	1 standard (3 optional)	14	Mono	NA	15	Full	A	ANSI	50-19.2K	Block	$529	
	Ampex 232	Televideo	3,300	1	14	Mono	NA	10	Full, half	A	ASCII	50-38.4K	Block	$499	
Ann Arbor Terminals, Inc. 6175 Jackson Road Ann Arbor, Mich. 48103 (313) 663-8000	Ambassador	DEC VT52, VT100	4,800	2	15	Mono	3	111	Full, half	A	ANSI	110-19.2K	User-defined	$1,595	502
Applied Digital Data Systems, Inc. 100 Marcus Blvd. Hauppauge, N.Y. 11787 (516) 231-5400	ADDS1010	ADDS Viewpoint	2,000	1	14	Mono	NA	6	Full, half	A	ASCII	19.2K	Character	$395	503
	ADDS2020	Wyse, Televideo	3,432	1 standard (2 optional)	14	Mono	1	16	Full, half	A	ASCII	38.4K	Character, block	$695	
	ADDS3220	DEC VT220, VT100, VT52	3,168	1	14	Mono	1	22	Full, half	A	ANSI	19.2K	Character	$695	
AT&T 15 Speedwell Ave. Morristown, N.J. 07960 (201) 221-8851	615	Any Unix environment	NA	NA	14	Mono	NA	8	Full	A	NA	NA	NA	$615	504
	620	Any Unix environment	NA	NA	14	Mono	NA	8	Full	A	NA	NA	NA	$1,295	
	510A	NA	NA	1	9	Mono	NA	8	Full, half	A	NA	NA	NA	$1,095	
	510D	NA	NA	2	9	Mono	NA	8	Full, half	A	NA	NA	NA	$1,795	
Beehive International 4910 Amelia Earhart Drive Salt Lake City, Utah 84125 (801) 355-6000	ATL-179	IBM 3270, 3179	1,920	1	14	8	NA	24	Half	A	EBCDIC	2.4M	Character	$1,895	505
	ATL-180	IBM 3180	3,564	NA	14	Mono	NA	24	Half	A	EBCDIC	2.4M	Character	$1,695	
	ATL-191	IBM 3191	1,920	1	14	Mono	NA	24	Half	A	EBCDIC	2.4M	Character	$1,149	
Cocorp 3189-E Airway Ave. Costa Mesa, Calif. 92626 (714) 754-0521	CE 1	NCR	3,300	2	14	Mono	NA	14	Full, half	A	ASCII	19.2K	Character, line, block	$329	506
	CE 3	NCR	3,300	2	14	Mono	NA	61	Full, half	A	ASCII	19.2K	Character, line, block	$600	
Chi Corp. 26055 Emery Road Cleveland, Ohio 44128 (216) 831-2622	Chi MP-1	IBM 3270	3,168	2	14	Mono	1	32	Full	S/A	ASCII	50-19.2K	Block	$1,125	507
CIE Terminals, Inc. 2505 McCabe Way Irvine, Calif. 92714 (714) 660-1421	7102 series	DEC VT100	3,168	NA	14	2	3	24	Full	A	ANSI	NA	Character	$645	508
	7103 series	ANSI X3.64	3,168	NA	14	2	3	80	Full	A	ANSI	NA	Character	$645	
	CIT 224	DEC VT220	3,432	1	14	3	NA	32	Full, half	A	ANSI	19.2K	Line, character	$749	
	CIT101XL	DEC VT100	3,168	4	14	3	NA	36	Full, half	A	ANSI	38.4K	Line, character	$699	
	CIT50+	Wyse, DEC VT100, Televideo	3,168	1	14	3	NA	36	Full, half	A	ANSI/ ASCII	38.4K	Line, character	$649	
Comterm, Inc. 110, boul Hymus, Pte. Claire Quebec, Canada H9R 1E8 (514) 694-4332	Comterm 6180	IBM 3278, 3180	3,564	2	15	7	NA	24	NA	S	EBCDIC	19.2K	Character, block	$2,325 (Canadian)	509
	Comterm 6191	IBM 3191, 3278, 3178	3,440	1	14	Mono	NA	24	NA	S	EBCDIC	19.2K	Character, block	$1,500 (Canadian)	

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.
Research assistance was provided by Datapro Research Corp.
CW chart compiled by Linda Gorgone.

DISPLAY TERMINALS

COMPANY	PRODUCT	COMPATIBILITY (EMULATION MODE)	DISPLAY CAPACITY (NUMBER OF CHARACTERS/PAGE)	MEMORY CAPACITY (NUMBER OF PAGES)	SCREEN AREA (DIAGONAL INCHES)	COLOR OR MONOCHROME	SPLIT SCREEN/WINDOWS	PROGRAM FUNCTION KEYS	TRANSMISSION MODE	TRANSMISSION (ASYNCHRONOUS/SYNCHRONOUS)	CODE	BIT/SEC. RATE	FORMAT	PRICE	READER SERVICE NUMBER
Data General Corp. 4400 Computer Drive Westboro, Mass. 01580 (617) 366-8911	Dasher D214 Display Terminal	Data General	1,920	1	12	Mono	24	[illegible]	Full	A	ASCII	19.2K	Character	$795	510
	Dasher D411 Display Terminal	Data General	1,944	1	12	Mono	24	19	Full	A	ASCII	19.2K	Character	$1,195	
Datamaxx USA Corp. 1815 S. Gadsden St. Tallahassee, Fla. 32301 (904) [illegible]	DMX 1100	Burroughs; NCR	3,168	2	14	Mono	4	[illegible]	Full	S/A	ASCII	Up to 19.2K	Character, block	$1,195	511
	[illegible] 1200	Burroughs; NCR; DEC VT52, VT100	3,168	[illegible]	14	Mono	4	40	Full	A/S	ASCII	38.4K	Character, block	$1,695	
Datamedia Corp. 11 Trafalgar Square Nashua, N.H. 03063 (603) 886-1570	Colorscan 90	ADDS Regent, Lear Siegler	3,168	1	12	8	8	18	Full, half	A	ASCII	19.2K	Character	[illegible]	512
	Elite 90	ADDS Regent, Lear Siegler	3,168	1	14	Mono	8	18	Full, half	A	ASCII	19.2K	Character	$925	
	Elite 60	DEC VT100, VT131; ANSI X3.64	3,168	1	14	Mono	NA	15	Full, half	A	ASCII	19.2K	Character	$950	
Datapoint Corp. 9725 Datapoint Drive San Antonio, Texas 78284 (512) 699-7000	[illegible]	Datapoint	1,920	[illegible]	14	Mono	8	10	Full	A	ASCII	50-19.2K	Character	$1,095	513
	7350	Datapoint	1,920	[illegible]	14	Mono	8	16	Full	A	ASCII	19.2K	Character	$1.495	
Davox Corp. 4 Federal St. Billerica, Mass. 01821 (617) [illegible]	4900	IBM 3270; DEC VT220, VT100, VT52	1,920	NA	12	Mono	64	16	Full	A/S	ASCII	400K	Character	[illegible]	514
	5900	IBM 3270; DEC VT220, VT100, VT52	1,920	NA	12	4 standard (7 optional)	64	16	Full	A/S	ASCII, EBCDIC	400K	Character	[illegible]	
Digital Equipment Corp. 200 Baker Ave. West Concord, Mass. 01742 (617) 264-1420	VT220	DEC	768	1	12	Mono	NA	15-30	Full	A	ASCII	19.2K	Character	$795	515
	VT240, VT241	DEC	768	1	12-13	Up to 4	NA	15-30	Full	A	ASCII	19.2K	Character	$2,195-[illegible]	
Direct, Inc. 460 Aldo Ave. Santa Clara, Calif. 95054 (408) 980-1414	Direct 811	DEC VT100, VT52	3,168	NA	12	2 (optional)	NA	8	Full (half optional)	A	ANSI	NA	Character, block	$1,195	516
Esprit Systems, Inc. 100 Marcus Drive Melville, N.Y. 11747 (516) 293-5800	ESP 6310	Televideo, ADDS Regent	1,920	1 (4 optional)	14	Mono	NA	11	NA	A	ASCII	19.2K	Character, line, block	$695	517
	Opus 2	Televideo, ADDS Viewpoint	3,168	2 (4 optional)	14	Mono	2	16	NA	A	ASCII	38.4K	NA	$549	
Falco Data Products, Inc. 1294 Hammerwood Road Sunnyvale, Calif. 94086 (408) 745-7123	Falco 500	Televideo, Wyse, ADDS Viewpoint	[illegible]	2 (2 optional)	14	NA	6	16	Full, half	A	ASCII	38.4K	Character, block	$795	518
	Falco [illegible]	IBM 3101; Wyse; DEC VT220, VT100, VT52; Televideo	[illegible]	2 (2 optional)	14	NA	[illegible]	16	Full, half	A	ASCII	[illegible]	Character, block	$495-$595	
General Business Technology, Inc. 1891 McGaw Ave. Irvine, Calif. 92714 (714) 261-1891	7700DS	IBM 5251	1,920	NA	14	1 (1 optional)	NA	[illegible]	Twinax	Twinax	EBCDIC	600-9.6K	Character	$1,450	519
	7710DS	IBM [illegible]	1,920	NA	14	Mono	NA	24	Twinax	Twinax	EBCDIC	NA	Character	$1.550	
[illegible] Electronics 1640 5th St. Santa Monica, Calif. 90401 (213) [illegible]	Oyster	DEC VT100	1,280	1½	[illegible]	LCD display	NA	4	Full, half	S/A	ASCII	19.2	Character, line, block	[illegible]	520
Harris Corp. 16001 Dallas Pkwy. Dallas, Texas 75240 (214) [illegible]	H179, H181	IBM 3179, 3180	1,920-3,554	NA	14	7	[illegible]	[illegible]	NA	S	EBCDIC	NA	Line	$1,895-[illegible]	521
Honeywell Information Systems, Inc. 3 Newton Executive Park Newton Lower Falls, Mass. 02162 (617) [illegible]	HDS7	Honeywell	[illegible]	NA	14	Mono	[illegible]	[illegible]	Half	S/A	ASCII, ANSI	9.6K	Character, block	$1,200	522
	[illegible]	ADDS Viewpoint, Wyse, Televideo	[illegible]	NA	14	Mono	NA	10	Half	A	ASCII	19.2K	Character	$525	
	[illegible]	DEC VT220, VT100, VT52	3,300	NA	14	Mono	NA	14	Full	A	ANSI	19.2K	Character	$750	
Human Designed Systems, Inc. 3440 Market St. Philadelphia, Pa. 19104 (215) 382-5000	HDS2200	DEC VT220	3,300	4	15	Mono	4	45	Full, half	A	ANSI	19.2K	Character, line, block	$795	523

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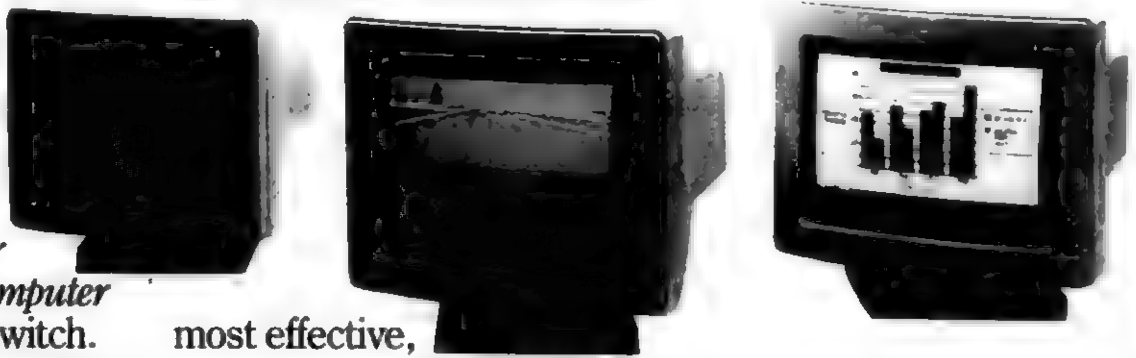

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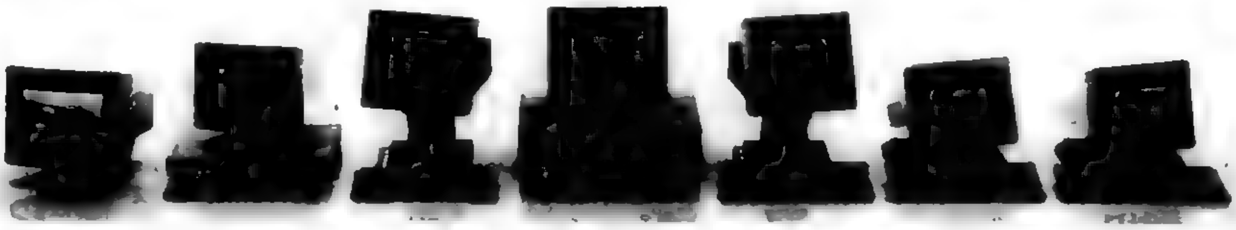

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DIAL-INQ READER SERVICE NUMBER 3

DISPLAY TERMINALS

COMPANY	PRODUCT	COMPATIBILITY (EMULATION MODE)	DISPLAY CAPACITY (NUMBER OF CHARACTERS/PAGE)	MEMORY CAPACITY (NUMBER OF PAGES)	SCREEN AREA (DIAGONAL INCHES)	COLOR OR MONOCHROME	SPLIT SCREEN/ WINDOWS	PROGRAM FUNCTION KEYS	TRANSMISSION MODE	TRANSMISSION (ASYNCHRONOUS/ SYNCHRONOUS)	CODE	BIT/SEC. RATE	FORMAT	PRICE	READER SERVICE NUMBER
	HDS2200G	Tektronix 4014, Visual 500	3,300	4	15	Mono	4	45	Full, half	A	ANSI	19.2K	Character, line, block	$1,295	
	HDS2200GX	Tektronix 4014, Visual 500	3300	6	15	Mono	4	45	Full, half	A	ANSI	19.2K	Character, line, block	$1,595	
IBM Old Armonk Road Armonk, N.Y. 10504 (914) 765-1900	3101, 3161,3162, 3163	DEC VT100, ADDS, Lear Siegler, Televideo	1,920	1	12	Mono	NA	24	Full, half	A	ASCII	19.2K	Block	$1,595	524
	3164	DEC VT100 family, ADDS, Lear Siegler, Televideo	1,920	1	14	Color	NA	24	Full, half	A	ASCII	19.2K	Character, block	NA	
	3194	NA	1,920	NA	14	Color	2	24	Full, half	S	EBCDIC	NA	Character, block	$2,895	
	3196	NA	1,920	NA	12	Mono	0	24	Full, half	S	EBCDIC	NA	Character, block	$1.295	
Informer Computer Terminals, Inc. 22936 Mill Creek Road Laguna Hills, Calif. 92653 (714) 855-3112	200-207	IBM 3101, 3178, 3276, 3278, 5251; DEC VT100, VT102	2,168	Unlimited	9	4	NA	24	Full, half	A/S	ANSI, ASCII	9.6K	Character	Available upon request	525
Intecolor/Datavue Corp. 225 Technology Park Norcross, Ga. 30130 (404) 449-5961	4100	Tektronix 4105	3,168	2	14	16	NA	NA	Full, half	RS-232	ANSI	38.4K	Character	$1,995	526
	CT210, CT220	DEC VT100, VT220	1,920	2	14	16	NA	24	Full, half	RS-232	ANSI	19.2K	Character	$1,295-$1,695	
ITT Courier P.O. Box 29039 Phoenix, Ariz. 85038 1 (800) 528-1400	9210	IBM 3270	1,920	NA	13	Mono, color	2	24	Full, half	S	EBCDIC	NA	Block	$1,295	527
	9230	IBM 3270	1,920, 2,560, 3,440	NA	16	Mono, color	2	24	Full, half	S	EBCDIC	NA	Block	$1,995	
Kimtron Corp. 1709 Junction Court San Jose, Calif. 95112 (408) 436-6550	KT-22/PC	DEC VT220, VT100, VT52; IBM PC XT, AT	3,300	3	14	Mono	4	15/30	Full, half	A	ANSI	38.4K	Line, character	$749	528
	KT-5	DEC VT52, ADDS Regent, Televideo	3,300	2	14	Mono	1	82	Full, half	A	ASCII, ANSI	50-19.2K	Block, line	$399	
Lanpar Technologies, Inc. 747 Main St. Concord, Mass. 01742 (617) 371-0915	Vision 3222	DEC VT220, 240	3,300	8	14	Mono	2	16	Full	A	ANSI		Character, line, block	$725	529
Lee Data Corp. 7075 Flying Cloud Drive Eden Prairie, Minn. 55344 (612) 828-0300	Model 1222	IBM 3278; DEC VT100, VT132; Hewlett-Packard; Televideo	3,564	1	15	Mono	6	24	Full, half	A/S	ASCII, EBCDIC	9.6K	Character, line, block	$1,900-$2,500	530
	Model 2131	IBM 3270; DEC VT100, VT132	3,564	1	15	7	6	24	Full, half	A/S	ASCII, EBCDIC	9.6K	Block, character	$2,100-$2,900	
Lee Data Corp. Phase Terminal Division 7650 E. Redfield Road Scottsdale, Ariz. 85260 (602) 991-6855	P3278	IBM 3278, 3178	1,920	1	12	Mono	NA	24	Half	S	EBCDIC	3270 coax	NA	$1,050	531
	1178, 1179	IBM 3178, 3179, 3279	1,920	1	14	Up to 7	NA	24	Half	S	EBCDIC	3270 coax	NA	From $795	
Liberty Electronics U.S.A. 332 Harbor Way South San Francisco, Calif. 94080 (415) 742-7000	Freedom Series	Wyse; Televideo; Lear Siegler; ADDS Viewpoint; Data General; DEC VT220, VT100, VT52	3,168	2	14	Mono	3	44	Full, half	A	ASCII, IBM PC scan codes	38.4K	Block, character, line	$449-$599	532
Link Technologies, Inc. 47339 Warm Springs Blvd. Fremont, Calif. 94539 (408) 943-0142	Link 125	Televideo; Wyse; Lear Siegler; ADDS Viewpoint	3,168	2	14	Mono	2	40	Full, half	A	ASCII	38.4K	Block, character, line	$525	533
	Link 220	DEC VT52, VT100, VT132, VT220; ANSI X3.64	3,432	2	14	Mono	2	20	Full, half	A	ANSI	38.4K	Block, character, line	$595	
	PCTerm	Wyse, Televideo	3,300	2	14	Mono	2	40	Full, half	A	ASCII, IBM PC scan codes	38.4K	Block, character, line	$649	
	MC 3	DEC VT100, Wyse, Televideo, ADDS Viewpoint	5,676	6	14	Mono	2	40	Full, half	A	ASCII, ANSI, IBM PC scan codes	38.4K	Block, character, line	$565-$675	
The Lynk Corp. 101 Queens Drive King of Prussia, Pa. 19406 (215) 265-3550	Lynk Station 912	IBM 5291, 3196	2,000	NA	15	Mono	2	22	Twinax	S	NA	3.2M	Character	Available upon request	534
	Computing Lynk	IBM 3180	3,300	NA	15	Mono	2	22	Twinax	S	NA	3.2M	Character	Available upon request	

DISPLAY TERMINALS

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McDonnell Douglas Computer Systems Co. 17481 Red Hill Ave. Irvine, Calif. 92713 (714) 250-1000	Prism 7, Prism 9	DEC VT220	3,168	1-8	14	Mono	NA	[illegible]	Full	A	ASCII, ANSI	To 19.2K	NA	$550-$750	535
Megadata Corp. 35 Orville Drive Bohemia, N.Y. 11716 (516) 589-6800	850	ANSI X3.64 (OEM interfaced)	2,000	8	15	Mono	2	Up to [illegible]	Full, half	S/A	ASCII	To 19.2K	Menu-selectable	$2,500-$2,800	536
Memorex Corp. San Tomas at Central Expwy. Santa Clara, Calif. 95052 (408) 987-1000	2179	IBM 3179	1,920	1	14	8	NA	24	Full, half	S/A	EBCDIC	19.6K	Block	$1,995	537
	2180	IBM 3180	[illegible]	7	[illegible]	Mono	NA	[illegible]	Full, half	S/A	EBCDIC	[illegible]	Block	$1,995	
	2180C	IBM 3180	3,440	7	14	8	NA	24	Full, half	S/A	EBCDIC	19.6K	Block	$2,195	
Micro-Term, Inc. 512 Rudder Road Fenton, Mo. 63026 (314) 343-6515	Foresight 4520, Foresight 4525	DEC VT220, VT100, VT52	3,300	2-7	14	Mono	3	15	Full, half	A	[illegible]	38.4K	Character	$695-$795	538
	Foresight 4560	DEC VT220, VT100, VT52; Tektronix	[illegible]	7	14	Mono	[illegible]	15	Full, half	A	ANSI, ASCII	38.4K	NA	$1,295	
	Ergo 440	DEC VT240, VT220, VT100, VT52	3,300	2	14	Mono	[illegible]	15	Full, half	A	ANSI, ASCII	19.2K	NA	$1,495	
Motorola Computer Systems, Inc. 10700 N. DeAnza Blvd. Cupertino, Calif. 95014 (408) 864-4740	TM3241G	DEC VT52, VT100, VT220, VT200; Tektronix	3,696	1	14	7	NA	15	Full, half	A	ANSI	19.2K	Character	[illegible]	539
	TM2201	DEC VT220	[illegible]	1	14	Mono	NA	15	Full, half	A	ANSI	19.2K	Character	$895	
Paradyne Corp. 8550 Ulmerton Road Largo, Fla. 33540 (813) 530-2000	7812, 7812 Enhanced	IBM 3278	1,920	NA	12	Mono	Up to 4	24	Full	S	EBCDIC	9.6K	Block	$1,300-$1,800	540
	7814	IBM 3278	3,564	NA	14	Mono	4	12	Full	S	EBCDIC	9.6K	Block	$2,400	
	7912	IBM 3279	2,560	NA	13	7	4	12	Full	S	EBCDIC	[illegible]	Block	$3,100	
Plessey Peripheral Systems, Inc. 15542 Mosher Ave. Tustin, Calif. 91680 (714) 261-9945	PT1000	DEC VT100 (VT131 option)	6,336	16K standard buffer	14	Mono	2	[illegible]	Full, half	A	ASCII, ANSI	To 19.2K	NA	$1,395	541
	[illegible]	VT220	3,168	NA	14	Mono	NA	45	Full, half	A	ASCII, ANSI	To 19.2K	NA	$795	
Prime Computer, Inc. Prime Park Natick, Mass. 01760 (617) 655-8000	PT200	IBM 3270	3,564	[illegible]	14	Up to 7	1	[illegible]	Full, half	A	ANSI	19.2K	Character, block	$995-$1,695	542
Qume Corp. 2350 Qume Drive San Jose, Calif. 95131 (408) 942-4144	QVT100 Plus	ADDS Viewpoint, Lear Siegler, Televideo	1,920	[illegible]	14	Mono	NA	20	Full, half	A	ASCII	To 19.2K	Block, line, character	[illegible]	543
	QVT119 Plus	ADDS Viewpoint, Wyse, IBM 3101, Televideo	3,168	[illegible]	14	Mono	[illegible]	20	Full, half	A	ASCII	To 38.4K	Block, line, character	$595	
	QVT203 Plus	DEC VT220, VT131, VT100, VT52	3,168	[illegible]	14	Mono	NA	15	Full, half	A	ANSI	To 38.4K	Block	$645	
RCA New Products Division New Holland Ave. Lancaster, Pa. 17604 (717) 295-6000	VP 5801	Televideo; DEC VT52, VT100	1,920	1	12	Mono	NA	8	Full, half	A	ASCII	9.6K direct connect	Character	$898	544
	VP 6000	Televideo; DEC VT52, VT100 [illegible]	1,920	12.5 (29 optional)	[illegible]	Mono	1	8	Full, half	A	ASCII	[illegible] direct connect	Character	$998	
	VP 7000	NAPLPS	960	1	12	16	NA	16	Full, half	[illegible]	ASCII, NAPLPS	19.2K	Character, NAPLPS	$1,250	
Tab Products Co. 1400 Page Mill Road Palo Alto, Calif. 94304 (415) 852-2400	E22	DEC VT100, VT52; Prime Computer	3,564	2 (4 option)	[illegible]	Mono	[illegible]	[illegible]	Full, half	A	ANSI, ASCII	19.2K	Character, line, block	$950	545
	[illegible]	DEC VT220, VT100, VT52	[illegible]	[illegible]	[illegible]	Mono	[illegible]	45	Full	[illegible]	ANSI, ASCII	19.2K	Character	$660	
Tandem Computers, Inc. 14231 Tandem Blvd. Austin, Texas 78728 (512) 244-8000	653X	Tandem	1,920	8	9, 12, 15	Mono	NA	16	Full, half	S/A	ASCII, RS-232	19.2K	Block, line, character	$1,295-[illegible]	546
	6526	Tandem; ANSI X3.64	1,920	[illegible]	14	Mono	NA	16	Full, half	A	ASCII, RS-232	19.2K	Block, line, character	$1,095	

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Tatung Co. of America, Inc. 2850 El Presidio St. Long Beach, Calif. 90810 (213) 979-7055	TVT-7220, 7220 Plus	DEC VT220, VT100, VT52	3,168	1 (2 or 3 option)	14	Mono	NA	105	Full, half	A	ASCII	9.6K	Character, line, block	$599-$650	547
	TVT-7261	Televideo; Lear Siegler; ADDS Viewpoint; IBM 3101; Wyse; DEC VT131, VT102, VT100, VT52	3,432	1 (2 or 3 option)	14	Mono	NA	105	Full, half	A	ASCII, ANSI	9.6K	Character, line, block	$650	
Tec, Inc. 2727 N. Fairview Ave. Tucson, Ariz. 85705 (602) 792-2230	Data-PAD portable LCD terminal	RS-232	1,280	6 (option)	9	Mono	NA	10	Full, half	A	ANSI	19.2K	Block	$995	548
	Tec ET series	RS-232	2,000	2	15	Mono	2	10	Full, half	A	ANSI	19.2K	Block	$1,795	
Telegenix, Inc. 26 Olney Ave. Cherry Hill, N.J. 08034 (609) 424-5220	TDS 2000 series	ANSI X3.64	16-1,920	1	NA	Mono	Unlimited	15	Simplex	A	ASCII	9.6K	Character	$2,400-$88,000	549
Teleray, Inc. P.O. Box 24064 Minneapolis, Minn. 55424 (612) 941-3300	Model 20 series	Hewlett-Packard; DEC VT220, VT100; Honeywell	3,168	8	14	Mono	2-4	32	Full, half	A	ASCII, ANSI	19.2K	Character, line, block	$1,295	550
Televideo Systems, Inc. 1170 Morse Ave. Sunnyvale, Calif. 94086 (408) 745-7760	955	Televideo 950	3,168	4	14	Mono	NA	64	Full, half	A	ASCII	38.4K	Character, line, block	Available upon request	551
Telex Computer Products, Inc. 6422 E. 41st Tulsa, Okla. 74135 (918) 627-1111	Telex C078	IBM 3270; DEC VT220	1,920	NA	12	Mono	7	240	Full	A/S	ANSI, ASCII	9.6K	Character, line, block	$2,695	552
	Telex 180-1	IBM 3270	3,564	NA	15	Mono	NA	24	Half	S	EBCDIC	19.2K	Block	$2,095	
	Model 078-2	IBM 3196	1,920	NA	12	Mono	NA	NA	Twinax	Twinax	Twinax	Twinax	Twinax	$1,295	
Texas Instruments, Inc. P.O. Box 2909 Austin, Texas 78769 (512) 250-7111	Travelmate	DEC VT100	1,280	1	9¼	Mono	NA	4	Full, half	A	ASCII	300-1,200 (internal modem)	Character	$1,295	553
Unisys Corp. P.O. Box 500 Blue Bell, Pa. 19424 (215) 542-4011	SVT-1100	DEC VT52, VT100	1,210	NA	12	Mono	NA	NA	Full	A/S	ASCII	19.2K	Character, block	$496	554
	SVT-1220	DEC VT220	2,048	1	12	Mono	2	20	Full, half	A/S	ASCII	NA	Character, block	$895	
	ET-1100	Burroughs	2,080	10	14	Mono	2	NA	Full	A/S	ASCII	Up to 338.4K	Character, block	$1,600	
	T27	Burroughs	2,400	24	12, 15	Mono	3	NA	Full	A/S	ASCII	Up to 38.4K	Character, block	$1,400	
Visual Technology, Inc. 1703 Middlesex St. Lowell, Mass. 01851 (617) 459-4903	Visual 603	DEC VT220	6,600	1	14	Mono	2	15	Full, half	A	ANSI	38.4K	Character	$695	555
	Visual 601	Wyse 50	6,600	1	14	Mono	2	16	Full, half	A	ASCII	38.4K	Character	$695	
Wang Laboratories, Inc. 1 Industrial Ave. Lowell, Mass. 01851 (617) 967-2123	Advent	NA	1,920	NA	19	Mono, color	NA	16	NA	A/S	ASCII	4.3K	Block	$13,900	556
	4230A	Teletype, DEC VT100, IBM 3271, 3274, 2780/3780, 3777	NA	NA	12	Mono	4	16	Full	S	Wang proprietary	4.3K	Block	$2,300	
	2110A	DEC VT102, Wang 2110	NA	8	14	Mono	1	16	Full, half	A/S	NA	19.2K	Character	$895	
Wicat Systems, Inc. 1875 S. State St. Orem, Utah 84058 (801) 224-6400	Wicat T7100	DEC VT131, VT100, VT52; Televideo; Ampex	1,920	2	14	Mono	2	16	Full, half	A	ANSI	38.4K	Character	$795	557
Wyse Technology, Inc. 3571 N. First St. San Jose, Calif. 95143 (408) 433-1179	WY-60, WY-85	DEC VT100, VT220, VT52; ADDS Viewpoint; Televideo; Wyse; IBM PC AT	3,300-5,808	1-7	14	Mono	2-3	15-16	Full, half	A	ASCII, ANSI	38.4K	Character, line, block	$599	558
	WY-350	Wyse, ADDS Viewpoint, Televideo	3,300	1	14	64	3	16	Full, half	A	ASCII	38.4K	Character, line, block	$999	
Zentec Corp. 2400 Walsh Ave. Santa Clara, Calif. 95051 (408) 727-7662	ADM 1000	ADM, ADDS Viewpoint, Esprit	1,920	2	14	Mono	NA	7	Full, half	A	ASCII	19.2K	Character	$399	559
	ADM 12 Plus	Televideo, Esprit, ADM	3,168	2	12, 14	Mono	NA	16	Full, half	A	ASCII	19.2K	Block, line, character	$549	
	8392	Hewlett-Packard	3,168	8	14	Mono	NA	8	Full, half	A	ASCII, ANSI	19.2K	Block, line, character	$1,195	

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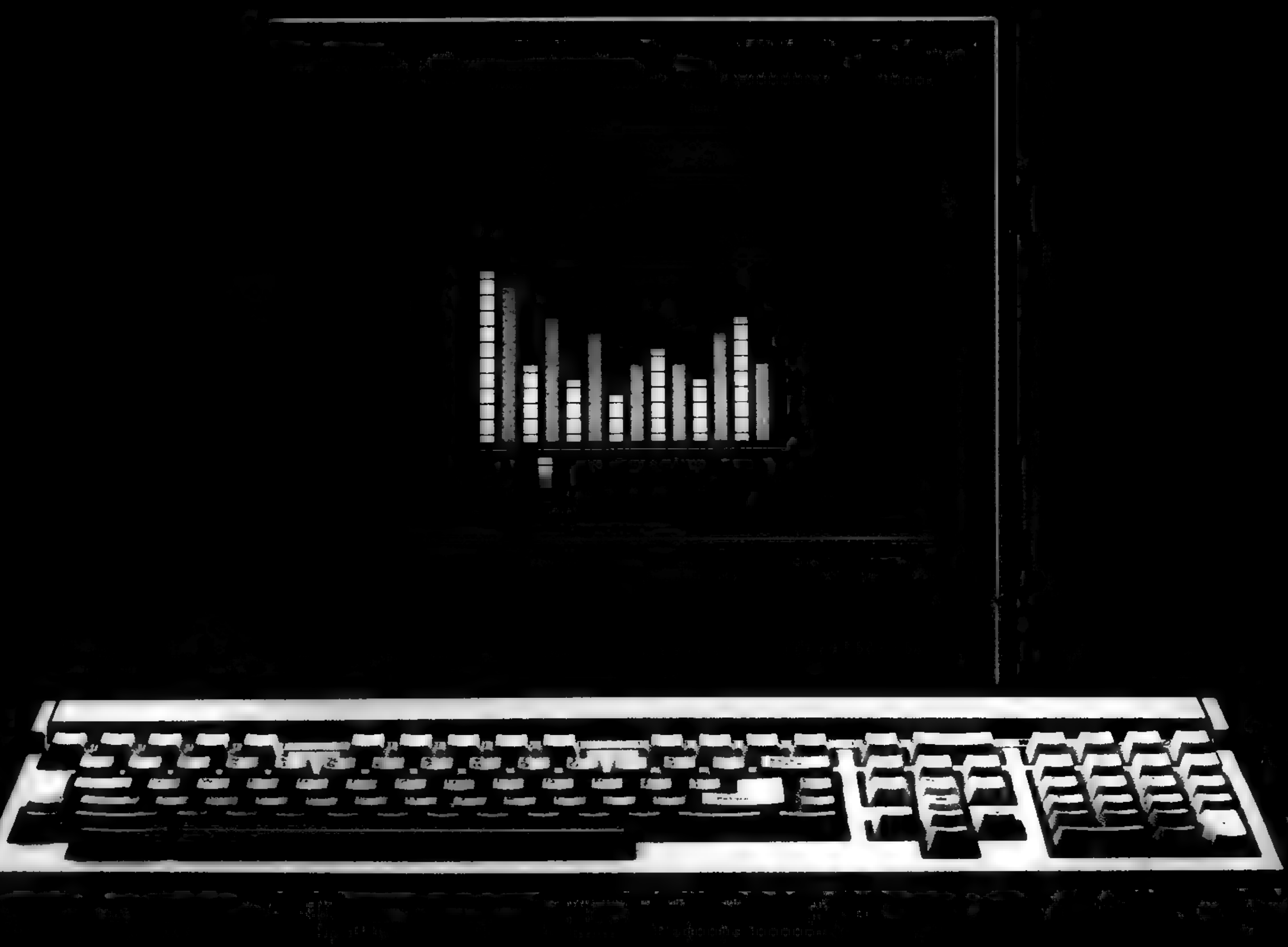

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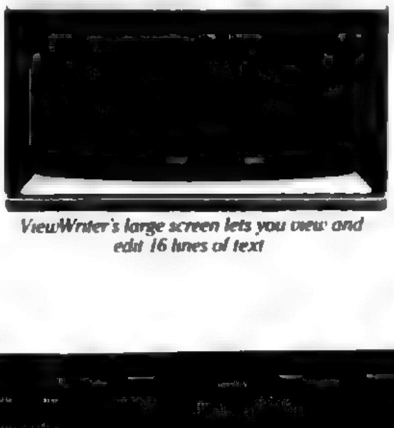
Easy-to-use ViewWriter is the typewriter that can insert or delete words and paragraphs in seconds

ViewWriter's a typewriter when you need it to be, and has word processing functions when you need



ViewWriter's large screen lets you view and edit 16 lines of text them. Yet, for all its versatility, it's so easy, your people can learn to use it in less than an hour. So they can be typing away on the very first day. Before lunch.

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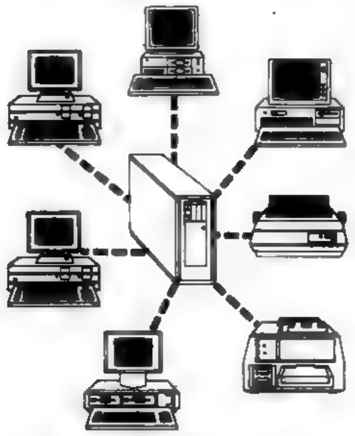

With the new Lanier network, you don't have to learn complicated computer commands to make all your PC's work together.

The Lanier network makes others obsolete because it's so easy to use. And because it's so easy to learn to use with the Lanier Support Staff. They'll have your office completely operational in far less time than it would be with any other network.

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In Depth

Intrapreneurship: Turning in-house projects to profit

There's a ready market for your proven software • Best bets: Critical applications and heavy volumes • Four reasons to sell to your competitors

By RICHARD RAYSMAN
and PETER BROWN

A mid-size radio station spent four years developing and implementing a software package that performed all of the station's accounting and billing functions, calculated its reach and frequency analysis for sales presentations to advertisers and analyzed its penetration into the radio-listening marketplace. The station's MIS department spent $300,000 to develop the system and was able to show increased savings of $125,000 during the first year of implementation.

During the third year of implementation, the station marketed the software system to eight other radio stations; this effort showed a $200,000 profit. This year, the station expects to have another 20 software customers.

Most companies overlook the potential profitability within their own MIS departments. These departments maintain specialized software products that take several years and large cash investments to develop. Once these products have been generalized for other applications, they can be licensed to firms that need proven, sophisticated software systems. The best of these products have proven themselves to be an integral and valuable part of a company's business.

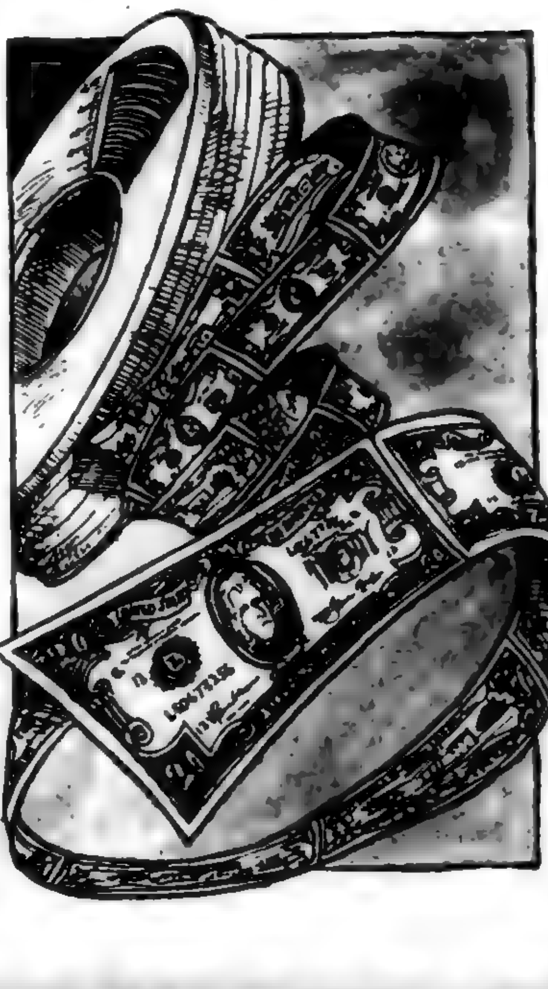
ILLUSTRATION BY JON MCINTOSH

With proper planning and a well-executed marketing effort, the "intrapreneurial," or in-house, venture can create additional useful products and become a dynamic profit center. But since software companies derive almost all of their value from the intellectual property in their software products, intrapreneurs must take unique precautions to protect these assets. These defenses must be in place well before the first software product is licensed to an end user.

The company considering an intrapreneurial venture must also weigh the strategic worth of its product, judging whether the product can be made available for public use without damaging the corporate competitive edge.

New opportunities

For companies searching for new businesses and new products, software is an ideal product to consider. In most large organizations, the data processing function is well funded and populated with highly skilled technical personnel. These technical workers are, for the most part, self-motivated, creative and innovative. In addition, the product's research and development expenses have been accounted for in its initial development, so start-up costs are well in hand.

Some pioneering companies that have committed to intrapreneurial ventures have found exciting opportunities. For example, a large international brokerage and investment banking firm recently began to market a comprehensive software product for brokerage applications. This product handles on-line applications — such as customer order entry and into-account inquiry — as well as back-office functions like end-of-day batch processing and detailed reports of the previous day's activities.

The brokerage firm is a leader in the trading of stocks and bonds and raising investment capital in the financial markets. Yet until recently, it was not in the business of licensing software products. However, top management's historical willingness to support intrapreneurial ventures was a factor in the brokerage firm's decision to enter an entirely new business.

A sophisticated brokerage processing software system was developed during a period of years for the brokerage firm's in-house data processing facilities. Millions of dollars in employee compensation, consultants' fees and leading-edge equipment costs were spent on the system's development. The end result was a sophisticated,

About the authors

Raysman and Brown are partners in the New York law firm Brown, Raysman & Millstein, specializing in computer law. They are co-authors of "Computer Law: Drafting and Negotiating Forms and Agreements," published by the Law Journal Seminars-Press.

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comprehensive brokerage software system that was better than virtually any other system being used by major brokerage companies.

The brokerage firm had made a significant financial commitment to the development of a first-rate automated system, and a readily identifiable market of other brokerage firms was available.

In addition, with the deregulation of the banking industry, many larger banks were interested in a sophisticated automation of their brokerage functions.

The firm's senior management, in conjunction with its MIS director, identified this new software product as a potential profit center. To implement its plans, the brokerage firm kept in place the technical staff that was instrumental in developing the automated system, and it recruited experienced management and marketing talent.

A new corporate subsidiary was formed to market the system. The subsidiary was assured a strong start by adequate financing and a superior management team.

> ”
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> ***Once software is generalized for use by others, it is potentially the core of a new business venture.***

The subsidiary currently markets the brokerage software system for $1,000,000 or more per license. This product is a proven one that works successfully; the new subsidiary can use the brokerage firm as a built-in reference. By supporting its staff and its internally developed products, the firm was able to launch a successful new business using existing resources.

Capitalizing on experience

In another example, a major international telecommunications company entered the stock transfer business. Stock transfer services are highly complex record-keeping functions that track buying and selling of stock, dividend reinvestment, stock splits and related transactions. The company was large enough to perform transfer services for itself and its subsidiaries.

To perform these services, the company had created a separate subsidiary. The stock transfer subsidiary acquired three large mainframes and employed more than 1,000 workers to program the computers and perform back-office functions. Since computer backup was crucial, one of the three mainframes was used almost solely for this purpose and often stood idle.

With the deregulation of the telecommunications industry, the company's management wanted to invest in new businesses and identified stock transfer services as an ideal new venture. Although the company had never before been in the stock transfer business, it was familiar with the necessary elements:

- It had been providing these services to its own shareholders for many years.
- It had made the investment in software.
- It had a large and highly sophisticated technical staff to improve and maintain this investment.

Management decided to capitalize on the company's experience by marketing the transfer services to banks, Fortune 500 companies and other large financial institutions. Instead of recruiting outside management talent as the brokerage firm had, the company decided to use its own personnel. Instead of forming an entirely new subsidiary, an additional division within the existing subsidiary was formed to support the stock transfer venture.

Since the telecommunications company had never before been in the business of marketing a software product, it retained outside marketing, financial and legal consultants to advise on the best way to pursue the stock transfer market. As in any new venture, the company's management had to work hard to assemble top-quality technical and marketing personnel. After normal start-up delays and a massive financial investment, the stock transfer subsidiary successfully launched a profitable new business using its existing software and staff.

The core of a new venture

Often, a large enterprise such as a bank, insurance company or manufacturing firm has spent millions of dollars to develop a sophisticated software system for its specific needs. However, the software can be modified to be generally applicable to other organizations with similar business needs. Once this software is generalized for use by others, it is potentially the core of a new business venture.

Large aircraft manufacturers, for example, have taken advantage of their software and hardware capacities for some time. These manufacturers have found it necessary to install expensive and sophisticated DP facilities.

In order to utilize excess DP capacities and their sophisticated in-house talent, some of these manufacturers have started lucrative computer service bureau operations. For example, Boeing Corp. has built Boeing Computer Services Co. into one of the most successful computer service bureaus in the U.S.; McDonnell Douglas Corp. has started the McDonnell Douglas Automation Co., often referred to as McAuto; and Grumman Corp. has created Grumman Data Systems Division. These intrapreneurial ventures were started well before intrapreneurial

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ventures came into vogue.

Software provides those companies that have already developed a working in-house system with an ideal medium for a new venture. A ready market is available for proven software products that work and have been used in the operation of a business.

The initial investment in software for new applications can be very large and unfortunately often results in software that does not work properly. It is often more economical for a company to acquire software by licensing an existing software product that works rather than attempting to develop its own.

Identifying the product

Several criteria should be applied to identify a product that might succeed as a new venture.

Major in-house software venture. The software product should originally have been a major financial and technical undertaking within the company itself. During the product's development and implementation, sufficient resources should have been devoted to the software product with the result that it would be sufficiently differentiated from other, potentially competitive software products.

Within any large organization, probably not more than a few software products can be classified as major development efforts. Additional technical development work would have to be performed on these software products to make them more generally usable by a broader range of companies.

Large volume of transactions. The software product should be used within the company's organization to process a large volume of transactions for the company.

If the product successfully handles a heavy load, a higher licensing fee in the marketplace is justified, resulting in a more profitable product.

Critical application. The software product should handle a vital function within the company. If the application is critical to the company, it will also be a critical application for the potential customers.

An organization is usually inclined to pay a higher license fee for software that can improve its vital functions than for a product that is more a luxury than a necessity.

In the brokerage company example, the software product was the lifeblood of the business. As a licensed software product, it would also become the lifeblood of other brokerage firms or banks, thus commanding a higher licensing fee.

Most companies will face objections from within the firm before they give away what they consider to be valuable trade secrets. The software product often gives a competitive edge over the company's direct competitors.

Some reasons a company will permit a valuable software product to be licensed to its competitors include the following:

- The company has a one- to three-year lead time in implementation.
- The competitive company usually implements a similar system anyway.
- The software product usually has such a potential for profit that it will more than make up for any loss in competitive edge.
- The developing company may retain some key features for itself so that the licensed product is not quite as comprehensive as the original.

Choosing the project team

Technical personnel. The most important element after a working product is the technical staff to support and improve the product. If the software was developed in-house, there should be a capable and sophisticated technical staff that can continue to support and maintain the software product as it is marketed to outside customers. If the software product has existed for several years, the technical staff may by then have been reduced primarily to less skilled maintenance programmers.

Before choosing a particular software product for intrapreneurial marketing, management should assure itself that it has the technical ability to support the product. The technical staff should come from within the ranks of the organization. If the ranks of the technical staff have been thinned out, capable personnel should be recruited prior to marketing the product. Usually there is one key technical manager, often a project leader, who was responsible for developing the software product. This individual should be recruited to head up the technical team.

While the software product is being refined for outside marketing, the project leader may be wearing two hats. He may still be heading the development effort for the in-house product as well as heading the project for the outside marketing effort. A project leader should be given some leeway to assemble a qualified and reliable technical staff.

Marketing personnel. Even a great product cannot sell itself. An excellent software product will still need a superb marketing effort to bring it to the marketplace. Thus, the marketing personnel will probably be the key employees in the new venture.

For the intrapreneurial business, the preferable choice for marketing director would be an individual from within the organization with proven marketing experience. In some cases, the company may have to go outside to recruit a marketing director.

Support staff. The licensing and distribution of a sophisticated software product is different from the sale of a manufactured item. Customer training and product maintenance are critical ingredients for a successful software product.

Adequate training staff should be

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> ***It is often more economical for a company to acquire software by licensing an existing software product that works rather than attempting to develop its own.***

in place by the time the software product comes to market. If trainers are not available to demonstrate the personnel, the software product implementation might fail after the first sale.

Sufficient technical maintenance personnel should also be in place prior to the first sale. Inevitably, some technical difficulties will arise at the time of the first software product implementation. The intrapreneurial company must be able to respond to these difficulties promptly and completely.

If this is not done, the initial installations may be frustrated and will not provide the positive references critical to a new software product.

To determine the scope of the training staff and technical maintenance personnel, the company might bring in a technical director who had previously supervised technical support for a software product.

Preparing the marketing effort

Evaluate the risk. The sale of a major application software system is a complex procedure. The sale often involves detailed proposals and many sales calls and customer contacts. A company entering this field with a complex product should recognize that it can sometimes take much more than a year to complete the first sale.

Thus, the company should be willing to commit the time and financial resources to fully analyze the market. A product should be upgraded and well documented prior to the marketing effort. The new software entity should be well financed, and the company should be prepared for a long marketing effort.

Joint venture. It is often difficult for any organization to enter into a new business without previous experience. It is sometimes advisable for a firm developing a software product to search for an already existing software company that understands the marketplace and can act as a joint marketing agent.

A joint venture can be mutually profitable. The developing company brings financial resources, technical expertise and a valuable software product. The already existing software company brings a valuable distribution network and marketing know-how.

However, joint ventures are risky affairs, often ending with both parties disappointed. Thus, it is advisable for any company entering into a joint venture to secure legal protection for the proprietary information it brings to the venture.

The company owning the software product should be certain that there is a written agreement that clarifies that it retains ownership of the software. The company might also add that any modifications or changes become part of the product to which the company retains full ownership.

The agreement should also specify that in the event of termination, the developer owns the product, and the marketing company has no further rights. It is not uncommon for both parties of a failed joint competition to continue to market the software product in competition with each other while disputing their respective ownership rights.

Service bureau. For a new product, marketing may be easier if the product begins as a service bureau operation. A service bureau owns computer equipment and provides all technical services for the customer. The customer may have only computer terminals on its premises that communicate via telephone lines to the service bureau's computers.

In using the service bureau, the customer will not have to make a large hardware investment to use the software. Once customers have used the software and are satisfied with it, they may decide to acquire the necessary equipment to leave the service bureau.

The software company must decide whether it wants to start up as both a service bureau and a direct licenser of the software. Establishing a service bureau is a complex and expensive venture in its own right. Technical staff must be on call for service bureau customers at all times, and additional hardware must be kept ready as emergency backup.

Some intrapreneurial companies have established business relationships with existing service bureaus that offer computer services on a reduced-fee basis to share in the income generated by the software. The initial marketing effort may be more successful if there is a service bureau for the customer.

Special legal issues

Software licensing. For a company that has never been in the software business, the concept of marketing and distributing software is often different from its previous experience. While most products are sold outright, software, when distributed, is licensed.

The licensee receives only a restricted license to use the product at its own facilities or on its own premises. The software company retains

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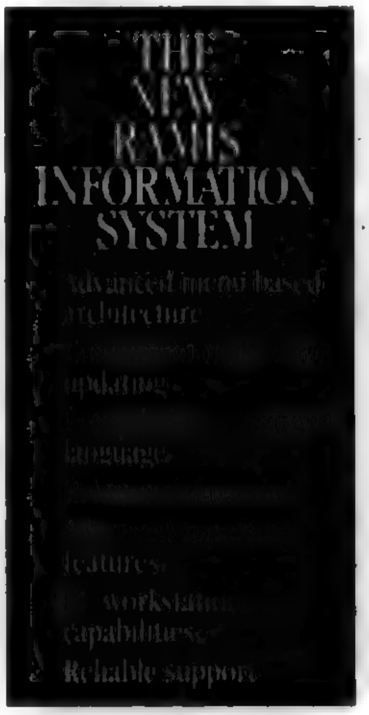
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Protecting your software investment

An intrapreneurial software venture, like any software company, should include clauses pertaining to restrictions, copyrights and confidentiality within its product license. The following are examples of such clauses:

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Licensee shall not (1) permit any third party to use the software, (2) use the software in the operation of a service bureau or (3) allow access to the licensed software through terminals located outside Licensee's business premises. A license may be temporarily transferred to backup equipment if the particular scheduled equipment is inoperative for more than 48 hours.

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The following clause pertains to contracts with consultants for development work:

The consultant agrees that all developments made and works created by the consultant in connection with the company's assignments shall be the sole and complete property of the company and that any and all copyrights and other proprietary interests therein shall belong to the company.

The consultant agrees that, except as directed by the company, he will not at any time during or after the term of this agreement disclose any confidential information to any person whatsoever or permit any person whatsoever to examine and/or make copies of any reports or any documents prepared by him or that come into his possession or under his control by reason of his consultant services and that upon termination of this agreement he will turn over to the company all documents, papers and other matter in his possession or under his control that relate to the clients of the company.

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— Richard Raysman and Peter Brown

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ownership of the product and can then issue similarly restrictive licenses to other customers.

The software company must take formal steps to retain rights to this intangible product. It must have all of its customers sign license agreements acknowledging that it owns the product and promising to keep. the product confidential. If the software company fails to acquire a signed licensed agreement, it may lose its rights to the product.

Further, the software company should protect this product with copyright notices on the licensed software. Copyright protection is effective protection for computer software (see sidebar above). Failure to adequately obtain copyright protection of its software could result in the intrapreneur's loss of a valuable ownership right.

Limitation of liability. Manufacturing companies historically have sought to protect themselves from product liability claims that are a result of physical injury.

Computer software companies need to protect themselves from liability for errors in the computer program that result in financial losses.

For example, in a stock trading program, a simple computer error could result in the loss of millions of dollars if dividend checks are improperly prepared. In licensing, the software company wants to be certain that the use of its software product by its customers will not result in major liability claims.

The software company must adequately protect itself by using the license agreement to disclaim all but limited warranties and by limiting its financial liability.

Software companies often limit their damages to the total amount paid for a license. Thus, if the licensing fee were $50,000 and a disastrous loss occurred, the total liability of the software company would be limited to $50,000. For service bureau operations, the liability might be limited to the prior three months' service fees.

Software companies frequently seek to get a commitment from a customer by getting a simple letter of intent. This written agreement may refer to the work involved but rarely contains appropriate limitations of liability. The failure to obtain a complete, signed license agreement may expose the software company to a large potential liability.

Product description. A manufacturing company's products may be described by using a prototype or by existing goods. The distributor of a software product must be equally certain that the licensee understands exactly what is being licensed. The software company must provide a realistic and accurate description of the software product. If the software product is described as being significantly better than it really is, the customer will ultimately be disappointed.

One problem in the software industry has been customers whose expectations are much greater than the product that is eventually delivered. If a software vendor has described features that do not really exist, the disappointed customer may reject the product and might eventually file a lawsuit.

Confidentiality agreements. The intrapreneurial company must realize that it now possesses a valuable product. It must take steps to protect its product not only from future licensees but also from misappropriation by employees or by outside consultants who are working on the product.

The best way to protect the ownership rights in the software product is to have signed written agreements with employees and outside consultants. In those agreements, the employees and consultants acknowledge that the product on which they are working is owned by the company. With most capable consultants, this agreement will likely be vigorously negotiated.

Employees and outside consultants must also acknowledge that they will maintain the confidentiality of the software product.

Company support leads to rewards

Tremendous opportunities exist for an intrapreneurial company to obtain an entree into the software industry. Like all other new business ventures, the entree must be well planned, well staffed and well financed.

The intrapreneurial company's special differences from a business and software protection viewpoint must be recognized. The central asset of the company — the software — must be protected.

Intrapreneurship is a new term for an old concept. Entrepreneurs start their own companies from scratch, while intrapreneurs, as employees of larger organizations, launch new ventures from within the organization.

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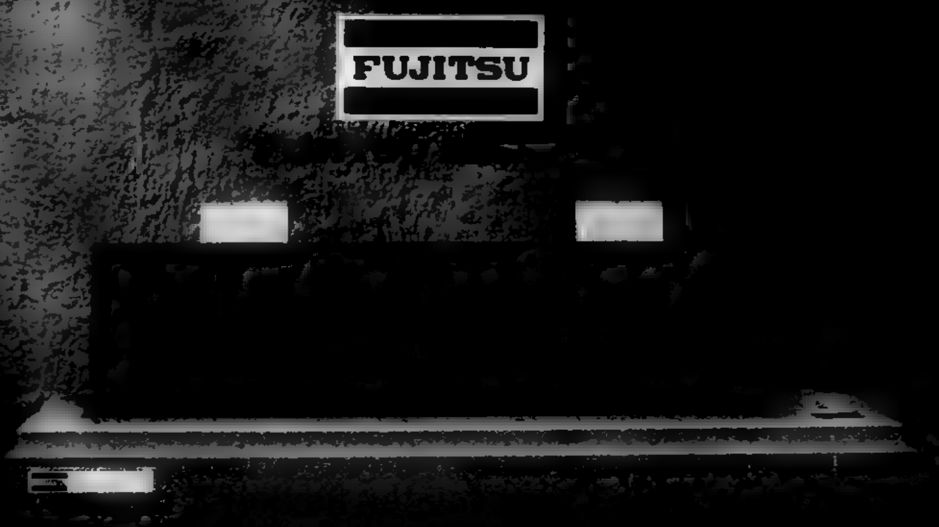

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MANAGEMENT

TAKING CHARGE
Kenneth W. Kolence

Managing capacity

Capacity management is somewhat like the ugly duckling. The problem, you may recall, was that the duckling wasn't really a duck at all. Likewise, capacity management isn't really a technical issue; it's a management issue.

Unfortunately, capacity management, which includes planning and performance issues, is frequently assigned to only one segment of MIS.

This leads to ineffective management because a single technical function cannot carry the burden of ensuring that there will be enough computer resources to meet the needs of the entire company.

It is critical, therefore, that managers recognize that capacity management is a multifaceted issue, not just an ugly technical function. If it is to be successfully addressed, it must be part of many MIS functions, including aspects of both operations management and applications development.

In many companies, the senior operations manager is given primary responsibility for capacity management because he has authority regarding the hardware and systems software.

This manager cannot effectively carry out such a responsibility, however, because he does not have authority over the use of resources by the applications software.

To obtain accurate work load forecasts, particularly for new applications, the operations staff has to work

See MANAGING page 52

Kolence is a cofounder of Boole & Babbage, Inc. and currently works as a consultant in Palo Alto, Calif.

Agway branches into DP

Farmers' co-op subsidiary expects to reap profits

By David A. Ludlum

DEWITT, N.Y. — Agway, Inc., a farmers' cooperative and Fortune 100 company involved in manufacturing, distribution and finance, has set up its data processing operation as an independent, profit-oriented subsidiary.

The new unit, Agway Data Services, Inc., attracted its first customer, the 23-branch Syracuse Savings Bank, four months before formally going into business Jan. 1. It is currently providing four other clients with limited services in data processing off-load, network management, consulting and systems review.

The foundation for Agway Data Services was laid in the varied experiences Agway's MIS department acquired in serving the company's range of businesses and from a tradition of customer-oriented service, according to Dennis J. LaHood, formerly Agway's MIS director and now president of Agway Data Services.

The MIS department has always charged internal users for services and development. "In that respect, the MIS department has always acted and thought of itself as a service bureau and has always attempted to have a customer orientation," LaHood said.

Agway's LaHood

In launching the subsidiary, that foundation was built upon support from the MIS department and the company's chief executive, who is involved with a hospital that also began marketing data processing services, LaHood said.

Additional encouragement came from outside companies that approached Agway's MIS department "asking if things could be done for them," he stated.

Agway, formed by a merger of three farmers' cooperatives 22 years ago, distributes petroleum products and runs four manufacturing businesses, a wholesale distribution firm and a retail chain. The company also offers insurance, banking, finance and leasing services, generally for Northeastern farmers.

See AGWAY page 52

INSIDE

Calendar: Selected conferences, exhibitions, seminars/56

INSTANT ANALYSIS

"Like many companies, the majority of retailers now possess enough computer power to bury themselves in data."
— Frank Andrews, Arthur Young & Co.

Retailers sold on integration

By David A. Ludlum

Retailers are focusing their attention on integrating systems that have been brought to maturity in recent years, particularly inventory control, point-of-sale (POS) and purchase order applications, according to a recent study.

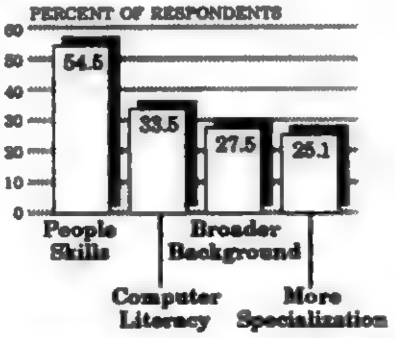
The study, conducted by accounting and consulting firm Arthur Young & Co., also found that the retailers it surveyed spent 0.91% of their sales on information systems in 1985. The total spending — $859 million — rose 11.6% from the previous year.

See RETAILERS page 54

•DATA VIEW

DP managers need people skills

Survey of 500 companies cites important attributes



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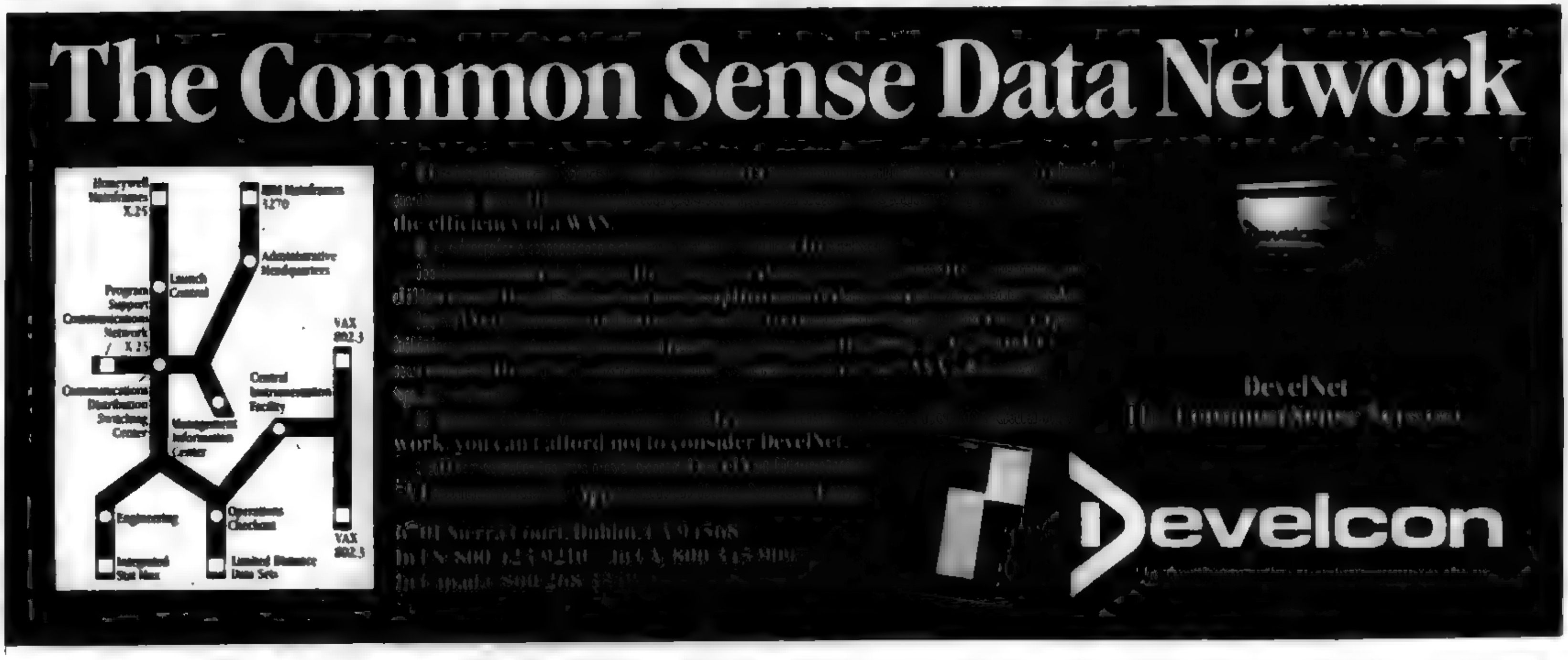
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Managing capacity

From page 51

with the applications development department as well as end users.

Since the applications staff and users do not consider capacity management a primary responsibility, they often do not realize the importance of providing operations with a useful forecast.

In addition, the operations manager has no control over the amount of work required per transaction for each application or the work-arrival rate for each part of the work load. The applications development department is responsible for determining both of these factors.

Without the necessary coordination and communication with other departments, operations essentially is forced to play a losing game in capacity management. To address capacity problems, the operations manager's only choices involve adding more hardware or improving the performance of present systems.

Multifaceted nature

The multifaceted nature of capacity management is often not recognized even within the operations department itself; the system tuning and planning responsibilities are divided among separate groups within the department.

To address these issues, the MIS manager should make capacity management a major responsibility integrated throughout his organization — and to do so he must make it a standard activity for all aspects of the organization.

For example, the people who allocate direct-access storage device (DASD) space should also be responsible for ensuring that DASD response time is maintained at reasonable levels. To accomplish this, they will need to have capacity management data from other departments, and the results of their efforts should be monitored at an appropriate management level.

A good way to begin the consciousness-raising is to require that the vice-president of information systems, as well as the directors of both the operations and applications development departments, sign service-level agreements. Such an action clearly states that service is a primary responsibility of the entire organization, not simply operations.

Agway branches out into DP

From page 51

Agway Data Services, which has targeted all its parent company's lines of business as its own markets, operates two IBM 3081 Model K mainframes, one of them hosting a CICS network serving about 160 Northeastern locations.

Despite its service-oriented tradition and willing customers, the transition from internal unit to independent subsidiary has been marked by challenges in establishing financing and marketing, according to LaHood.

The move was formally launched last year by the commissioning of a study by John Diebold & Associates of Agway's DP capabilities and the opportunities to market them.

The most serious consideration was the effect on service to internal users, LaHood said. The company decided to expand computer resources and enhance the staff to accommodate each outside customer, "so that we weren't stealing resources from customers we were already servicing," he explained. The 140-employee subsidiary is also adding needed expertise in marketing, sales and finance.

Top management concerns in setting up the unit included whether Agway could meet its financial goals in a timely manner, according to Richard Radey, Agway, Inc.'s-senior vice-president for finance and control and chairman of Agway Data Services.

"With most startup organizations, it generally takes longer to get the desired payback than what your original hope was," Radey said.

Radey said the capital investment required for the effort was "not overly significant," thanks in part to equipment leasing, and that the substantial commitment was in "getting the right human resources in place."

There are many other factors that facilitated the move to subsidiary status, according to Michael Weiner, vice-president of John Diebold & Associates, who was a consultant on the project. Agway's MIS organization was large and well run, and the Agway name brings recognition for quality in its market, Weiner said.

Several steps taken by Agway bode well for the subsidiary, he added. They include targeting Agway's "business and geographical footprints" in the market, garnering top management support and incorporating the unit.

Incorporation allows establishment of management incentives that are important for a relatively small, entrepreneurial organization but might be foreign to a large company like Agway, Weiner said. "Companies of that size typically have bureaucratic structure and management," he said.

LaHood and Radey declined to specify the financial and manpower requirements called for in setting up the subsidiary or to disclose projections for the unit's sales and profits.

LaHood said the change has not revealed any bureaucratic inertia in the MIS department that had to be overcome. "It has certainly increased the enthusiasm and excitement of our MIS department. Data processing professionals have all come forward enthusiastically about the expectations," LaHood said.

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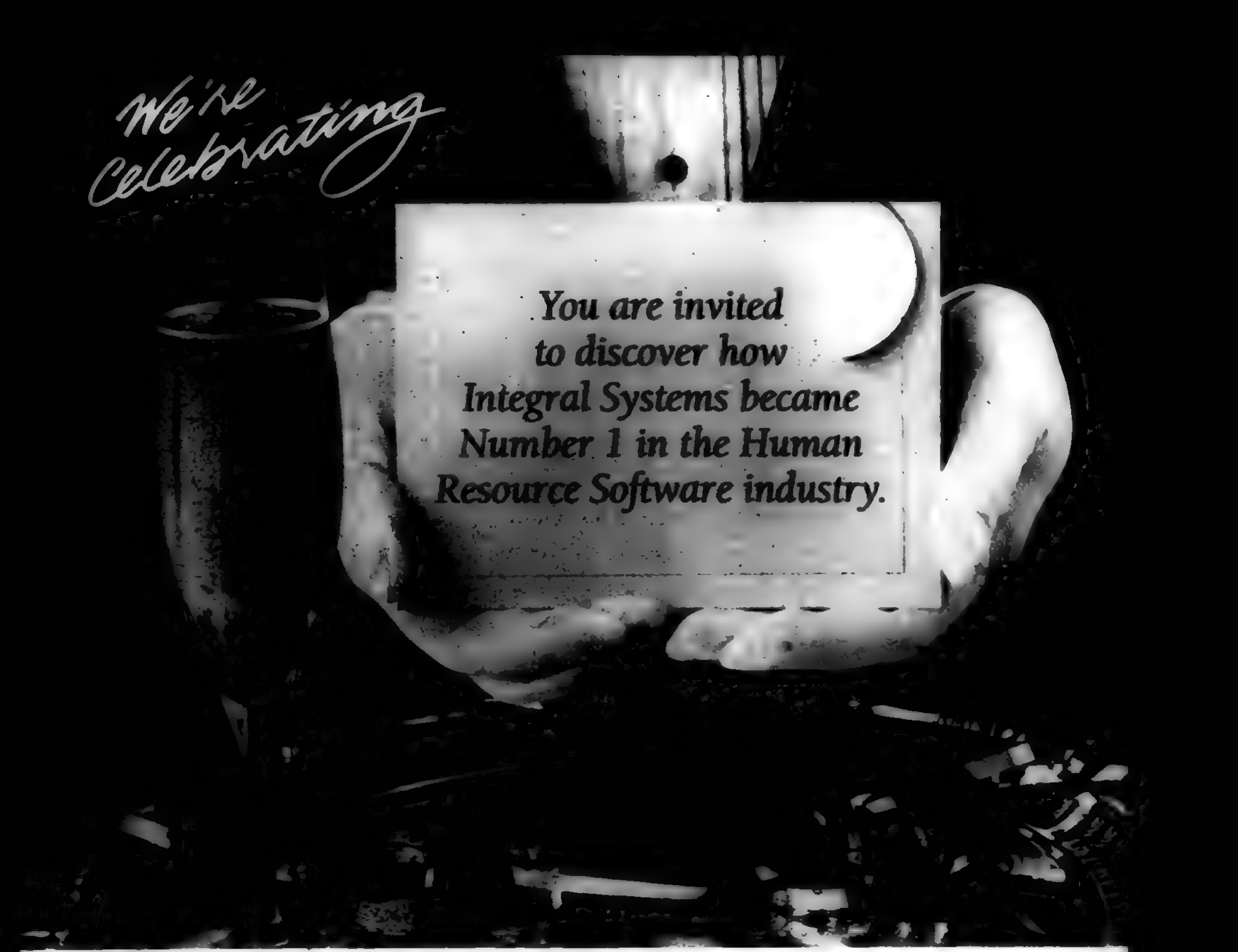
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Retailers sold on integration

From page 51

Arthur Young surveyed 127 mass merchandisers and chains of department, specialty and grocery stores with average 1985 sales of about $760 million.

The survey found many of the retailers' systems for jobs such as sales reporting and analysis, accounts payable, general ledger and payroll had reached maturity and that the companies are turning their attention to integrating their systems.

"Retailers have spent the last five years enhancing individual applications. Now they're spending their technology dollars on improving the level of integration between these applications," said Frank Andrews, Arthur Young's manager of retail consulting.

> ”
>
> ***'Retailers have spent the last five years enhancing individual applications. Now they're spending their technology dollars on improving the level of integration between these applications.'***
>
> — Frank Andrews
> Arthur Young & Co.

The integration "is an effort to let the left hand know what the right hand is doing," Andrews said. "Integration allows the different functional areas to use the same information in decision-making."

With inventory their biggest asset, retailers said they see systems for controlling inventories as the most critical area for integration, with 57% focusing on that area this year, according to the study.

"Retailers recognize the opportunity for greater profit and superior competitive position available through improved inventory management, and they are using technology to get there," Andrews said.

The study also found more retailers putting computing power in stores, particularly through the use of self-contained POS systems that can store data on stocks of goods, prices and transactions and also access credit records.

Andrews said the systems, costing as little as $3,000, can often communciate with other systems in stores so that, for example, a clerk can tell a manager he needs change or has spotted a shoplifting suspect. Most of the retailers reported efforts to integrate POS systems with others in stores.

The survey reflects the situation at Minneapolis-based Dayton Hudson Department Stores, a subsidiary of Dayton-Hudson Corp., according to Fred Asher, the chain's vice-president of MIS. Inventory management is the major concern there, and POS systems are "an integral part of that whole process," Asher said.

"The key to that is being in stock on wanted merchandise. We're providing the information systems to assist that process," he said. That calls for close integration of marketing, procurement and distribution systems, Asher added.

Inventory and POS are also leading concerns at K Mart Corp. in Troy, Mich., according to David M. Carlson, vice-president of corporate information systems.

K Mart has endorsed IBM's Token-Ring local-area network for linking in-store systems — such as its IBM Personal Computer AT-based ones for labor management, POS and receiving — and is developing all of them to accommodate Token-Ring, Carlson said.

A typical benefit of such interconnection is K Mart receiving systems' retrieval of retail prices, at which the systems log incoming shipments from POS systems. Retailers are careful to keep the prices in POS systems up to date.

The study found that in development efforts, specialty retailers and department stores are emphasizing merchandise planning applications to control stocks of seasonal goods, with about 20% of the respondents reporting they had recently completed a major system and about 45% ranking it as a major development or enhancement priority in the next year or two.

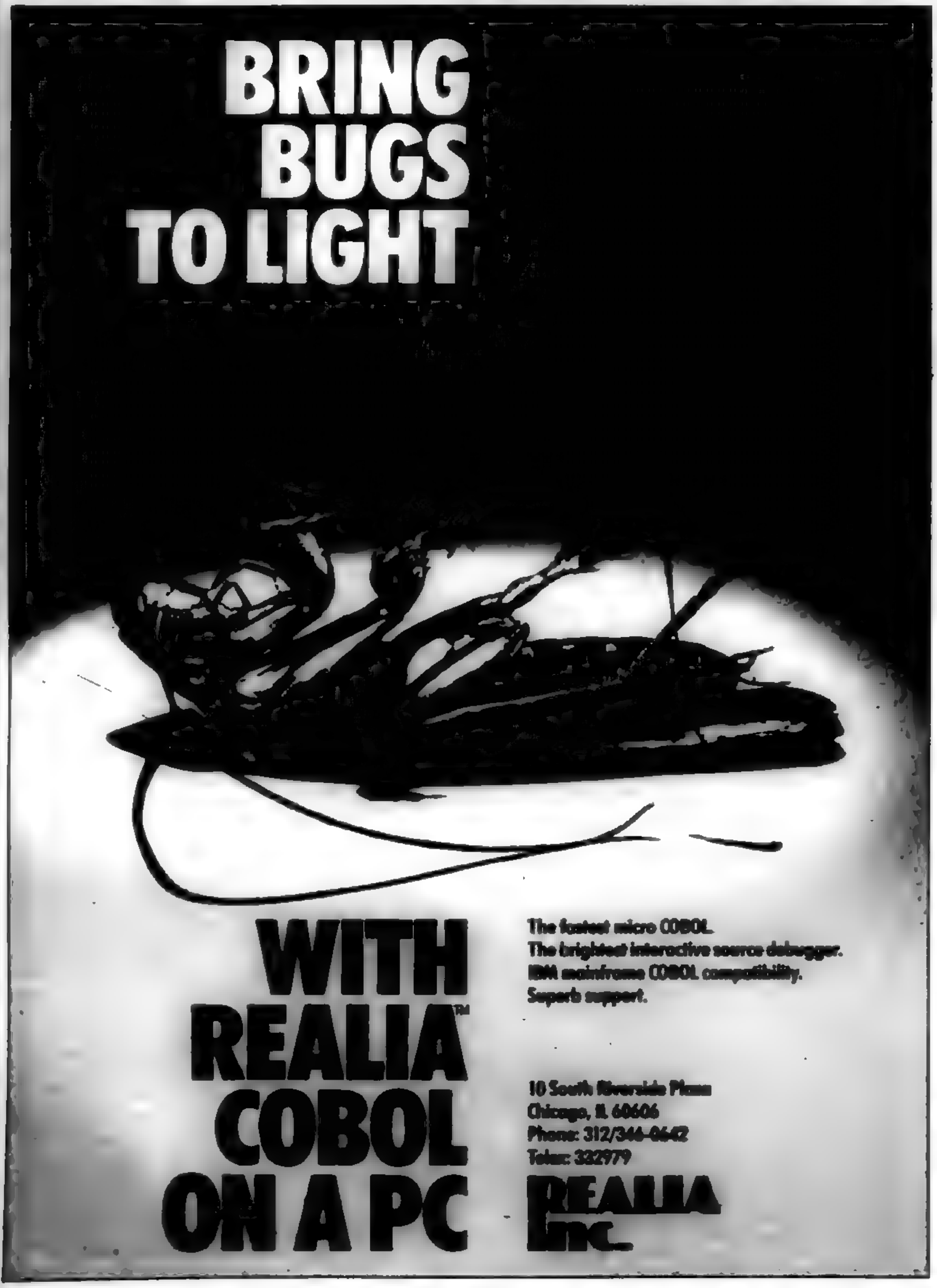
Cost control a priority

For mass merchandisers, however, purchase order management systems for controlling costs are the development priority; 19% said they had recently developed a system and 63% reported they plan to develop or improve one in the next 18 months.

The study found that the software packages retailers most often purchase — rather than develop in-house — include general ledger (53%), payroll (49%), accounts payable (35%), fixed assets (33%) and POS (24%).

Packages for POS systems have become more common because the systems often function similarly; most packages are driven by parameters, so they can be customized; and many offer sophisticated functions previously developed in-house, such as cashier productivity and scheduling, Arthur Young's Andrews said.

The retailers' expenses for training and for support of systems in stores rose 50% in fiscal 1986, indicating an emphasis on training end users in order to get the most from investments in systems, Andrews said.



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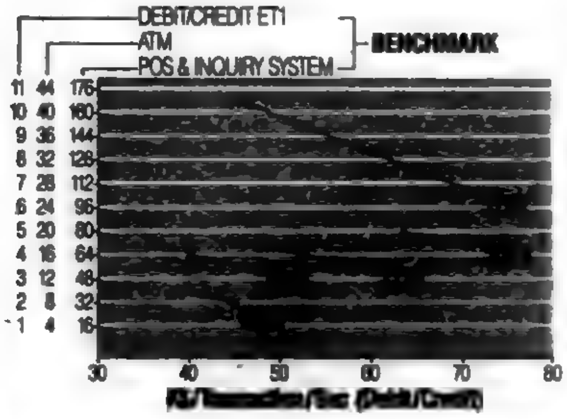

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CALENDAR

JANUARY 25-31

Networking PCs. Cleveland, Jan. 26-27 — Contact: T. Jess Seiple, American Institute, 55 Main St., Madison, N.J. 07940. Also being held Jan. 29-30 in Denver, Feb. 5-6 in Kansas City, Mo., and Feb. 9-10 in Boston.

How to Negotiate with IBM. Orlando, Fla., Jan. 26-28 — Contact: International Computer Negotiations, 238 Christopher St., Upper Montclair, N.J. 07043.

Integrating Purchasing, Receiving and Accounts Payable Systems. Philadelphia, Jan. 26-30 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Mapper Installation, Coordination and Support. Dallas, Jan. 26-30 — Contact: Compumetrics Training Institute, P.O. Box 58383, Houston, Texas 77258.

NCITD Informational Forum. New Orleans, Jan. 27 — Contact: Eugene A. Hemley, Executive Director, National Council on International Trade Documentation, Suite 1200, 350 Broadway, New York, N.Y. 10013.

Corporate Disaster Recovery Planning. Columbus, Ohio, Jan. 27-29 — Contact: HSH, Inc., 2715 Tuller Parkway Drive, Dublin, Ohio 43017. Also being held March 24-26 in Philadelphia and Sept. 29-Oct. 1 in Los Angeles.

Annual Conference on Improving Productivity in EDP System Development. Phoenix, Jan. 27-30 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

National Insurance and Protection Conference of Financial Institutions. San Diego, Jan. 27-30 — Contact: American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Microsoft Windows Development Seminar. Boston, Jan. 28-29 — Contact: Microsoft Corp., Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

1987 RIA Annual Meeting. San Diego, Jan. 28-30 — Contact: Robotic Industries Association, P.O. Box 3724, 900 Victors Way, Ann Arbor, Mich. 48106.

Keeping U.S. Manufacturing Globally Competitive. San Diego, Jan. 28-30 — Contact: Robotic Industries Association, P.O. Box 3724, 900 Victors Way, Ann Arbor, Mich. 48106.

Conference on Desktop Communications. San Francisco, Jan. 28-31 — Contact: The Seybold Group, Inc., Suite 132, 20695 Western Ave., Torrance, Calif. 90501.

Being More Profitable and Competitive with PC CAD/D. Sarasota, Fla., Jan. 30 — Contact: Maura Belliveau, Graphic Systems, Inc., 180 Franklin St., Cambridge, Mass. 02139.

FEBRUARY 1-7

Computer and Electronic Printers. Key Biscayne, Fla., Feb. 1-3 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Integrated Systems: What Can be Done Today? San Antonio, Feb. 1-4 — Contact: International Communications Association, Suite 710, LB-89, 12750 Merit Drive, Dallas, Texas 75251.

1987 ABA Bank Telecommunications & Data Processing Workshop. San Diego, Feb. 1-4 — Contact: American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Long Range Information Systems Planning. Dallas, Feb. 2-5 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Instructional Computing Conference VII. Orlando, Fla., Feb. 2-5 — Contact: Florida Department of Education, Educational Technology Section, Knott Building, Tallahassee, Fla. 32399.

Third International Conference on Data Engineering. Los Angeles, Feb. 2-6 — Contact: The Computer Society of IEEE, Inc., 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Automated Clean Room Processes. San Jose, Calif., Feb. 3-4 — Contact: Robotics International of Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Digital Image Processing. Washington, D.C., Feb. 3-6 — Contact: Integrated Computer Systems, P.O. Box 3614, Culver City, Calif. 90231. Also being held March 17-20 in Boston.

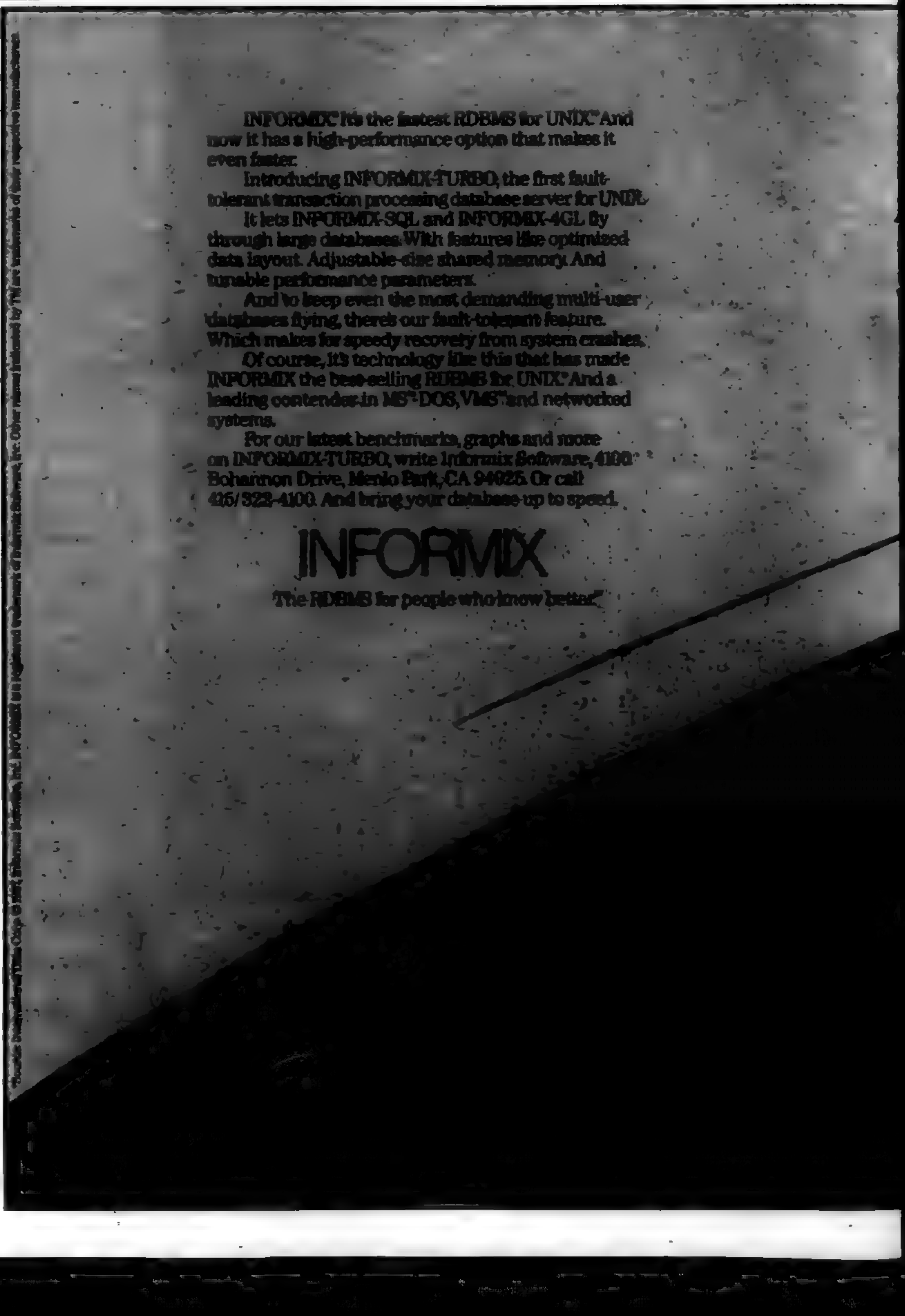
Implementing LAN in Your Organization. Milwaukee, Feb. 4-6 — Contact: Center for Continuing Engineering Education, University of Wisconsin-Milwaukee, 929 N. Sixth St., Milwaukee, Wis. 53203.

National Information System Quality Assurance Association Meeting. New York, Feb. 5 — Contact: Peat, Marwick, Mitchell & Co., 1600 National City Center, Cleveland, Ohio 44114.

FEBRUARY 8-14

12th Annual SAS Users Group International Conference. Dallas, Feb. 8-11 — Contact: SUGI Registration, SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511.

Advances in Marketing Analysis: Research Applications and Decision Support Systems. Philadelphia, Feb. 8-13 — Contact: Office of Executive Education, The Wharton School, University of Pennsylvania, 200 Vance Hall, Philadelphia, Pa. 19104.



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Prototyping: Implementation Strategies. Ottawa, Feb. 9-10 — Contact: Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

Fourth and 5th Generation Data Management Software. Boston, Feb. 9-10 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held March 2-3 in Chicago.

Project Management Software. New York, Feb. 9-11 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held March 23-25 in Chicago.

How to Design & Improve a Cost Information & Control System. Los Angeles, Feb. 9-11 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held Feb. 18-20 in Boston, Feb. 25-27 in Chicago, March 9-11 in New York, March 16-18 in Washington, D.C., and March 23-25 in Dallas.

Key Issues in Managing Information Systems. St. Petersburg, Fla., Feb. 9-12 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Communications Networks '87. Washington, D.C., Feb. 9-12 — Contact: CW/Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

A Manager's View of Expert Systems Building. Atlanta, Feb. 10-11 — Contact: Department of Continuing Education, Georgia Institute of Technology, Atlanta, Ga. 30332. Also being held April 9-10 in Atlanta.

Computer Aided Publishing '87. Washington, D.C., Feb. 10-12 — Contact: Computer Aided Publishing, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

Systems Design & Integration Conference. San Jose, Calif., Feb. 10-12 — Contact: Electronic Conventions Management, 8110 Airport Blvd., Los Angeles, Calif. 90045.

Real-Time Operating Systems: A Hands-On Workshop. Feb. 10-13, Toronto — Contact: Integrated Computer Systems, P.O. Box 3614, 5800 Hannum Ave., Culver City, Calif. 90231. Also being held March 3-6 in Washington, D.C., March 17-20 in Palo Alto, Calif., March 31-April 3 in Boston and April 21-24 in Los Angeles.

Creating Box Structured Information Systems: A New Approach for Information Systems Analysis and Design. Orlando, Fla., Feb. 11-13 — Contact: Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

1987 Bank Data Security Technical Symposium. Orlando, Fla., Feb. 11-13 — Contact: Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

AM/FM International Regional Conference on Automated Mapping/Facilities Management. Orlando, Fla., Feb. 11-13 — Contact: Barbara Emery, AM/FM International, #820, 8775 E. Orchard Road, Englewood, Colo. 80111.

South Florida Data Base Users Group. Ft. Lauderdale, Fla., Feb. 12 — Contact: 4780 N. State Road 7, Ft. Lauderdale, Fla. 33319.

FEBRUARY 15-21

Electronic Imaging '87. Anaheim, Calif., Feb. 16-19 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

15th Annual Association for Computing Machinery Computer Science Conference. St. Louis, Feb. 16-19 — Contact: Department of Computer Science, University of Pittsburgh, P.O. Box 13526, Pittsburgh, Pa. 15243.

Electronic Data Interchange. Alexandria, Va., Feb. 18 — Contact: American Trucking Association Management Systems Committee, 2200 Mill Road, Alexandria, Va. Also being held April 30 in Kansas City, Mo., and May 20 in Chicago.

Resource Planning for Central File Conversion. New Orleans, Feb. 18-20 — Contact: Innovative Systems, Inc., 341 Fourth Ave., Pittsburg, Pa. 15222.

Expo-IV (for Pick-based system users). Atlantic City, Feb. 18-20 — Contact: Expo-TMS, 22951 La Cadena, Laguna Hills, Calif. 92653.

Interactive Instruction Delivery. Kissimmee, Fla., Feb. 18-20 — Contact: Society for Applied Learning Technology, 50 Culpeper St., Warrenton, Va. 22186.

Electronic Data Interchange. Arlington, Va., Feb. 19-20 — Contact: TDCC, Suite 712, 1101 17th St. N.W., Washington, D.C. 20036.

FEBRUARY 22-28

1987 User Group Conference. Marina del Rey, Calif., Feb. 22-25 — Contact: Trax Software, Inc., 10801 National Blvd., Los Angeles, Calif. 90064.

Fourth Annual Electronic Printing Systems Conference. Miami, Feb. 22-26 — Contact: Dunn Technology, Inc., Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

Exchange Carriers Standards Association Technical Subcommittee T1Q1. Orlando, Fla., Feb. 23-27 — Contact: Radisson Plaza Hotel Orlando, 60 S. Ivanhoe Blvd., Orlando, Fla. 32804.

IBM: Mastering the Transition 1987-1992. New York, Feb. 24-25 — Contact: The Yankee Group, Seminar Division, 200 Portland St., Boston, Mass. 02114.

Computer Aided Software Engineering Symposium. Atlanta, Feb. 24-26 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Introduction to Performance/Capacity Management. Phoenix, Feb. 25-27 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

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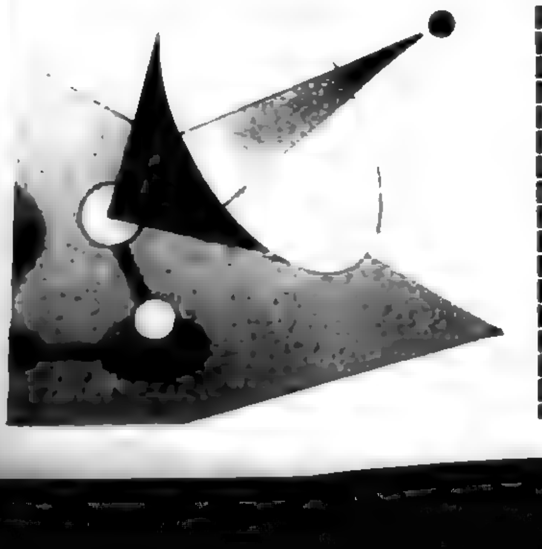

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NEW PRODUCTS

Oracle adds VAX/VMS to SQL spreadsheet

Belmont, Calif.-based Oracle Corp. has announced a Digital Equipment Corp. VAX/VMS version of its SQLCalc spreadsheet facility said to allow users to access, update and create tables in a relational data base directly from a Lotus Development Corp. 1-2-3-like spreadsheet.

The VAX/VMS version is said to be functionally identical to the IBM Personal Computer version introduced in 1986. According to a company spokesman, users can move spreadsheets and data bases between the VAX and PC versions, using the same interface in both environments.

Users enter IBM SQL requests into cells, just like formulas. The SQL statements can refer to other spreadsheet cells, so users can change parameters and see new information from the data base. The SQL requests can be edited, copied, moved and projected just as formulas can.

SQLCalc provides Lotus-compatible features such as menus, data entry and flexible formatting of spreadsheet data

Using Oracle's SQLStar distributed data base management system architecture, users can concurrently access a VAX Oracle data base of unlimited size through a common spreadsheet interface running on any mix of PCs and VAX ASCII terminals.

Multiple concurrent users running SQLCalc or any of the vendor's other end-user and programmatic interfaces can access the Oracle data base. Security protection is extended to the field level by the Oracle security system, the vendor said.

VAX/VMS SQLCalc is priced based on the CPU size. It ranges from $1,000 for an initial license on a DEC Microvax I to $18,000 on a VAX 8800. Microvax II licenses cost $2,000, while the price on the VAX 8200 and 8300 systems is $7,200.

In addition, the Oracle relational data base management system must be licensed on the system with SQLCalc. Oracle base licenses cost from $5,000 to $90,000.

During the next few months, SQLCalc will be available in other operating system and computer environments, including IBM mainframes and Unix, the vendor said.

Cincom enhances Mantext

Release 1.4 allows users access to mainframe files

Cincom Systems, Inc. in Cincinnati has announced Release 1.4 of its Mantext mainframe text processing system.

The IBM CICS-based system is said to provide direct access to mainframe files; a text application development language; printer support in both batch and on-line modes; full-screen editing capabilities; free-form typing; and optional support for 10 languages — English, German, Danish, Dutch, French, Italian, Norwegian, Portugese, Spanish and Swedish.

According to a company spokesman, features of Release 1.4 include enhanced performance characteristics, improved productivity for users and new operational capabilities.

Specifically, Release 1.4 allows on-line users to format documents as an asychronous task. Users receive an immediate response from the terminal after sending a document to be printed.

Mantext now automatically truncates words at the end of each line of text according to the hyphenation rules of the particular language being used.

Users of the product are said to have access to a modifiable table that contains words that are intended to be hyphenated differently than was originally specified by Mantext.

The spool control system architecture now gives users control over the Mantext printer network, and a special library has been created in Mantext Release 1.4 for document models that are used by multiple users.

Mantext is priced from $33,000 to $62,000, depending on the modules purchased, configuration and languages selected, the vendor said.

INSIDE

Software & Services/62
Microcomputing/63
Networking/67
Systems & Peripherals/68

EMC disk subsystem features shadowing for Prime systems

EMC Corp. in Natick, Mass., has announced a fault-tolerant disk subsystem designed to increase the reliability and performance of Prime Computers, Inc. computers.

According to the vendor, the subsystem, which is said to provide fault-tolerant data storage using paired Winchester disk drives, employs a technique called shadowing.

Shadowing increases the availability of critical data by utilizing two disk drives that hold identical images of the same information, the vendor said. The technique is implemented using a 24-MHz controller called the IDS-4 Shadow Controller.

Performance boost claimed

The IDS-4 Shadow Controller is said to provide improved disk performance and flexibility in determining appropriate disk configurations in addition to fault tolerance. It operates two disk drives simultaneously so that when a problem occurs with one, it automatically accesses the other.

The controller is capable of supporting up to two drive pairs. It is based on a Motorola, Inc. 16-bit microprocessor and a direct-memory access (DMA) controller.

It comes equipped with an expanded memory buffer with a 512K-byte capacity and features an On-line/Off-line switch.

No changes needed

According to the vendor, it requires no changes to the Primos operating system or existing hardware and is 100% compatible with any Prime system at REV 19.2 or higher.

The IDS-4 Shadow Controller is available as part of an EMC disk-storage subsystem. The disk-storage subsystems feature 858M-, 510M- and 374M-byte drives.

An EMC disk subsystem employing an IDS-4 Shadow Controller and paired 510M-byte drives costs $25,500 plus $265 for 36 months, the vendor said.

DG offers Office/Publisher

Intercon's tool to be used with CEO software

Data General Corp. in Westboro, Mass., has announced an Independent Software Vendor agreement with Intercon Associates, Inc. for Office/Publisher, desktop publishing software that can be integrated with DG's CEO office automation software.

Intercon Office/Publisher software is said to provide CEO with office publishing functionality. According to a DG spokesman, Office/Publisher was designed to accept CEO-formatted documents and then recompose, paginate and produce graphics-quality output for use with laser printers or for phototypesetting.

Can access CEO functions

Users can access standard CEO functions such as electronic mail, filing and calendar while having access to the typesetting capabilties offered by the Intercon software, the spokesman added.

Specific commands can be created within CEO to add Office/Publisher features that let users set type and column size, justify margin ruling and then produce camera-ready output of each page set, the spokesman said.

Prices for Office/Publisher start at $5,000 for use on the entry-level DG Eclipse MV/2000 departmental computer systems.

Lexi introduces laser printer

A 10 page/min. laser printer said to have bar code capabilities has been introduced by Lexi Computer Systems Corp., located in North Andover, Mass.

Designated the Lexi 1087, the printer is said to be configured for the IBM mainframe environment. It features IBM Coax A plug compatibility and is also suitable for applications using the RS-232 serial port for electronic publishing environments outside the IBM mainframe world, the vendor said.

Other features include more than 50 resident fonts resembling popular typefaces such as Helvetica, Letter Gothic and Prestige Elite. Users also have the capability to create custom-size typefaces and download fonts. They may also utilize Hewlett-Packard Co. Laserjet Plus and Kyocera formats.

According to a company spokesman, the Lexi 1087 generates 300 dot/in. print resolution. It offers a 250-sheet manual-feed paper cassette; a paper output capacity of 150 sheets, face down; toner yield of 3,000 sheets; drum yield of 10,000 sheets; developer yield of 50,000 sheets; and an accessible clamshell design for maintenance purposes.

The Lexi 1087 is plug compatible with the IBM 3287 or 4214 printer Models 2, 3, 4 or 5 and attaches to IBM 3274 and 3276 controllers via the standard Coax A interface. It weighs only 64 lb, the spokesman added.

The Lexi 1087 Compact Laser Printer costs $5,690.

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tions, you never have to worry about being left in the technological lurch.

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Ungermann-Bass, Inc., 3900 Freedom Circle, Santa Clara, California 95052. Telephone (408) 496-0111.

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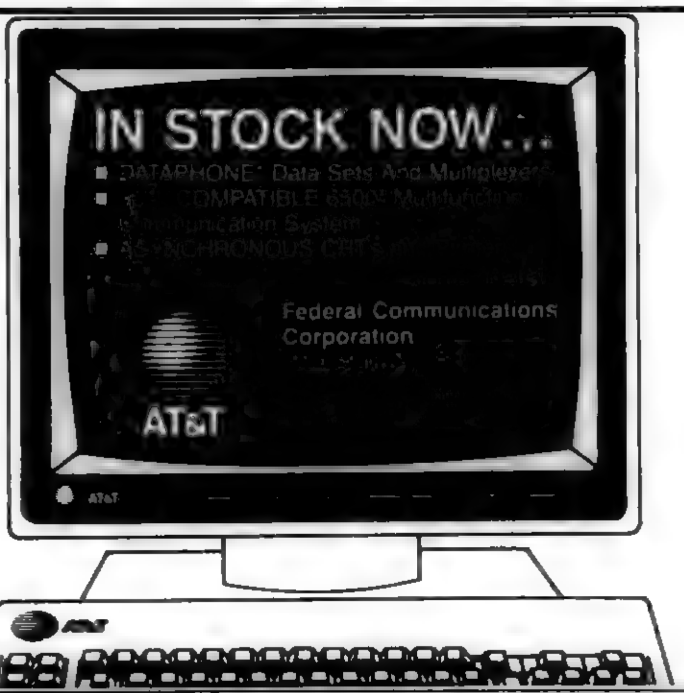
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NEW PRODUCTS/SOFTWARE & SERVICES

SOFTWARE & SERVICES

Systems software

Profitkey International, Inc. has announced **Sales Analysis**, a module for its Profitkey manufacturing system.

The module is said to use sales information already captured in the data base to provide the reporting information needed to analyze the sales cycle and customer purchasing habits and manage the sales force.

Sales Analysis is priced at $4,000. Profitkey runs in multiuser environments under Microsoft Corp. Xenix and Unix on AT&T, IBM, NCR Corp. and Unisys Corp. computers.

Profitkey International, 200 Prestige Park, Salem, N.H. 03079.

Applications packages

AT&T has announced **Unitrax**, Unix System V-based video transaction and information retrieval processing software.

Starter application packages contain data base design structure, data base linkages, North American Presentation Level Protocol Syntax and ASCII starter data base on magnetic tape cassette or disk. The applications available include Product Catalogs; Literature and Product Ordering; Training Courses; Corporate Information and Support; and Business Communications. The packages can be customized and expanded using AT&T's Unitrax software Application Development System.

The binary software license fee ranges from $5,000 to $20,000. Each starter application package costs $750.

AT&T, 100 Southgate Pkwy., Morristown, N.J. 07920.

■

Daly & Wolcott, Inc. has announced **Release 1.0** of its **G/L History and Inquiry System** for the IBM System/36.

Written in RPG-II, the system is said to retain detailed general ledger transactions needed for the analysis of general ledger accounts. Inquiry may be performed by entering either account or journal reference information. Reports include G/L History Report/Worksheet by account, account ranges or journal reference and may be printed in detailed or summary form by dates. Period balances and net changes are printed on the reports along with a work area for notes.

The G/L History and Inquiry System costs $900.

Daly & Wolcott, P.O. Box 1509, East Greenwich, R.I. 02818.

Utilities

Alcyon Corp. has announced **DB68**, a C source-level debugger for its C68 Versados compiler.

DB68 is said to be a tool for symbolically debugging executable C programs at the source level. It provides a set of break-point commands and allows the user to debug without knowing the bit representation or size of C data types.

DB68 is priced at $950.

Alcyon, 5010 Shoreham Place, San Diego, Calif. 92122.

■

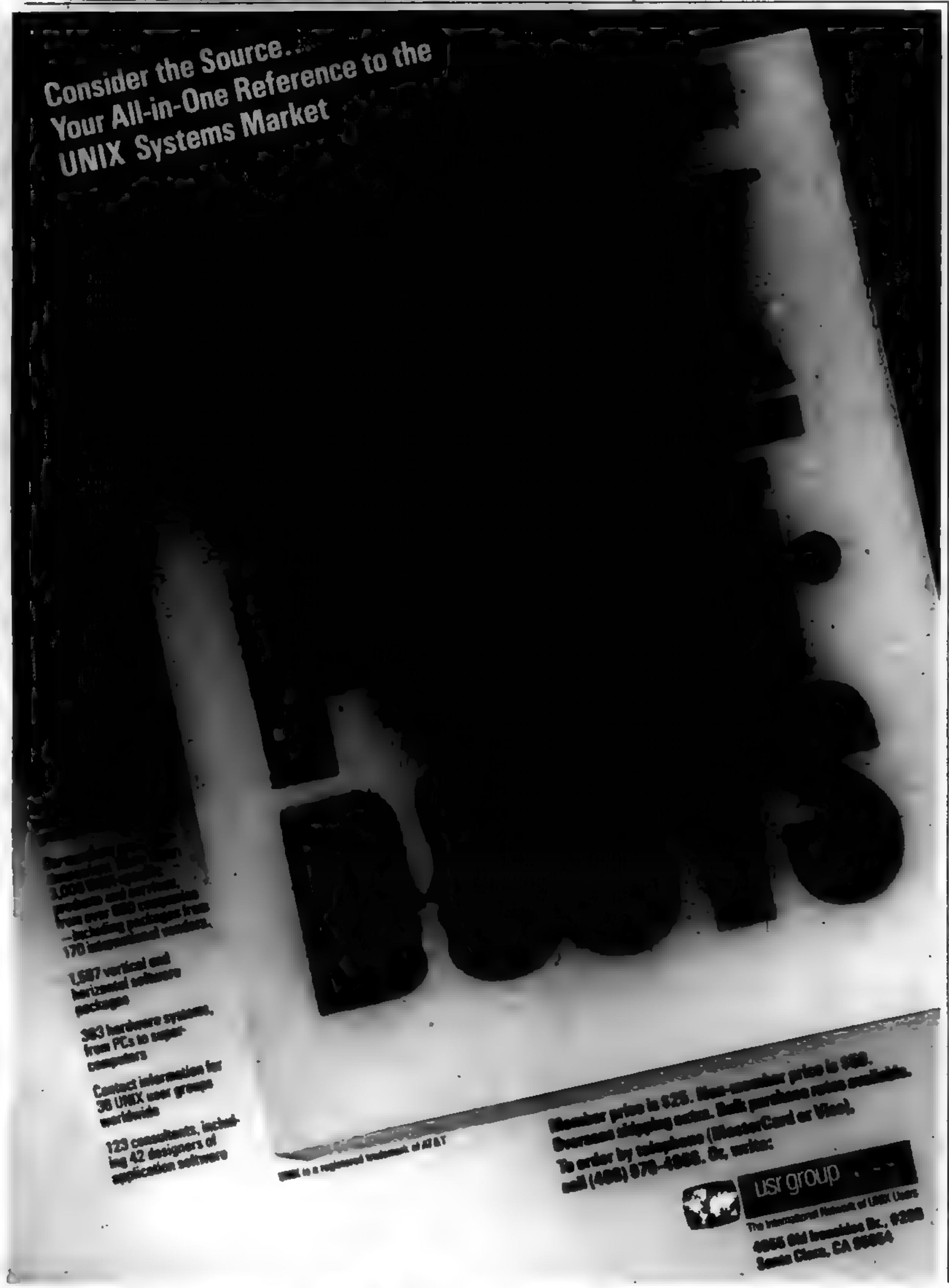
Axios Products, Inc. has announced **Pilot/MVS, Pilot/CICS** and **Pilot/SMF**.

Pilot/CICS is a reporting, tracking and modeling system. Pilot/MVS answers questions about the MVS and XA environments and depicts Resource Management Facility, direct-access storage drive, time-sharing option, paging and channeling information. They work with Lotus Development Corp.'s 1-2-3 to provide forecast, analysis and predictions based on mainframe data.

Pilot/SMF provides modules to clean, archive and format SMF records. It works with the other Pilot products by managing the mainframe data for transfer to a micro.

Pilot/CICS and Piot/MVS cost $3,500 each. Pilot/SMF costs $4,000.

Axios Products, 1455 Veterans Highway, Hauppauge, N.Y. 11788.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usr group
The International Network of UNIX Users
[illegible] Santa Clara, CA [illegible]

Softech Data Systems, Inc. has announced **Fist**, an RPG-II program generator for the IBM System/36.

Fist is said to produce RPG-II source code compatible with all existing applications and utilities. It allows users to create, modify and compile RPG-II entry, inquiry, report and update programs. According to the vendor, the program employs a comprehensive menu-, prompt- and Help screen-driven system.

Fist is priced at $2,950.

Softech Data Systems, 806 Rt. 17, Ramsey, N.J. 07446.

MICROS

Software applications packages

U.S. Data Corp. has announced a **run-time version of Factorylink**, its open-architecture real-time automation software for IBM Personal Computers, as well as a dynamic trending option for the package.

The run-time version is compatible with all Factorylink functional software, including interval and event timers, alarm supervisors, data logging, math and logic, networking and interfaces to industrial programmable controllers.

Dynamic trending permits users to add graphic trending charts to any color graphics display without programming.

The run-time kernel costs $1,750. The Dynamic trending option costs $995. The Factorylink foundation system costs $2,750.

U.S. Data, P.O. Box 850058, 1551 Glenville Drive, Richardson, Texas 75085.

Great Plains Software, Inc. has announced the **Great Plains Accounting series** for the Apple Computer, Inc. Macintosh personal computer.

The accounting series includes modules such as general ledger, accounts receivable, accounts payable, payroll, inventory, order entry with point-of-sale invoicing, network manager, purchase order and job cost.

Features include a reference manual, learning guide, 175 reports, instant look-up windows and data export capabilities.

Each module costs $695, except network manager and purchase order, which cost $395 each.

Great Plains Software, 1701 S.W. 38th St., Fargo, N.D. 58103.

Software utilities

Beacon Street Software, Inc. has introduced an application development and management system called **PC/Power** for the IBM Personal Computer and compatibles.

PC/Power is said to allow programmers to speed up and control the application development process. It supports various dialects of Pascal, C, Basic and Assembler languages. Developers can build screens with data fields, both of programs and of particular programming languages, that were predefined independently.

PC/Power is priced at $95.

Beacon Street Software, P.O. Box 216, State House, Boston, Mass. 02133.

■

Intersecting Concepts, Inc. has released **Backup Master**, a full-color, hard-disk backup utility for the IBM Personal Computer and compatibles.

The program is said to back up hard-disk data to floppies, other hard disks or cartridge hard disks. It is capable of performing a 10M-byte backup to 5 ¼-in. floppies in less than eight minutes, the vendor said. It also features such hard-disk file and directory management support features as full directory tree and file display, preview files capabilities and call Microsoft Corp. MS-DOS function.

Backup Master costs $69.95

Intersecting Concepts, 4573 Heatherglen Court, Moorpark, Calif. 93021.

Software enhancements

Mosaic Software, Inc. has enhanced its **Integrated-7** personal computer software package.

The new version includes the vendor's Lotus Development Corp. 1-2-3 Release 1A-compatible Twin Classic instead of the original spreadsheet module. Other modules include a relational data base management system; Datamail; business graphics; word processing with integral spell checker; terminal emulation; and PC-to-PC communications at up to 9.6K bit/sec.

The new version, Integrated-7/Twin, is priced at $199. Current users of Twin can upgrade for $99. Current users of Integrated-7 can upgrade for $45.

Mosaic Software, 1972 Massachusetts Ave., Cambridge, Mass. 02140.

■

Systems Guild, Inc. has announced a new version of the **Csharp Realtime Toolkit**, a package of real-time tools for the C programmer.

Csharp 3.0 is said to support real-time programming in the C programming language. The five tools included in Csharp provide interrupt handling and state system control.

Features of Version 3.0 include graphics drivers to the IBM Color Graphics Adapter and Enhanced Graphics Adapter and the Hercules Computer Technology, Inc. Monochrome Graphics Card.

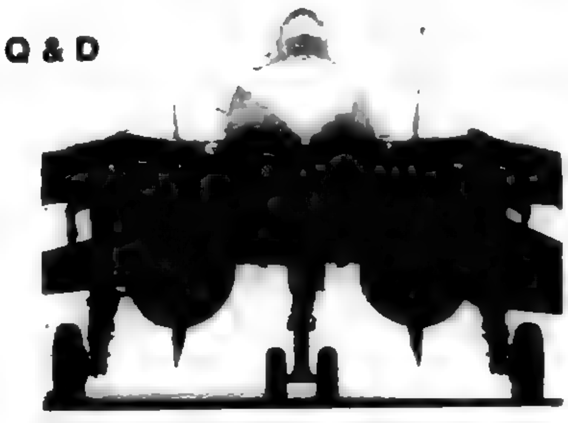
A Csharp source license costs $495. Object production licenses cost $495 for 25 units or $2,475 for unlimited units.

Systems Guild, P.O. Box 1085, Kendall Sq. Station, Cambridge, Mass. 02142.

Data storage

Hewlett-Packard Co. has announced the **HP 9154B** 20M-byte rugged disk drive

Continued on page 68



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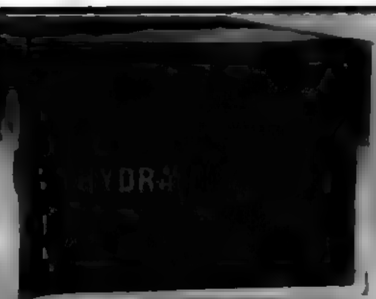
Systems Technology And Research
P.O. Box 3278
Humble, TX USA 77347



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Buddy Allee
Data Processing Manager
Tower Life Insurance, Co.

Communications
"As Hawaii's premier inter-island carrier it is vital for the information we transmit to reach its destination. This is why we chose the HYDRA. It enables us to use local and remote (including mainland) PC's to communicate data to/from our mainframe. We also download files containing member lists into PC's for preparation of personalized letters, for example, to our frequent fliers. We have been very impressed with HYDRA's performance!"
Natalie N. Playdon
Director-Computer Services
Aloha Airlines

Terminal Emulation
"HYDRA has been extremely effective in PC and switched access to the Host. Our students can use their PCs as a work station or a 3270-type terminal connected to the HYDRA. We have over 250 devices supported on 3 systems by HYDRAs which eliminated the need for additional dedicated controllers. We found HYDRA costs less than we were spending on our previous protocol converter each year in maintenance alone."
Kelly McDonald
Technical Support Manager
Brigham Young University

Dial-in Support
"HYDRA allows students and programmers off campus to dial-in and work on projects. With support for such a wide variety of devices HYDRA enables virtually any ASCII terminal or PC to talk to our system. This is ideal for us as we can cater for students no matter what terminal or PC they may be using. We are thrilled with the performance of the HYDRA and would definitely recommend it as a strong asset for any data processing center."
Dwight Ayle, Sr. Instruction
Programmer Analyst
Mt. San Antonio College

1403 Printer Emulation
"HYDRA's 1403 printer emulation has been a real money saver for us. We use Printronix 600 LPM printers defined as 1403's for jobs that would normally require expensive laser printers. HYDRA's versatility made it possible for us to generate our bar coded inventory tags. Our customers and programmers also appreciate HYDRA's dial-in capabilities."
Steve Brown
Data Processing Director
R.M.S.A.

3211 Printer Emulation
"With HYDRA's 3211 printer emulation support, our customer reps can print sample documents on their matrix printers and review them before we begin a major production run. We had a definite need, and HYDRA was the solution to our problem. What really helped was not needing to go through a front-end processor or additional controllers. HYDRA channel attaches, which made things very simple for us."
Jim Mountain
System Consultant
Mailing Services of Pittsburgh

Their Solution Can be Your Solution!

Call Today! 800-55-HYDRA In California (714) 770-2263

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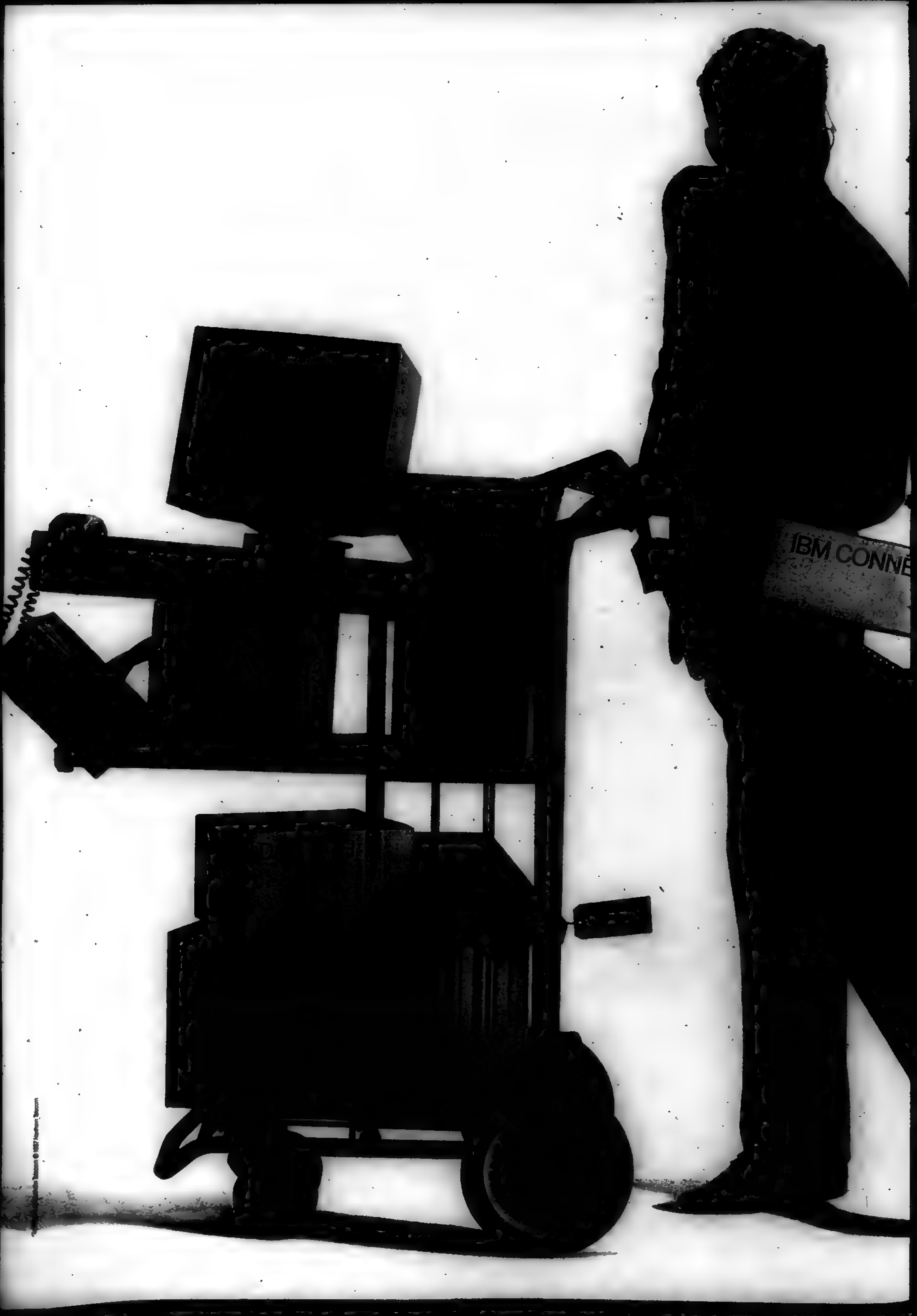
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NETWORKING

NEW PRODUCTS/MICROCOMPUTING

Continued from page 63

and the **HP 9153B** 20M-byte drive with 3½-in. microfloppy.

Features of the 20M-byte drives include write protection, data protection, IBM Personal Computer compatibility and increased data throughput up to 50% more than the HP 9133H/9134H 20M-byte products.

Designed for use in computer-aided design and engineering systems as well as for word processing, business graphics and spreadsheets, the drives cost $2,390 for the HP 9154B and $2,740 for the HP 9153B.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

■

Micropolis Corp. has announced the **1330 Series Powerdrives** for IBM Personal Computers.

The Powerdrives are hard disk drives. According to the vendor, they can upgrade most ST506/412-interface personal computers to capacities of 44M, 53M or 71M bytes. They offer 30-msec. average access time and a 25,000-hour mean time between failures.

Prices for the 1330 Series Powerdrives range from $995 for the 44M-byte drive to $1,595 for the 71M-byte drive.

Micropolis, 21123 Nordhoff St., Chatsworth, Calif. 91311.

Printers/Plotters/Peripherals

QMS, Inc. has announced the **QMS-PS800+** Postscript printer and the **QMS-PS2700CK** Postscript-based controller for use with Xerox Corp. 2700 laser printers.

The QMS-PS800+ is an 8 page/min. laser printer with 35 resident type styles. It is compatible with the IBM Personal Computer and Apple Computer, Inc. Macintosh and provides text and graphics printing at 300 by 300 dot/in. resolution.

The external 2700CK controller allows the Xerox 2700 to accept the Postscript page description language. It adds graphics and font-scaling capabilities.

The QMS-PS 800+ printer costs $5,495. The 2700CK controller costs $5,995.

QMS, P.O. Box 81250, Mobile, Ala. 36689.

Board-level devices

Univation has announced its **Dream Board** turbo-EMS enhancement card now offers IBM Enhanced Graphics Adapter (EGA) capabilities.

The Dream Board with EGA is said to offer up to 2M bytes of random-access memory (RAM) with the Lotus/Intel/Microsoft Expanded Memory Specification (EMS).

Features are said to include IBM EGA compatibility; IBM Color Graphics Adapter, Monochrome Display Adapter and Hercules Computer Technology, Inc. Monochrome Graphics compatibility; 256K bytes of display RAM; 64 colors; RAM-loadable character set; light-pen interface; and utility software.

The Dream Board with EGA costs $1,250 with 1M byte of EMS RAM and $1,595 with 2M bytes.

Univation, 1231 California Circle, Milpitas, Calif. 95035.

■

Ideassociates has announced **All Aboard 286**, a surface-mount technology board for the IBM Personal Computer XT 286 and PC AT.

The multifunction board offers 16M bytes of memory, serial and parallel ports and IBM Enhanced Graphics Adapter capabilities.

According to the vendor, three memory options are available. Conventional memory brings the AT from 512K bytes to 640K bytes. Up to 4M bytes of Expanded Memory Specification can be added. Up to 16M bytes of extended memory are also available on the multifunction board.

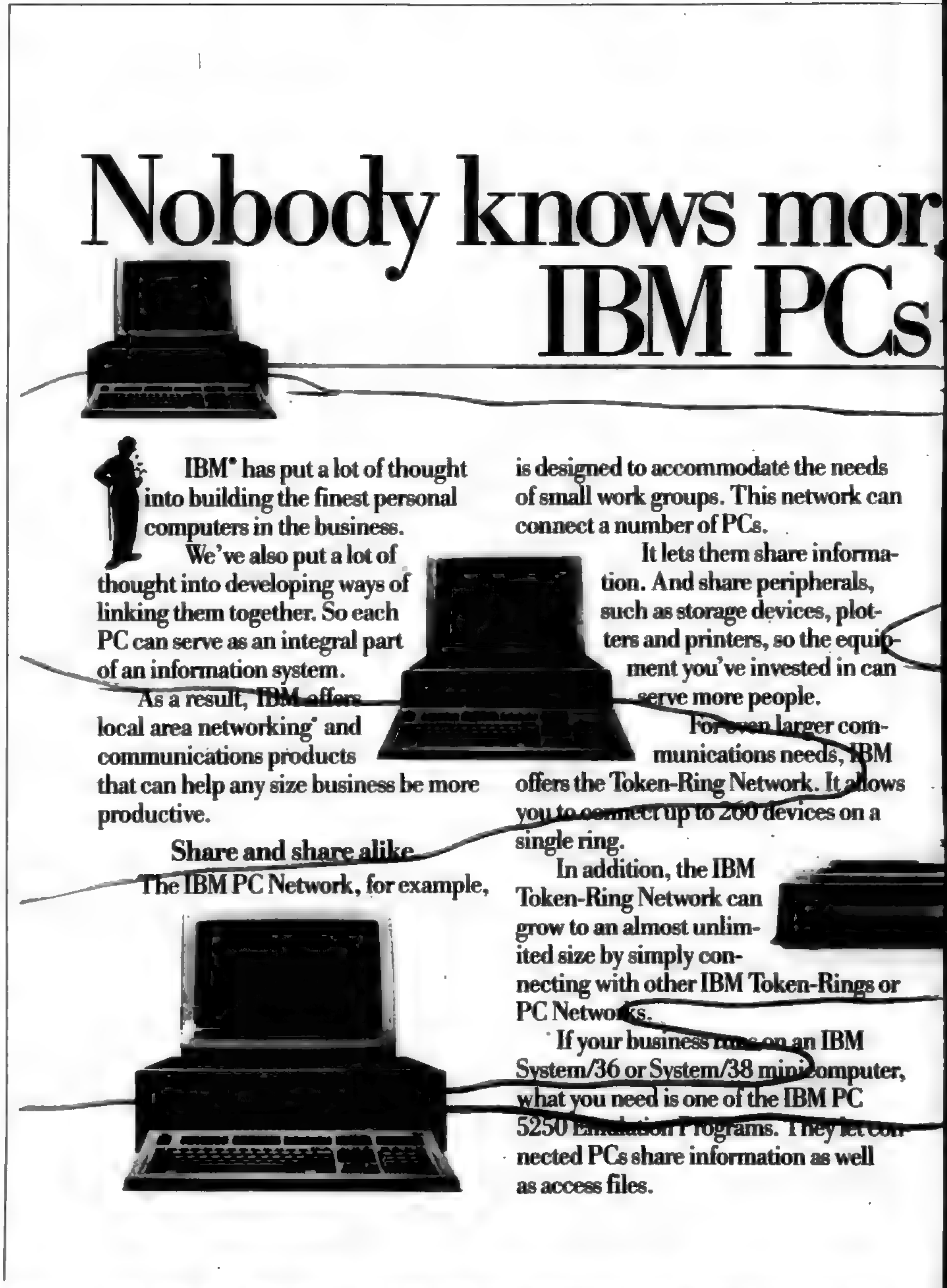
All Aboard 286 is priced at $995 with 128K bytes of memory; 4M bytes of memory cost $2,595; and 16M bytes cost $12,995.

Ideassociates, 29 Dunham Road, Billerica, Mass. 01821.

Auxiliary equipment

Renex Corp. has announced the expansion of the storage buffer of its **Datahawk** data line monitor add-on package for the IBM Personal Computer and compatibles.

The Datahawk storage buffer has been expanded from 32K bytes to 320K bytes of memory, an attribute that allows users to save and record more gathered information while monitoring dedi-



Nobody knows mor
IBM PCs

IBM* has put a lot of thought into building the finest personal computers in the business.

We've also put a lot of thought into developing ways of linking them together. So each PC can serve as an integral part of an information system.

As a result, IBM offers local area networking* and communications products that can help any size business be more productive.

Share and share alike

The IBM PC Network, for example, is designed to accommodate the needs of small work groups. This network can connect a number of PCs.

It lets them share information. And share peripherals, such as storage devices, plotters and printers, so the equipment you've invested in can serve more people.

For even larger communications needs, IBM offers the Token-Ring Network. It allows you to connect up to 260 devices on a single ring.

In addition, the IBM Token-Ring Network can grow to an almost unlimited size by simply connecting with other IBM Token-Rings or PC Networks.

If your business runs on an IBM System/36 or System/38 minicomputer, what you need is one of the IBM PC 5250 Emulation Programs. They let connected PCs share information as well as access files.

cated lines.

According to the vendor, Datahawk also features unlimited triggers, which offers users the ability to define any kind of event to set off an alarm.

Datahawk, including a range of codes, communications protocol parameters and specialized communication interface and software, is priced at $1,175.

Renex, 1513 Davis Ford Road, Woodbridge, Va. 22192.

NETWORKING

Communications controllers

Equinox Systems, Inc. has unveiled the **MDX**, a networked data private branch exchange.

The switch is said to allow keyboard-controlled port sharing and to allow micros to share printers and modems. It ties up to 16 devices into a local network.

The MDX allows terminal users to be connected to more than one computer port and to select ports from the terminal keyboard. It supports eight lines and can be expanded to 16 by adding an Equinox LM-8 Local Multiplexer. All lines can transmit asynchronously up to 19.2K bit/sec.

The eight-line MDX costs $800. The eight-line LM-8 expansion costs $700.

Equinox, 12041 S.W. 144 St., Miami, Fla. 22186.

Voice/data communications

Berkeley Speech Technologies, Inc. has announced the **Bestspeech Integrated Telecommunication System**, said to combine digital storage of human voice messages with its TTS proprietary text-to-speech conversion process.

Bestspeech systems are said to provide spoken output of computer information. The systems include the necessary hardware and software for telephone applications with Touchtone encoding and decoding.

The Bestspeech System Prototyping Package for developers runs in microcomputers and includes a digital signal processing board with jacks for telephones and speakers. The standard package costs $3,250.

Berkeley Speech Technologies, 2409 Telegraph Ave., Berkeley, Calif. 94704.

Software

SDM International, Inc. has announced **SDM/Link**, a combined System Network Architecture/Binary Synchronous Control (SNA/BSC) batch communications product.

SDM/Link is said to provide CPU-to-CPU data transfer capabilities for IBM 3000, 4300 and 9300 series systems. It can be used as a Remote Job Entry (RJE) workstation for IBM's RSCS, JES2, JES3 and Power/RJE subsystems. It can support file-to-file data transfer as either the host or terminal. Supported features include manual and autodial, leased or switched lines and space compression and expansion.

SDM/Link runs in a batch environment under any IBM DOS/VSE or MVS operating system. It costs from $5,000 to $12,000.

SDM International, 134 Spring Ave., Fuquay-Varina, N.C. 27526.

Multiplexers/Modems

Data Comm for Business, Inc. has announced the **SPL family of statistical multiplexers** featuring an on-line manual.

The multiplexers concentrate up to 14 asynchronous terminal ports over one composite communications channel. The full-duplex composite may be asynchronous or synchronous. Dial-up or leased-line modems, digital service units, synchronous multiplexers or other equipment up to 19.2K bit/sec. may be used between SPL locations. The manual is accessed through an asynchronous port.

Models are available from two to 14 ports in two-port increments. Prices range from $795 to $2,995.

Data Comm for Business, 807 Pioneer, Champaign, Ill. 61820.

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The mainframe connection.

Only one thing works harder than an IBM PC.

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To help make this important connection, IBM offers a family of IBM PC 3270 Emulation Programs.

Simply put, these programs give each PC access to your company's information resources.

With the Entry Level Emulation Program, you can conveniently "hot key" between PC and mainframe tasks.

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In a network of PCs, IBM's advanced Emulation Programs (Versions 2.0 and 3.0) enable one PC to act as a "gateway" or communications server. Bringing the power of a mainframe to many users on the network.

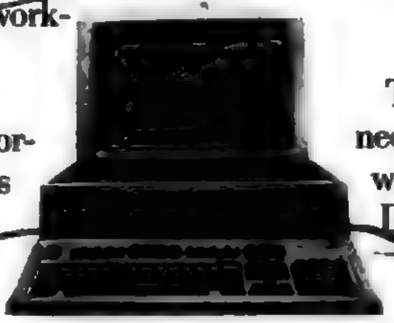
For those who need multitasking capabilities, IBM offers the IBM 3270 PC workstation. With it, you can work with up to four mainframe sessions and six PC DOS sessions concurrently.

Tying it all together.

To get started with IBM's connectivity options, just link up with an Authorized IBM PC Dealer. Or call your IBM marketing representative.

For the name of a store near you, call 1-800-447-4700.† IBM®

*IBM mainframes, together with all models of the IBM PC, IBM PC XT, IBM Personal Computer AT, and IBM 3270 PC, properly equipped and programmed, may be used with IBM networking options. © Copyright 1987 IBM Corporation. IBM is a registered trademark of International Business Machines Corporation. † In Alaska 1-800-447-0890, in Canada, 1-800-465-6600; for a Value Added Dealer, 1-800-426-8277. Little Tramp character is licensed by Bubbles Inc., s.a.



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Local-area networks

Control Data Corp. has announced its **XN line of data communications products** designed for networks with large numbers of terminals accessing multiple applications on multiple IBM host mainframes.

The XN systems are said to be able to support networks of more than 4,000 host computers and more than two million terminals. An XN communications processor supports up to 254 communications lines and more than 8,000 terminals; XN device interface subsystems are said to extend and improve IBM Virtual Telecommunications Access Method/Systems Network Architecture environments.

XN users can access multiple applications concurrently.

A typical system including hardware and software supporting 196 communications lines and two hosts costs $565,000.

Control Data, 8100 34th Ave. S., Minneapolis, Minn. 55440.

Test equipment

Standard Logic, Inc. has announced **Datamon**, an RS-232 communication analyzer, monitor and patch panel designed for real-time testing of all RS-232 networks.

The Datamon analyzer is said to allow the user to view a real-time data transfer in several different formats. It also records data to its 32K-byte buffer memory. It provides complete breakout box capability, status LED monitoring, bit/sec. rate conversion and data pattern triggering, the vendor said.

The Datamon analyzer costs $795.

Standard Logic, P.O. Box 3219, 132 Business Center Drive, Corona, Calif. 91720.

■

Tekelec has announced the **TE821C** multiplexer/demultiplexer, designed to give users multiplexing and demultiplexing capabilities to analyze T1C data and test standard T1C multiplexer/demultiplexers.

The stand-alone unit allows users to analyze T1C data from a T1C multiplexer and simulate a variety of errors to provide stress testing for a T1C demultiplexer. It also offers B8ZS capabilities for T1C testing. The B8ZS option is said to increase the quality of T1C testing by inserting a special transmission code to assure reliable clock recovery.

The TE821C is priced at $4,250. The B8ZS option costs $1,750.

Tekelec, 26540 Agoura Road, Calabasas, Calif. 91302.

SYSTEMS & PERIPHERALS

Printers/Plotters

Greyhawk Systems, Inc. has introduced three user options, **Cadam Red Line**, **Plot Utility** and **Plot Storage**, said to make its Softplot 2122 paperless plotter interactive.

The Red Line option is said to permit the user to make annotations and store them within the data base.

The Plot Storage option is said to allow drawings to be stacked locally for review. The Plot Utility option is said to allow images to be panned or zoomed.

The Cadam Red Line option costs $8,000. The Plot Utility package costs $1,850, and the Plot Storage package option costs $3,200 for 2M bytes and $5,000 for 4M bytes. The Softplot 2122 costs from $39,750.

Greyhawk Systems, 1557 Centre Pointe Drive, Milpitas, Calif. 95035.

■

Rutishauser of America, Inc. has announced the **Paperpro 88 series** of cut-sheet feeders for dot matrix and daisywheel printers.

The printers feature third-bin envelope or multipart form-feed capability; reverse feeds up to 65 lines for columnar or graphics printing; support for a full range of paper sizes in portrait or landscape format from any bin; and forward or reverse order collation of output.

The Paperpro 88 paper supply bins have a 150-sheet capacity. They are priced from $45.

Rutishauser of America, 10345 Brockwood Road, Dallas, Texas 75238.

■

Lexi Computer Systems Corp. has announced its **1087 Compact Laser Printer** with bar-code capabilities.

The printer features IBM Coaxial A plug compatibility. It also features more than 50 resident fonts. It is said to generate 300 dot/in. print resolution and offers a 250-sheet manual-feed paper cassette; a paper output capacity of 15 sheets, face down; toner yield of 3,000 sheets; drum yield of 10,000 sheets; and developer yield of 50,000 sheets.

The Lexi 1087 costs $5,690.

Lexi Computer Systems, Suite 1D, 231 Sutton St., North Andover, Mass. 01845.

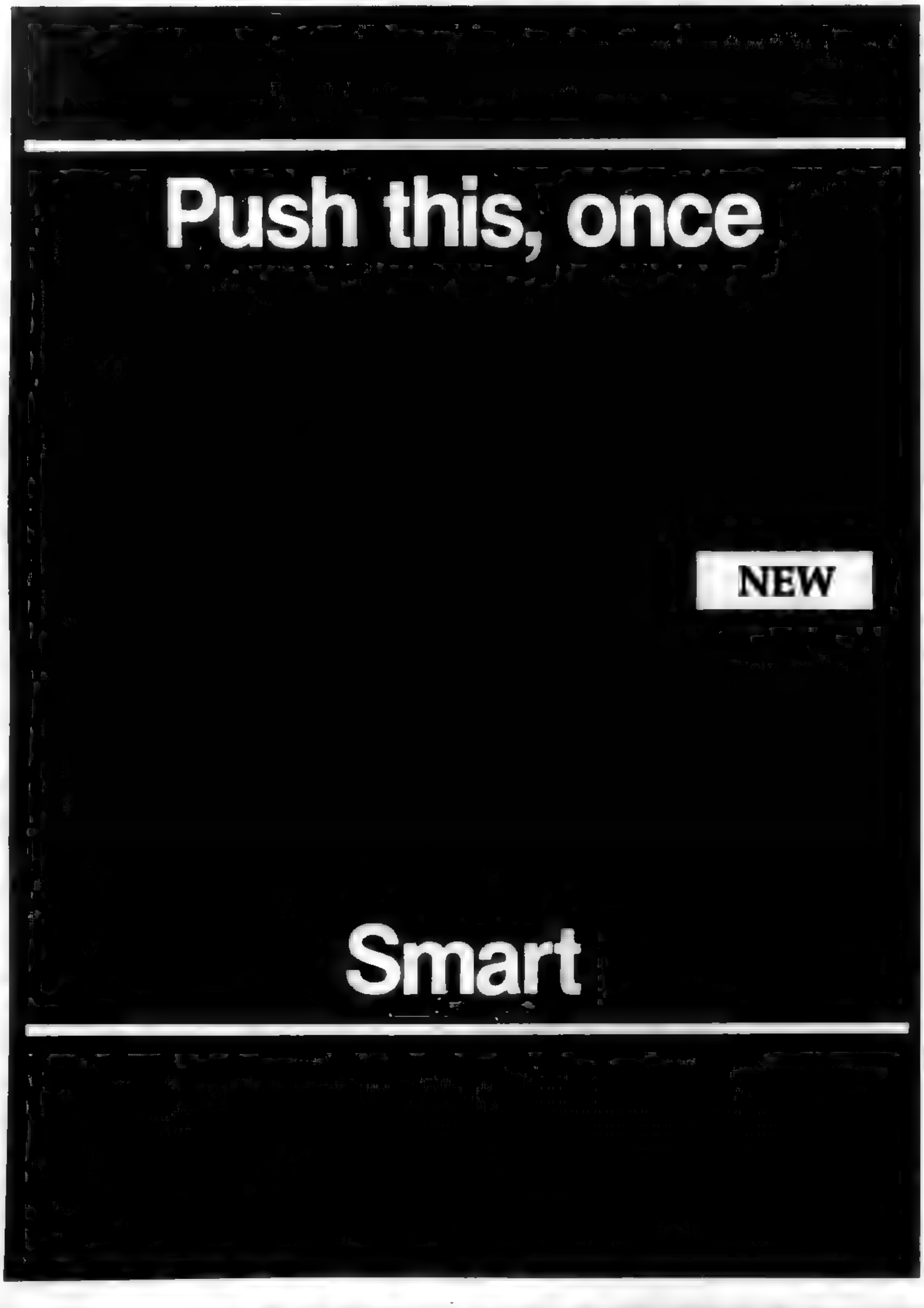
Data storage

California Peripherals Corp. has introduced the **Model CP-240** ½-in. cartridge streaming tape drive.

The Model CP-240 is said to use the IBM 3480 cartridge or equivalent to provide 240M bytes of formatted storage. It has an enhanced small device interface-level interface and offers an optional small computer systems interface-intelligent interface. Data transfer rate is 250K bit/sec. at a tape speed of 2.0 meter/sec.

The Model CP-240 costs $1,950.

California Peripherals, 19701 S. Vermont Ave., Torrance, Calif. 90502.



COMPUTER INDUSTRY

Section begins on page 94

Ultimate attributes success to serendipitous business acumen

Pick systems vendor finds lucrative mart

By Alan Alper

EAST HANOVER, N.J. — Serendipity can be just as important as business acumen in getting a fledgling computer company into high gear. Theodore Sabarese, founder and chairman of 8-year-old The Ultimate Corp., a vendor of Pick-based systems, can attest to that.

Being in the right place at the right time has enabled Ultimate to offer systems running its enhanced version of Pick on the hottest hardware around. Ultimate began as a vendor of Pick systems based on Honeywell, Inc. minis and now offers Pick on Digital Equipment Corp.'s large-scale integration and VAX computers and IBM 4300 processors.

Using a worldwide group of value-added resellers, Ultimate has grown from $260,000 in revenue in 1979 to $140 million in the fiscal year that ended last April. Earnings have risen from almost zero in 1979 to $14.4 million in fiscal 1986.

Ultimate's arrangement to sell Pick-based systems on DEC's entire family of VAX systems, from the Microvax on up, has turned out to be a blessing. The firm's involvement in the VAX market comes at a time when demand for the DEC processors has never been higher.

Sabarese's serendipity has early roots. As a leading dealer during the late 1970s of Pick-based systems built by the then-struggling Microdata, Inc., Sabarese figured there had to be a better way to promote the little-known operating system.

Ultimate's Sabarese

He and another Microdata dealer got together and, with the blessing of the Pick operating system's author, Dick Pick, started Ultimate on a couple of thousand dollars and a prayer. Sabarese then struck a deal to sell Pick-based Honeywell minis, and Ultimate has never looked back.

At the time, Pick was the province of a fanatical few who worshipped the decade-old operating system's portability, ease of use and strong data base management capabilities. Today, there are almost 70,000 Pick-based systems installed worldwide, according to Infocorp, a Cupertino, Calif., market research firm. Ultimate has risen through the ranks to become the No. 3 supplier of Pick-based systems, according to Infocorp.

Although Pick still suffers somewhat from a lack of recognition within the data processing community, some industry analysts feel the operating system is now regarded as a viable alternative to Unix in multiuser and multitasking applications.

"There is significantly more acceptance of Pick than people give the operating system credit for," Sabarese suggests. "Six of our dealers were recently acquired by major corporations — firms like Continental Insurance, Security Pacific Bank, Automatic Data Processing, Inc. and American Hospital Corp. That's a pat on the back for Pick."

Although Ultimate is Honeywell's largest OEM customer, the control of Honeywell's computer business by France's Compagnie des Machines Bull and Japan's NEC Corp. should not hurt Ultimate's business prospects, Sabarese predicts. Bull has sold and serviced Ultimate's machines in France for some time, and Jacques Stern, the French firm's chairman, is a "Pickee," Sabarese says.

"Before, we were a significant customer of a large company that did many other things besides sell computers," according to Sabarese. "Now, we'll be a large customer of a larger company that is only involved in computers."

In the IBM world, Ultimate's good fortune continued in 1986. By acquiring rights to market Pick-based systems on the IBM 4300 from Systems Management, Inc., a Chicago dealer, Ultimate also received rights to the IBM 9370, Big Blue's new family of mid-range processors.

"We think [the 9370] is going to be an instant winner for IBM and tremendous business for us," Sabarese declares. "The machine costs more and offers less performance than our other products in that class, but people will want it because IBM has never had a product in that vertical market before."

Product and market expansion for publicly held Ultimate, however, have not come without some roadblocks. Ultimate was hit with lawsuits last summer by shareholders who claimed the firm, after completing a secondary stock offering, did not provide warning that earnings for its first fiscal quarter would be lower than expected.

Sabarese concedes the earnings and revenue shortfall occurred because Ultimate tried to do too much at once. "I think the lawsuits will sit dormant for two years," he speculates. "I'm confident that there was no fraud committed, and as the year unfolds and we reach our goals, all will be forgotten."

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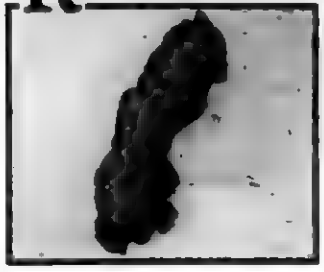

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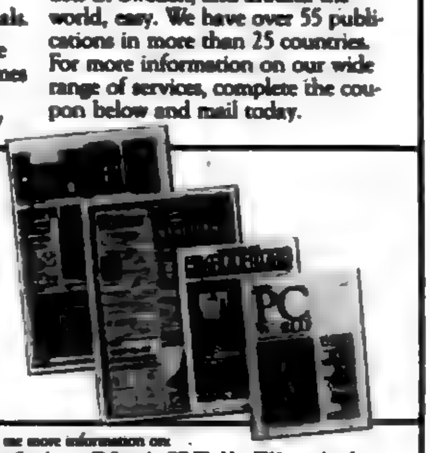

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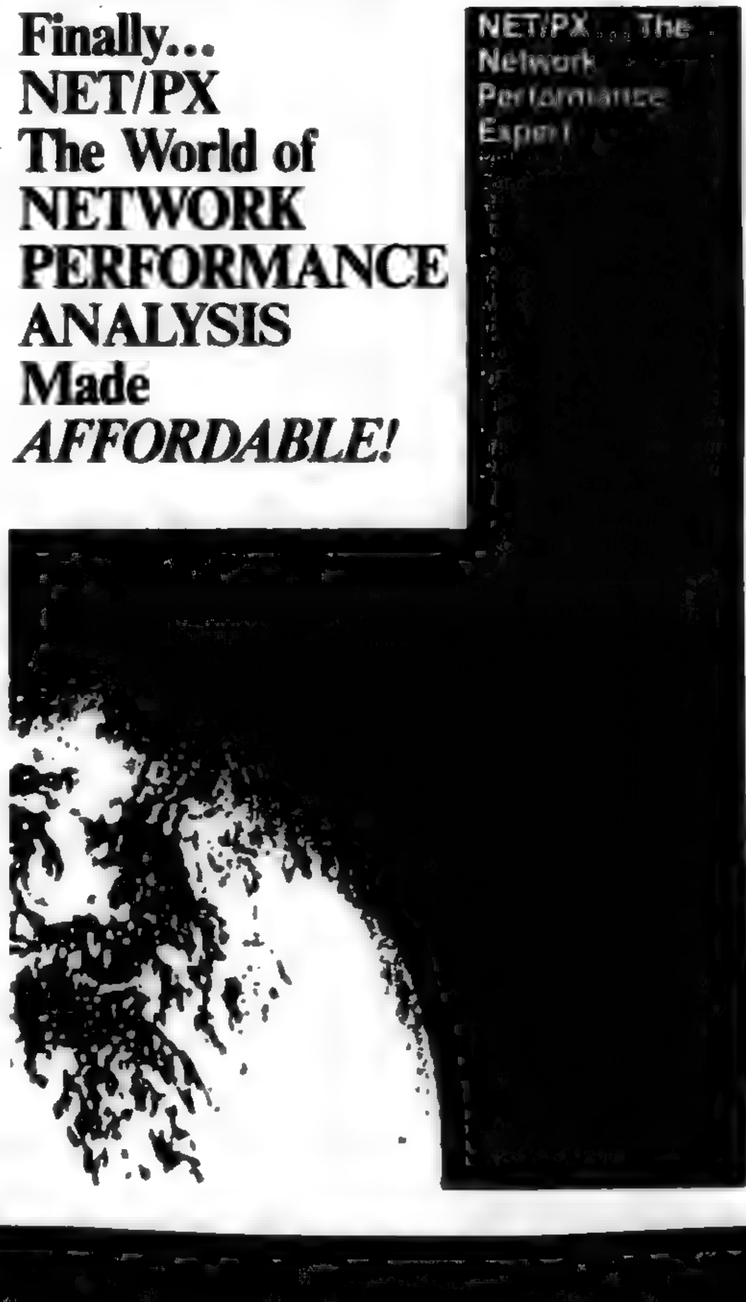
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TI settles two lawsuits on RAM chips

By James A. Martin

DALLAS — Texas Instruments, Inc. has reached settlements with Japan's Fujitsu Ltd. and Sharp Electronics Corp. regarding patent infringement lawsuits filed by TI to protect its dynamic random-access memory (RAM) semiconductor technology.

Under the agreements, TI will license its dynamic RAM patents to the two companies in exchange for significant royalty payments to be paid until the licenses expire in late 1990. In addition, TI will receive per-unit royalties based on the use of its dynamic RAM patents. The company did not disclose the amount of the royalties.

TI filed patent infringement suits against Fujitsu, Sharp and seven other Japanese and South Korean chip manufacturers in January 1986, claiming the firms were using TI semiconductor technology for their own products. The suits also claimed the chips made from TI technology were sold in the U.S. without licenses.

Intellectual property

The settlements were seen as important to the semiconductor industry in its battle to establish products as intellectual property. "The settlements also establish the fact that there is, after all, some validity to patent protection," said Edward C. White Jr., an analyst with E. F. Hutton & Co.

The greatest significance, however, is for TI. Such royalties could have meant an extra $27 million in pretax income for TI in 1986, said Michael Gumport, an analyst with Drexel Burnham Lambert, Inc.

"In general, these settlements should slightly increase dynamic RAM prices, slightly reduce Japanese competitiveness and significantly increase TI's competitiveness," Gumport said.

Still pending are TI's patent infringement suits against Hitachi Ltd., Oki Electric Industry Co., Mitsubishi Electric Corp., Matsushita Electric Industrial Co., NEC Corp. and Toshiba Corp. in Japan and South Korea's Samsung Co.

Last February, TI filed a related complaint with the International Trade Commission (ITC), requesting a U.S. ban on dynamic RAM chips that infringed on TI patents. Fujitsu and Sharp, according to the settlement, have been dropped from that request.

The ITC investigation into the remaining seven companies will continue.

MSA to report higher sales, lower expenses

By James A. Martin

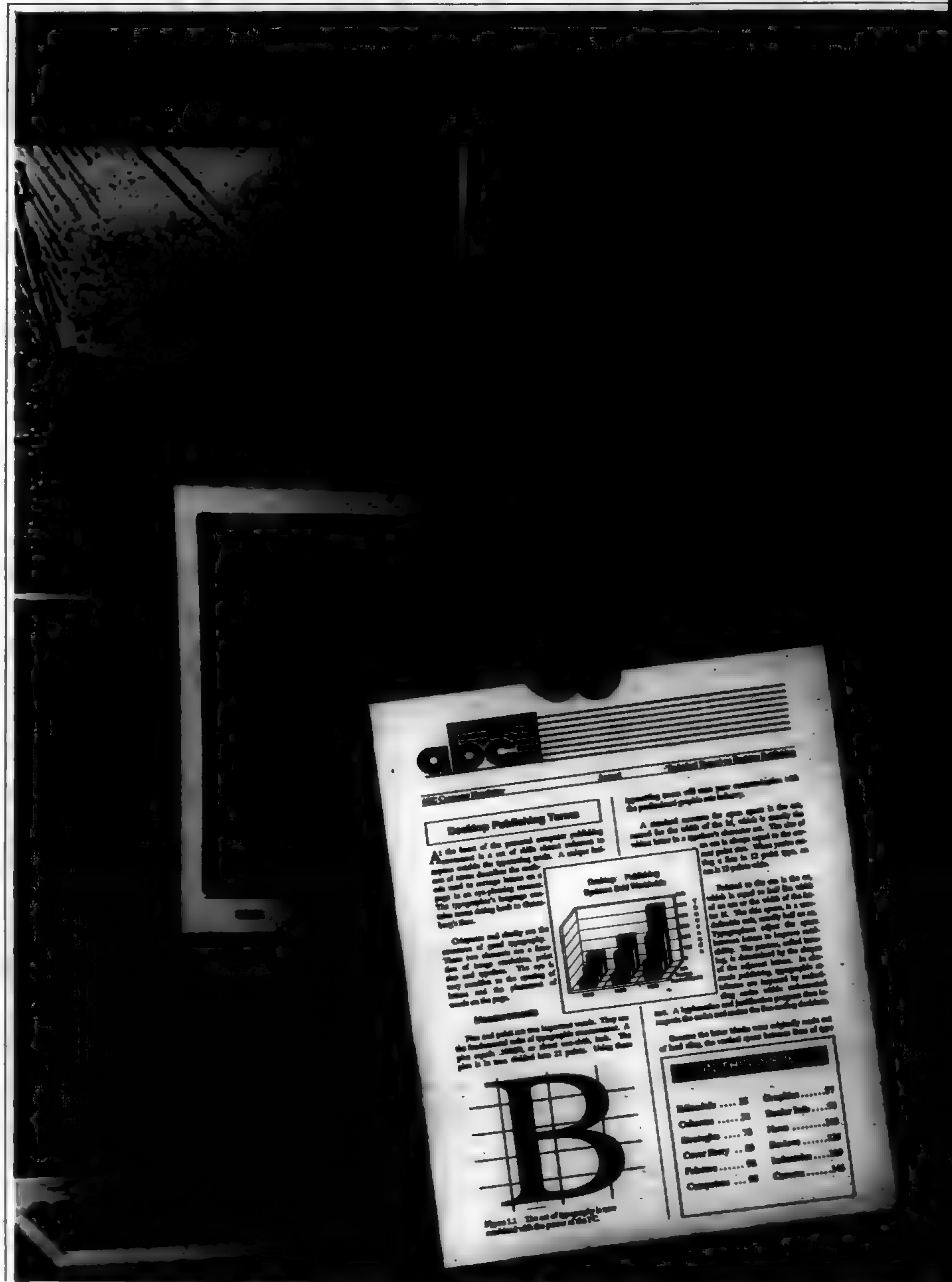
ATLANTA — Management Science America, Inc. (MSA) estimated last week that it will report revenue growth of approximately 25% for 1986.

MSA said profits increased roughly 160% from the firm's relatively sluggish performance in 1985.

The mainframe applications vendor said 1986 operating revenue was between $190 million and $193 million, compared with $151.7 million in 1985. Net income is expected to have been about $18 million, or $1.00 to $1.03 per share, compared with $6.9 million, or 39 cents per share, during the previous year.

Preliminary figures show MSA's sales were higher and its expenses lower than anticipated, according to Mark Finley, an analyst with Gartner Group, Inc. in Stamford, Conn. "There's no big turnaround here, but it looks to be a little better than what most people thought," he said. The increase in profits is most likely a result of cost reductions rather than results from MSA acquisitions in 1986, he added.

MSA's expansion of its customer base and sales force are the primary reasons behind its healthy fiscal year, said Scott Smith, analyst and vice-president of Donaldson, Lufkin and Jenrette, a New York brokerage firm. MSA is expected to report final results in early February.



AT&T to become Southwestern Bell's ISDN customer

In-house switch to allow flexibility

By Elisabeth Horwitt

ST. LOUIS — AT&T signed a four-year contract recently to become the third commercial Integrated Services Digital Network (ISDN) customer of divested Bell operating company Southwestern Bell Telephone Co.

Under the agreement, Southwestern Bell will provide ISDN capability for 2,300 access lines at AT&T's southwest regional headquarters in the St. Louis suburb of Ballwin, Mo. The lines will support digital data, voice and video transmissions within the 400,000 sq-ft facility through a connection to Southwestern Bell's ISDN central office switch in St. Louis.

Switching to ISDN telephone line-based connections from in-house coaxial cable should allow AT&T more flexibility in adding transmission capacity. "This will result in an anticipated savings of $1 million just in time and expense involved in moving data terminals," said Douglas K. Jacobs, regional vice-president for AT&T in St. Louis.

Southwestern Bell said it is involved with AT&T, as well as with Northern Telecom, Inc. and Bell Communications Research Corp., in a technical ISDN trial in St. Louis.

AT&T is Southwestern Bell's third commercial ISDN customer. Last November, Southwestern Bell announced ISDN commitments from Shell Oil Co. and Tenneco, Inc., both in Houston.

Other ISDN contracts are being negotiated within Southwestern Bell Corp.'s five-state area, the company said.

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Ashton-Tate to focus on inside growth

By Alan Alper

NEW YORK — Ashton-Tate expects its growth in 1987 to come primarily from internally developed products, as opposed to acquired software, Chairman Edward M. Esber Jr. told a recent meeting of security analysts.

Regarding acquisitions, Esber said the firm is interested in companies that would extend Ashton-Tate's product portfolio into uncharted areas. "We would be interested in new software categories or technology and the right mainframe or mini data base software company if it came along," he said.

Esber remains convinced that Ashton-Tate's microcomputer approach to data base management will persevere in contrast to competing products and mainframe and mini methods. Ashton-Tate has shipped 1.1 million units of its Dbase family, a figure that Esber said is more than double mainframe or mini data base management system shipments. "There appears to be a high resistance to change among data base users," he suggested.

With the flagship Dbase family expected to remain strong and with a data base product for the Apple Computer, Inc. Macintosh expected to ship in the next quarter, analysts predict Ashton-Tate will continue to perform well. For the nine months ended Oct. 31, net income was up 89% to $19.5 million on a revenue increase of 85%, to $147.9 million.

Esber said he is convinced that IBM Personal Computers and Apple Macintoshes will have to coexist in the work groups that make up departmental computing. As part of its "synergistic cooperation with Apple," Ashton-Tate has pledged to provide software to enable PCs and Macintoshes to trade files, he observed.

"I expect 1987 to be a good year," Esber said. "We will grow at the same rate as the software business."

Silicon Graphics, Convex ally in joint marketing, development pact

By James Connolly

RICHARDSON, Texas — Convex Computer Corp. and Silicon Graphics, Inc. last week joined forces in an attack on the high-performance, three-dimensional graphics market by signing a joint development and cooperative marketing agreement.

Under the agreement, the companies hope to combine Silicon Graphics' strength in interactive three-dimensional graphics workstations with Convex's near-supercomputer technology. The companies will cooperate in software development and marketing efforts, including joint sales calls and promotion.

The companies will pair Silicon Graphics' Iris Superworkstation with Convex's C1 series of near-supercomputers, which use a technology based on the Cray Research, Inc. supercomputer architecture.

The alliance will target applications such as computational fluid dynamics, mechanical engineering and molecular modeling applications.

"This cooperative effort between Convex and Silicon Graphics makes possible the computation and visualization of large simulations at an accessible price," said Steve Wallach, vice-president of technology for Convex.

Sprint joins EDS in job bid

To vie with AT&T, MCI for GSA contract

By Mitch Betts

WASHINGTON, D.C. — Industry competition for the federal government's coveted $4.5 billion telecommunications contract received a new entry recently when U.S. Sprint Communications Co. announced it will team up with Electronic Data Systems Corp. (EDS) to bid for the so-called Federal Telecommunications System (FTS) 2000 contract.

Officials said the team combines the systems integration and software experience of Dallas-based EDS with the all-digital, fiber-optic network of U.S. Sprint. They will be competing against two other teams, one that pairs AT&T and Boeing Computer Services Co. and another that includes Martin Marietta Corp. and MCI Communications Corp. (CW, Dec. 15).

The General Services Administration (GSA) on Jan. 7 released the final bid request document for the FTS 2000 long-distance network. Bids will be made in June, and the 10-year contract will be awarded by the end of 1987.

The GSA is seeking a digital, software-defined network for voice and data traffic. Those specifications fit well with U.S. Sprint's virtual private network offering, according to U.S. Sprint officials.

U.S. Sprint officials also said that the FTS 2000 network is similar to the private digital network that EDS is implementing for its parent company, General Motors Corp.

National Semi to close POS plant

By Clinton Wilder

SANTA CLARA, Calif. — Still showing the effects of the long-depressed U.S. chip industry, National Semiconductor Corp. will close a point-of-sale terminal manufacturing plant and take a one-time charge of $15 million.

National Semiconductor will shut its Maynard, Mass., Datachecker production facility, transferring its production to Datachecker plants in Santa Clara, Calif., and Hong Kong. The company will lay off 250 employees.

The associated charge, to be taken in the firm's third fiscal quarter, which ends March 8, virtually assures the firm another quarter in the red. Although National Semiconductor earned a small profit from operations in the last two quarters, it reported net losses of $1.4 million and $5.7 million in the first and second quarters, respectively.

SAS acquires compiler firm

By James A. Martin

CARY, N.C. — SAS Institute, Inc. announced it has acquired Lattice, Inc., the developer of a highly regarded C language compiler, for an undisclosed amount.

The affiliation between SAS, an IBM mainframe software vendor, and Lattice dates to 1984 when SAS began marketing the Lattice C compiler for IBM mainframes and developing SAS software programs with the C language.

Although this is the first such merger for SAS, President James Goodnight does not see acquisition as a new corporate growth plan. "We will consider acquisitions, though, when they make sense, when there is a logical and strategic fit with our goals," he said.

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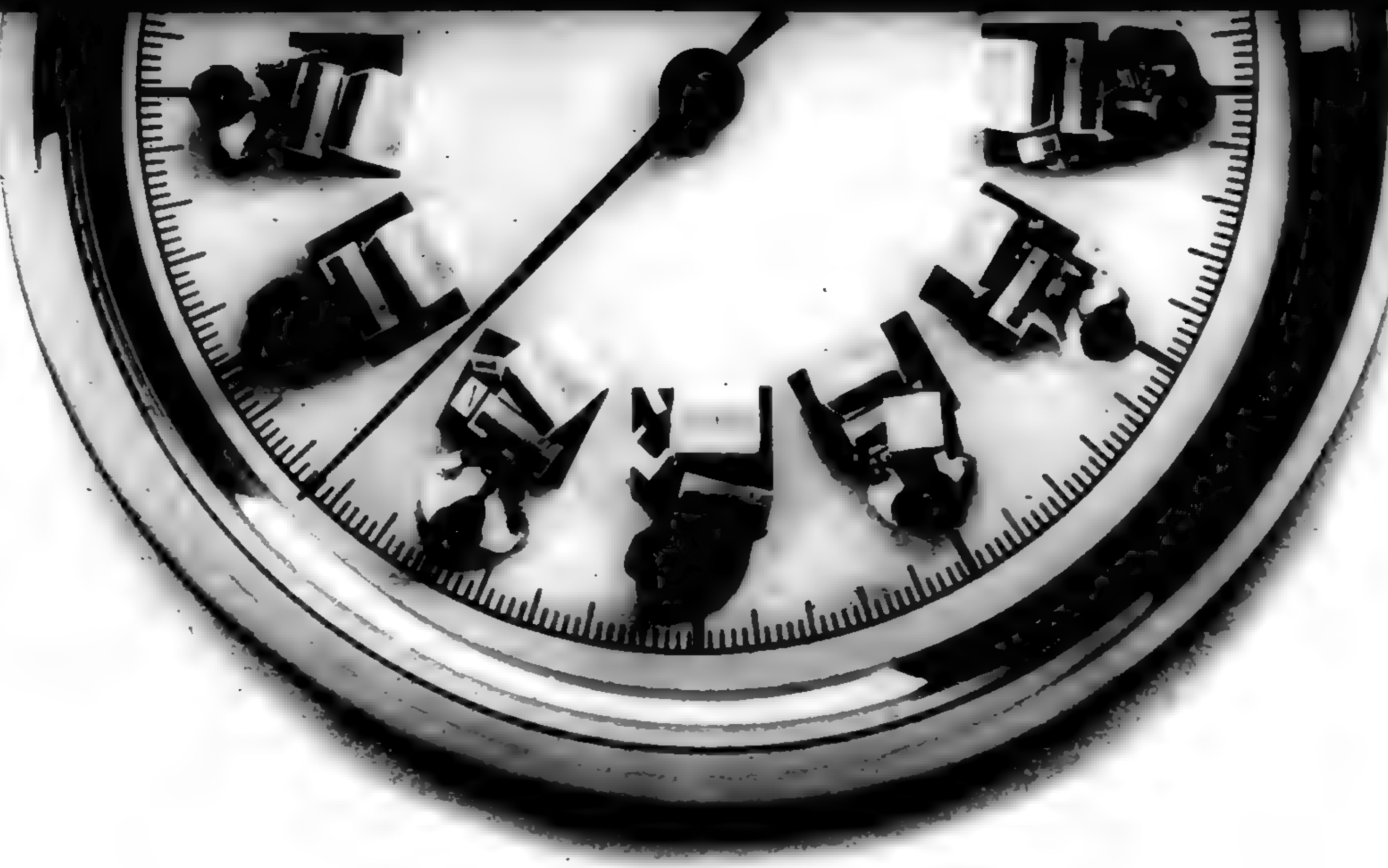

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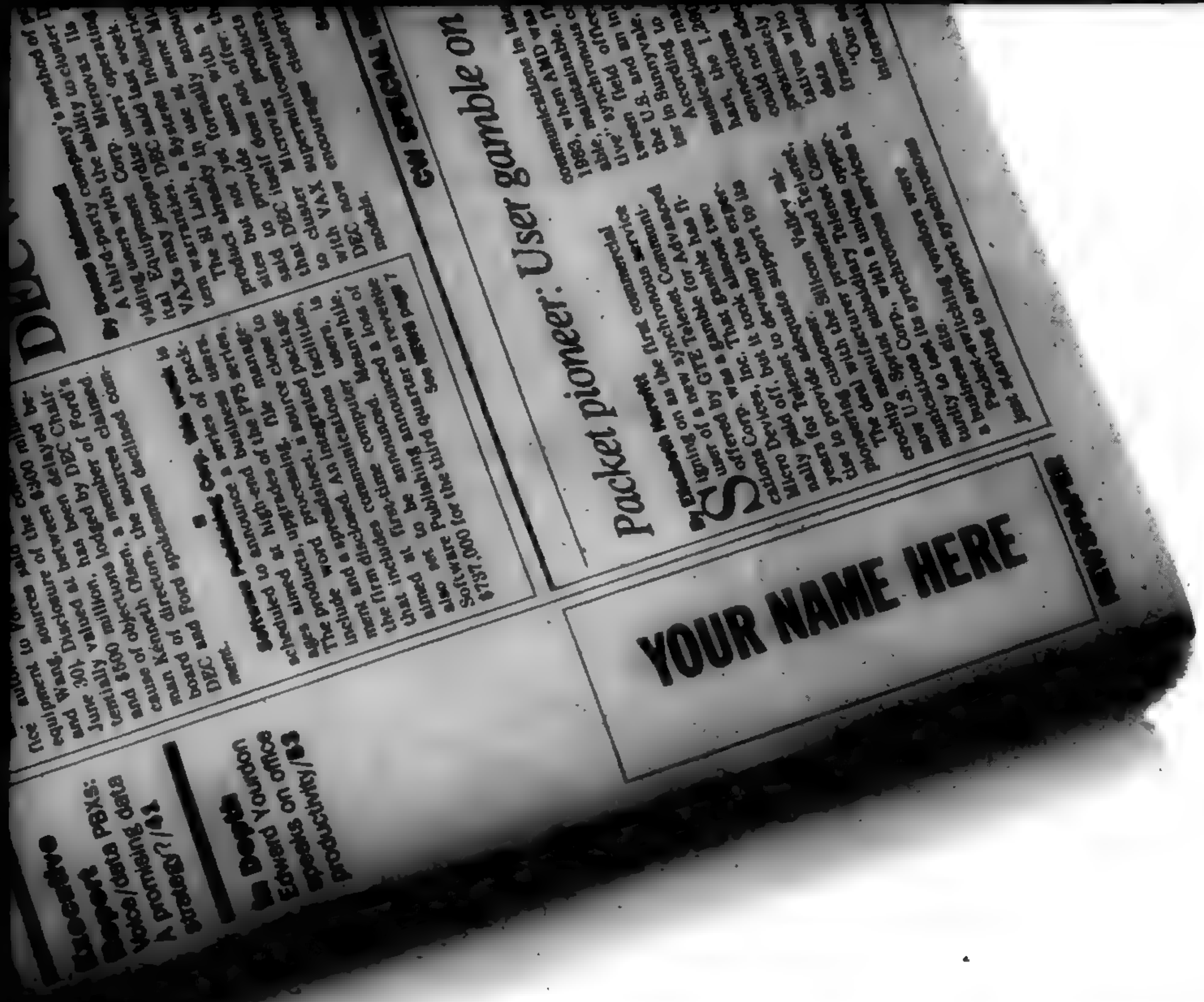
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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Banking software is heating up

From page 94

nesses by gobbling up acquisitions, EDS hopes to be ready with a system that can integrate the multiple data bases of such financial miniconglomerates.

Norwest and Bank One, like Security Pacific Information Services in Los Angeles, Dallas-based MCorp, Wachovia Corp. in Winston-Salem, N.C., and others, are seeking to establish themselves as providers of computer products and services as well as banking services.

Also in this category is the Texas Commerce Information Systems unit of Houston-based Texas Commerce Bancshares, Inc., which last fall inked an unusual agreement with small software vendor BKW Systems, Inc. in Nashua, N.H.

Formidable competitor

Texas Commerce will distribute and support BKW's bank software running on Wang Laboratories, Inc. systems and also develop an IBM 4300 version of the programs. The interesting twist to this deal is that BKW Systems is currently operating under Chapter 11 bankruptcy protection.

According to San Francisco-based Hambrecht & Quist, Inc. analyst Osman Eralp, who specializes in banking software, the EDS-Bank One-Norwest venture will not produce a deliverable system "for at least two years and possibly much longer." But when it does — having presumably picked up a few more major banks as partners in the interim — it could prove a formidable competitor for IBM/Hogan and certainly for the Anacomps and Uccels of the world.

"We believe that IBM and EDS eventually have to win," Eralp concludes, "probably at the expense of the others in varying degrees."

After a slow start, IBM now appears to be fully geared up to hawk the Hogan products, much to the consternation of ADAPSO, whose Bernard Goldstein called on Big Blue to cease and desist at the software vendor's association anniversary bash in Phoenix last fall.

Goldstein was particularly concerned about IBM buying the souls of vendors in other vertical markets. Given all of IBM's hardware revenue trends and its celebrated lack of success in applications software, it seems inevitable that Goldstein's fears will be borne out.

But it is telling that Big Blue chose high-end banking software for its first major foray with another vendor's products. The overall economic health of the banking sector and the formation of much larger regional banks offering a full coterie of financial services should combine to create a heavy, long-term demand for sophisticated software that can handle banking chores.

IBM and EDS certainly think so, and the banks themselves, like Bank One and Norwest, will continue to seek their own pieces of change from that growing information services dollar. With the presence of two of the computer industry's largest players both aligned with unconventional partners, the banking software market bears close watching.

5¢ 10¢ NICKELS AND DIMES

Digital Communications Associates, Inc. announced revenue for the second quarter ended Dec. 31 of $46.1 million, compared with $38.9 million a year earlier. Profits were $8.7 million, or 58 cents per share, up 124% from $3.9 million, or 31 cents per share, reported a year earlier.

■

Tandon Corp. reported revenue for the year ended Sept. 28 of $214.1 million, compared with $268.8 million in the previous year. Net loss for the year was $62.8 million, or $1.24 per share, compared with a loss of $135.4 million, or $2.66 per share, during the previous year.

For the fourth quarter, revenue was $56.4 million, compared with $54.7 million in the year-ago quarter. Net loss was $45.3 million, or 89 cents per share, compared with $85.1 million, or $1.67 per share, in the corresponding period one year earlier.

■

On-Line Software International, Inc. reported net income for the second quarter ended Nov. 30 of $1 million, or 25 cents per share, compared with $578,000, or 15 cents per share, a year earlier. Revenue for the quarter was $12.7 million, compared with $8.6 million for the year-ago period.

■

Kaypro Corp. announced revenue for the quarter ended Nov. 28 of $30 million, a 113% increase from revenue of $14.1 million in the comparable period last year. Net income was $1.3 million, or four cents per share, including an extraordinary income-tax carryforward credit of $515,000, or one cent per share. This compares with a net loss of $2.5 million, or seven cents per share, the previous year.

■

Adobe Systems, Inc. announced revenue for the fourth quarter ended Nov. 30 of $5.2 million, compared with $2 million in the year-ago period. Profits were $1 million, or 19 cents per share, compared with $486,000, or 11 cents per share, in the like quarter a year earlier.

For the year, revenue was $16.1 million, compared with $4.6 million in the previous year. Profits were $3.6 million, or 76 cents per share, compared with $496,000, or 11 cents per share, the previous year.

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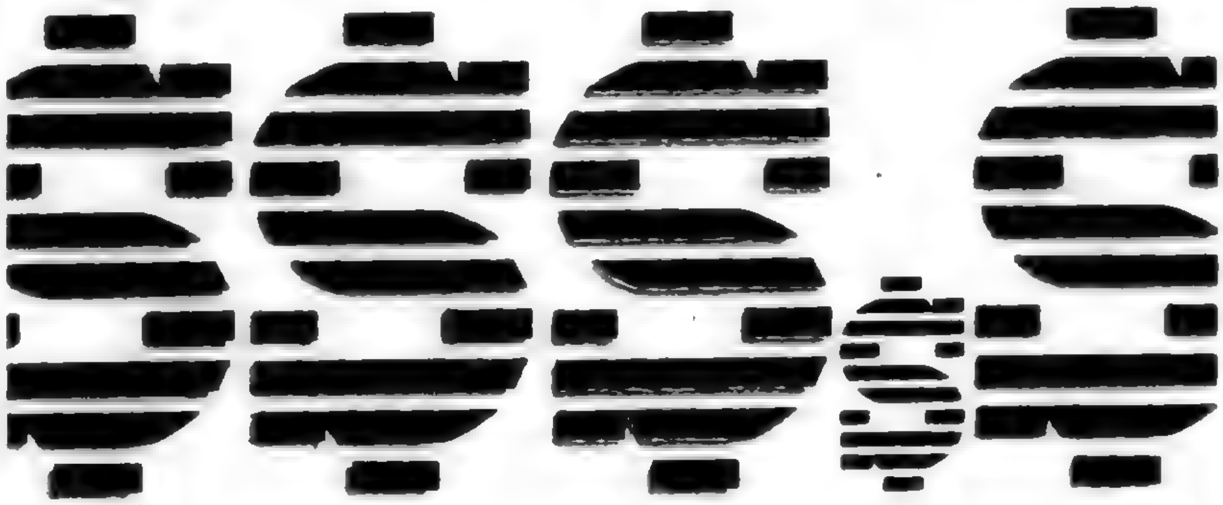

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It's Monday morning. Your

8:30 A.M. • TOKYO, JAPAN

IDG's International Data Corporation managing director **Yugi Ogino** is stopped in his tracks by a flash report on the company's International News Service. *Digital News* has just spotted a potential challenge to IBM's grip on the professional PC market: DEC has announced their Local Area VAX Cluster. Ogino sets up a conference call with *Computerworld Japan* editors to brief them on his analysis.

8:40 A.M. • SYDNEY, AUSTRALIA

At almost the same moment 4,300 miles to the south, *Computerworld Australia* publisher **Susan Coleman** sees the DEC story on her news wire. She calls in **Peter Scott**, her editor, to plan editorial coverage for their market.

11:00 A.M. • HELSINKI, FINLAND

Halfway around the world, **Timo Tolsa**, editor of IDG's Finnish computer newspaper *Tietoviikko Ky*, faxes his comments on the pending story to **Dieter Echbauer**, editor of *Computerwoche* in Germany, who appoints an editorial team to file a comprehensive story for use by all five IDG publications in Germany.

10:10 A.M. • BUENOS AIRES, ARGENTINA

Ruben Argento, the head of IDG's *Computerworld* newspaper in Argentina uncovers a new wrinkle in the rapidly unfolding story–and alerts Doane Perry, senior market consultant at IDC in Framingham, Massachusetts: a DEC competitor in South America is developing a similar cluster product.

world just changed again.

10:30 A.M. • BOSTON, MASSACHUSETTS

IDG reporter **Kathryn Esplin** files a VAX Cluster story for *Digital News*. Her back-up analysis is sent to all publication offices around the world on the company's news wire.

2:00 P.M. • FRAMINGHAM, MASSAC TS

Perry meets with **Bill Ford**, IDC Information Industry Services Chief, to plan a global research report on computer clusters and their potential impact on business users.

4:45 P.M. • PALO ALTO, CALIFORNIA

IDC Research Director **Jean Yates** faxes detailed schedules of the report requirements to IDC research centers in 16 other countries. Deadline: 1 week. Overnight mail announcements of the pending report are mailed to IDC's top 1,000 customers around the world.

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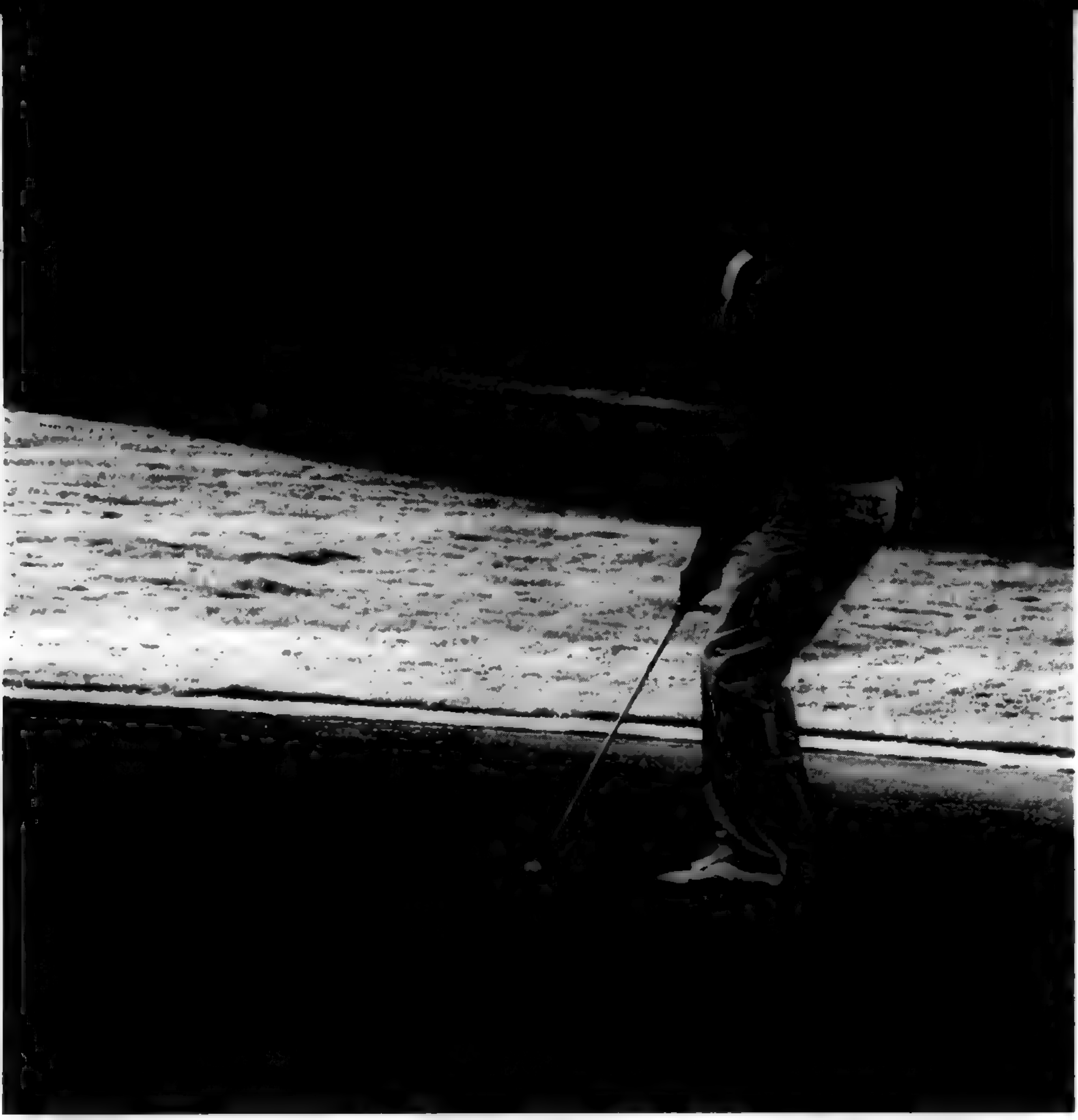

Bob Ashworth
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In his spare time, Bob's an avid golfer, a snow skier, water skier and a jogger.

As you can see, Bob's schedule is full. But if you want to reach him, there's one surefire way.

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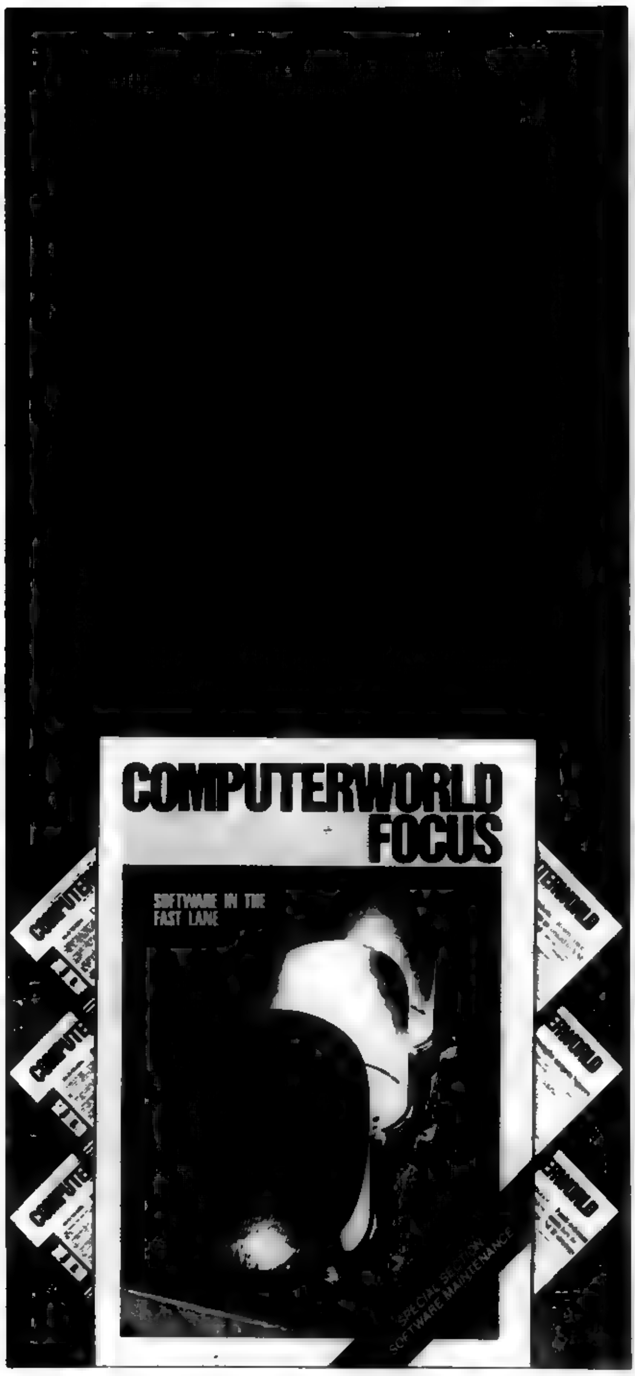
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data processing

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The Board of Governors Cooperative Computer Center is a regional data center providing computer services to three Chicago area state universities with an enrollment of approximately 22,000 students. Our current environment includes distributed processing with an IBM 4381 mainframe. Online software includes MVS, CICS, database (DATACOM), software packages include McCormack & Dodge Payroll System and Information Associates Business Systems.

Assistant Director for an Applications Group

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Karen D. Schneider, Personnel Director
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Equal Opportunity Employer M/F AA

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ADVERTISERS INDEX

Adobe Systems 18
Artificial Intelligence Corp. 43
AT&T Information Systems 42,S 4-5

BASF 29
Bell Atlantic 72
Bendata 31
BI Moyle Associates 25
Bridge Communications 20

Chicago Soft 28
Chipcom 52
Codex 19
Communication Networks '87 58
Computer Associates 40
Computer Corp of America 24
Computer Technology Group 46
Concurrent Computer 55
Cullinet 9
CW Circulation 74
CW Corporate 76-77,90
CW Product Spotlight .... S Cover 2
CW Testimonial 78
CWIMS Landgrant .... S 6
CWIMS Sweden 69

Data General Corp. 26-27
Datasphere 6
Develcon 51

Esprit .... S Cover 4
Exide Electronics 95

Federal Communications Corp. 62
Fujitsu America 50

GE/RCA 39

Hewlett-Packard 22-23
Hughes Aircraft 34

IBM 30-35,47,66-67
Informix 56-57
Inmac 13

Innovation Data Processing 5
Integral Systems 53
Interface Group 21,35,38
Infrastructures 14

JDS MicroProcessing 63

MicroFrame 10
Mitron 28
MK Technology 67
MSA 96

Northern Telecom 64-65

On-Line Software 44-45,73
Oracle 11,33

Performix 69

Realia Inc. 54
Relational Technology 36

SAS Institute 32,37
Software AG 48-49
Software Quality Engineering 12
Software Technology & Research (STAR) 12
Spectrum Technology 8
Syncsort 3
Systems International 10
Systems Technology & Research 63

Telex .... S Cover3
Televideo .... S 3

Ungermann-Bass 60-61
Unilease 75
Universal Data Systems 68
USR/Group 62

VM Software 7

Westinghouse 15
Wyse Technology .... S 12-13

Xerox 70-71

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Users searching for alternatives to dead-end 8100 machines

By Jean S. Bozman

IBM's installed base of 8100 users has embarked on an urgent search for alternatives to the aging machine, a system that IBM said last year it will not enhance.

A recent survey indicates 60% of 8100 users plan to migrate — or are currently migrating — away from the 8-year-old product line. The survey, conducted by Dallas-based consulting firm B. R. Blackmarr and Associates, Inc., polled 25% of all domestic 8100 sites last summer — including about 2,000 machines.

In 1985, there were about 15,000 IBM 8100s in the world, approximately 8,000 of them in the U.S., according to industry estimates.

The survey indicates that 37% of users running 8100s with the DPCX operating system are actively moving to another product, but only 18% of the DPPX operating system users said they are currently migrating.

But 31% of DPPX users said they were planning to migrate, as were 23% of DPCX users.

Less than 25% of all DPCX users and less than 33% of all DPPX users said they were unconcerned about migration (see chart at right).

Some users questioned by *Computerworld* said they view the 8100 dilemma as an opportunity to move away from what they believe is an ungainly combination of communications controller and office workhorse.

"I got rid of the 8100s as soon as I could," said one Midwestern MIS manager. "We spent a lot of time customizing the applications, and it never really delivered on our manufacturing application."

A report based on the survey will not be published until March, but some conclusions can be drawn already, according to Blackmarr President Brian Blackmarr. The survey shows that users in the government and insurance sectors — large users of the DPCX operating system — are feeling the greatest pressure to expand their processing capacity.

IBM has already said that it will not support DPCX on another IBM product line. It was DPCX that gave the 8100 a wide range of office automation capabilities.

Others, who run manufacturing and retail applications under DPPX, said they feel somewhat less pressure.

Some of them are still buying the 8100 from IBM's stockpile. IBM has indicated it will support DPPX on the IBM 9370 departmental processor (see story page 1).

Large users of DPCX drove many sales of 8150s in recent years, causing the market to expand slightly at the end of the 8100's product cycle.

Among them is Travelers Insurance Co.'s Joseph Brophy, senior vice-president, who said he has no immediate plans to replace his 8100s, which at one time numbered 500.

But throughout the next two to four years, the insurance company plans to move more of the function either up to the host or down to the microcomputers in the field.

"Originally, we went to the 8100s to get better response time and better availability than we had in the 1970s. But most of those reasons aren't as important today because there are better alternatives," Brophy said.

IBM 8100
Demand for new systems

Industry	Number of Systems Needed in Next Two years	Number of Firms Responding
Aerospace	0	5
Chemical and Allied Products	[illegible]	[illegible]
Communications	6	5
Financial	11	10
General Manufacturing	20	39
[illegible]	[illegible]	[illegible]
Insurance	248	34
[illegible]	[illegible]	[illegible]
Retail	5	4
[illegible]	[illegible]	[illegible]
Other	131	18
[illegible]	[illegible]	[illegible]
Total	684	179

INFORMATION PROVIDED BY B.R. BLACKMARR AND ASSOCIATES

IBM 8100
Migration planning

Response	Use Only DPPX	Use Only DPCX
In Progress	18%	37%
Budget Defined and Planned	3%	3%
Planned Effort but not started	31%	23%
Not Concerned	32%	[illegible]
Other	15%	14%
Total Respondents	61	119

Due to rounding, total does not equal 100%

INFORMATION PROVIDED BY B.R. BLACKMARR AND ASSOCIATES

Competitors hunger for user base

The retreat of IBM's 8100 distributed processing systems presents a challenge for competing vendors to correctly position their own computer products to provide for the needs of 8100 users.

Who stands to benefit by exploiting the gap in IBM's line isn't clear. A study by B. R. Blackmarr and Associates, Inc. (see story above) shows that different 8100 shops have widely different needs and that migration could well benefit different computer vendors, depending on application.

Blackmarr and Associates has written migration code for the Digital Equipment Corp. and Wang Laboratories, Inc. machines, but it has not yet made it available to users.

Users feel they do not have much time to identify their choice.

"The sense of urgency is clearly there," says Keith Brown, a Blackmarr and Associates vice-president. "You find users asking, 'Where am I going to get more capacity?', and IBM's alternative, whatever it is, isn't ready yet."

The Blackmarr study, which was supported by vendors including IBM, DEC, Hewlett-Packard Co. and Wang, was designed to identify those features of the 8100 that users felt were critical to the success of any alternative or follow-on IBM product.

"IBM and other vendors are asking what it will take to meet these requirements now that the 8100 is running out of horsepower," says Brian Blackmarr, president of Blackmarr and Associates.

On-site testing

As part of the study, an on-site testing program at American Express Co.'s 8100 data processing facility in Phoenix is comparing features of five types of alternative minicomputer hardware. On the list are systems from DEC, Wang and NBI, Inc.

However, the tests at American Express, which continue this week, will have no clear winner, Brown says. "It isn't considered to be a beauty contest," he says. "However, the rating of this fairly sizable user will give vendors pretty good guidance in developing new products."

DPCX users feel that the 8100's Distributed Office Support System (Disoss) functionality will be hard to replace with any other product, including ones from IBM, Blackmarr notes. "The 8100 is the single most functional device for connecting into host-based Disoss," he says.

"Large users, like large insurance firms, use every bit of that capability in their Systems Network Architecture networks today," Blackmarr says. The 8100's 3270 pass-through feature and ability to act as a traffic cop for personal computer and terminal inquiries to the host will not be easily duplicated, either, he adds.

Vendors who have participated in the side-by-side comparison contend that the movement to replace 8100 capacity represents a solid marketing opportunity. "The timing was good for us," says Gary Sobol, manager of systems engineering for NBI in Boulder, Colo. "We had just finished a beta test of our Disoss implementation. We felt that it was a good opportunity to show a consulting group, as well as American Express, the power of our system."

— Jean S. Bozman

Users of 8100 led down path

From page 1

IBM to support DPPX than DPCX on other IBM systems.

"DPPX is programmed in a variant of PL/S, which is the language that all of IBM's major operating systems are programmed in. Because of that, the bulk of DPPX code can be easily recompiled," Ackerman said.

When IBM announced the 8100 in October 1978, the product was the logical descendant of the IBM 3790 cluster controller. The 8100 inherited a relatively small main memory, a penchant for cluster-controlling and the 3790's DOSF operating system, which was incorporated into DPCX as a migration tool for 3790 users.

First 8130s

The first 8130 units, shipped in the fourth quarter of 1979, had just 256K to 512K bytes of main memory. But these units were the first — and at the time the only — IBM machines able to act as true distributed processors, said Ackerman, who is a longtime IBM 8100 consultant and market research analyst.

Ackerman, whose newsletter, *Update/8100*, has chronicled the machine's evolution, said that the 8100 embodied three components of the period's distributed processing theory.

"It was able to act as a host for the terminals that were attached to it, it was in charge of controller/host functions such as 3270 support and RJE," he said, "and it was able to act as an intelligent processor that carried on concurrent communications with the host and with the terminals."

An inheritance

Those kinds of functions were provided by the 8100's DPPX operating system. This operating system was able to process apart from the host and to ready the results for later transmission to the host.

But the 8100 also inherited something else from its 3790 predecessor: the ability to support the 3790's DOSF operating system, which included the first release of the Distributed Office Support System.

A new operating system, DPCX, was written in native mode on the 8100 to support DOSF, supplying the 8100 with office capabilities few machines had in the early 1980s.

Convergent signs OEM pacts

Revises Unisys deal, will resell Banyan LAN

By Clinton Wilder
and Elisabeth Horwitt

SAN JOSE, Calif. — Convergent Technologies, Inc. last week restructured its long-standing OEM agreement with a traditional reseller, Unisys Corp., and agreed to resell the local-area network (LAN) products of a new partner, Banyan Systems, Inc.

Convergent Chairman Paul C. Ely Jr. said the agreement with Unisys is intended to stabilize the rags-or-riches inconsistency of Convergent's 6-year-old deal with Burroughs Corp., which became Unisys after acquiring Sperry Corp. last year. The three-year pact requires Unisys to purchase a specified number of Convergent products in order to gain the right to manufacture those products.

The revision, Ely told *Computerworld*, stemmed from difficulties between Convergent and Burroughs during the last three years. When Convergent was unable to manufacture enough Ngen workstations to be resold as Burroughs' B25 in 1983, Burroughs manufactured the product itself, and its purchases from Convergent declined to none.

"There were disruptions in our relationship that almost killed it," Ely said. "The new terms give both companies incentives to do what they need to make it work." The new agreement covers all current Convergent workstations and servers as well as future products in those lines.

Separately, Convergent signed an agreement to purchase and resell Banyan's Virtual Networking Software (Vines). The LAN operating system, working in conjunction with Convergent's PC Exchange software, to be announced this week, will interconnect Convergent's Clusternet LANs and work group servers.

Banyan, of Westboro, Mass., is the first PC LAN vendor to form an alliance with Convergent since the proposed merger beween Convergent and IBM PC Network vendor 3Com Corp. fell through last year.

Banyan is currently working on several OEM relationships, including one with a major private branch exchange manufacturer and several with host vendors, according to Banyan Vice-President of Marketing Robert Stearns.

DEC's earnings surge 98%

From page 94

rector of investor relations.

"We haven't done anything terribly different on cost controls," he said. "If anything, we loosened up a bit."

At a time when many competitors, most notably IBM, are reporting a slowdown in overseas growth, DEC reported a 47% gain in international sales. "That, plus the growth in service revenue, was exceptionally impressive," Geran said.

Steinkrauss said DEC continued to make strong inroads into the financial, insurance and telecommunications markets during the quarter, while also reporting growth in sales to the health care, aerospace, chemicals and electronics-related industries.

However, Steinkrauss also confirmed what DEC's less successful competitors are saying: that computer sales to the MIS shops of traditional manufacturing industries remain sluggish.

"We're still not seeing that core U.S. manufacturing business pick up, and the selling cycle isn't getting any shorter," he said. "But we've proven that with the right resources and the right combination of products, you can still succeed."

Merrill Lynch, ADP sign deal

From page 94

tor. "Outside of Prudential-Bache Securities, Inc., they haven't been very successful in attracting national retail brokerage accounts," one industry source said.

Paul Savage, vice-president of sales for ADP's Financial Services Group, conceded that aggressive pricing played a role in the Merrill Lynch deal.

"You have to look at it in the overall context of things, though. Merrill Lynch is a big customer and would certainly get a good volume discount," Savage said. "We feel we're as price competitive as anyone on the street."

Some observers said they were surprised by Merrill Lynch's attempt to forge a relationship with ADP so soon after the Imnet debacle.

"It appears that the bad feelings between Merrill Lynch and Citicorp run deeper than I knew," observed Tom Lawton, editor of "The Computer Services Report" in Belmont, Mass.

"If ADP gets Merrill Lynch's business, it would be a big feather in their cap. I don't expect Quotron to sit still and do nothing about it," Lawton maintained.

"Imnet was formed with the assumption that Quotron was vulnerable," said a financial data processing consultant who requested anonymity. "Merrill Lynch spent a lot of money on Imnet and on Quotron services but would still like to be less dependent on Quotron."

ADP derives about 25% of its annual $1.2 billion in revenue from its financial services business. ADP entered that market in 1983 after acquiring GTE Corp.'s front-office systems operation. Last February, ADP purchased the financial services portion of Allied-Signal, Inc.'s Bunker Ramo subsidiary.

Separately, ADP announced last week that earnings grew 22% to $30 million, or 41 cents per share. ADP's revenue rose 15% to $334.2 million in the second quarter ended Dec. 31.

End-user computing firms should end '86 on high note

ACTIVE ISSUES
Kathy Porteus

When technology companies report December-quarter results this month, investors will hear everything from tremendous gains to flat earnings to sizable write-downs and charges. Generally, those companies directly involved with end-user computing will post the most impressive results.

"Digital Equipment Corp. (DEC — 130) is a hero in the user community," says John Dean of Montgomery Securities. According to Dean, DEC's recognition of networked workstations and personal computer applications for end users continues to lift the company above other minicomputer vendors. Last Wednesday, DEC reported its second-quarter earnings doubled to $2.02 per share, propelling DEC stock more than 11 points to 130.

However, analysts expect results from other minicomputer companies to continue reflecting weak industry conditions. Wang Laboratories, Inc. (WANB — 14), scheduled to report its December quarter tomorrow, has already disclosed that it will post an operating loss in excess of $35 million for the quarter.

The lack of new product deliveries continues to restrain earnings at both Hewlett-Packard Co. (HP — 49) and Prime Computer, Inc. (PRM — 20), according to Dean. He estimates Prime will post earnings of 28 cents per share for its December quarter and HP will report earnings of 45 cents per share when it discloses its January-quarter results.

Although the December quarter traditionally represents a seasonal boost to microcomputer companies, Dean partly attributes expected high quarterly earnings to growing demand for desktop computing power. Dean expects strong quarters from Compaq Computer Corp. (CPQ — 23½) and Businessland, Inc. (BUSL — 12¾), which he estimates will report earnings of 39 cents and 11 cents per share, respectively.

According to Dean, Apple Computer, Inc. (AAPL — 48¼) will report flat earnings of 90 cents per share versus 91 cents per share for the same period last year. Dean points out, however, that Apple's December quarter results last year were the company's best.

Heightened demand for end-user computing has also benefitted the workstation arena, in which both Apollo Computer, Inc. (APCI — 18½) and Sun Microsystems, Inc. (SUNW — 27) are expected to post boom December quarters.

Mark Stahlman, an analyst with Sanford C. Bernstein & Co., says Apollo will report earnings of 12 cents per share on revenue of $112 million and Sun will earn 25 cents per share on $105 million. "Sun and Apollo's excellent performance will continue in 1987," Stahlman says, "if they simply adhere to their product plans and deliver the new products to existing customers."

On the other hand, Stahlman does not expect impressive financial results from computer-aided design and computer-aided manufacturing (CAD/CAM) suppliers such as Daisy Systems, Inc. (DAZY — 10¾), Mentor Graphics, Inc. (MENT — 20¾) and Valid Logic Systems, Inc. (VLID — 6½) for at least a few more quarters. According to Stahlman, these companies suffer from weak capital spending and from the CAD/CAM market shift to a design rather than a drafting business.

The theme of end-user computing also emerges in the software sector. Charlotte Walker, an analyst with L. F. Rothschild, Unterberg Towbin, estimates Lotus Development Corp. (LOTS — 57¼) will report 92 cents per share vs. 70 cents per share for the same period one year ago; Ashton-Tate (TATE — 25) will earn 74 cents vs. 59 cents per share one year ago; and Microsoft Corp. (MSFT — 60) will earn 65 cents per share this year vs. 46 cents per share last year.

According to Walker, other December-quarter highlights among software and computer services companies will include Hogan Systems, Inc. (HOGN — 13¼), Management Science America, Inc. (MSAI — 17¼), SHL Systems, Inc. (SHKIS — 17) and ASK Computer Systems, Inc. (ASKI — 13½). Management Science America said it expects to report a sharp rise in 1986 net income, to the $1-to-$1.03 range, reflecting a very strong December quarter.

Likewise, ASK Computer Systems' December-quarter earnings, which Walker estimates will be 16 cents to 17 cents per share, represent a more impressive sequential, rather than yearly, improvement. Walker estimates Hogan Systems and SHL Systems, with earnings of 13 cents to 15 cents and 13 cents per share, respectively, will report results that represent more than a 100% increase from last year's December-quarter earnings.

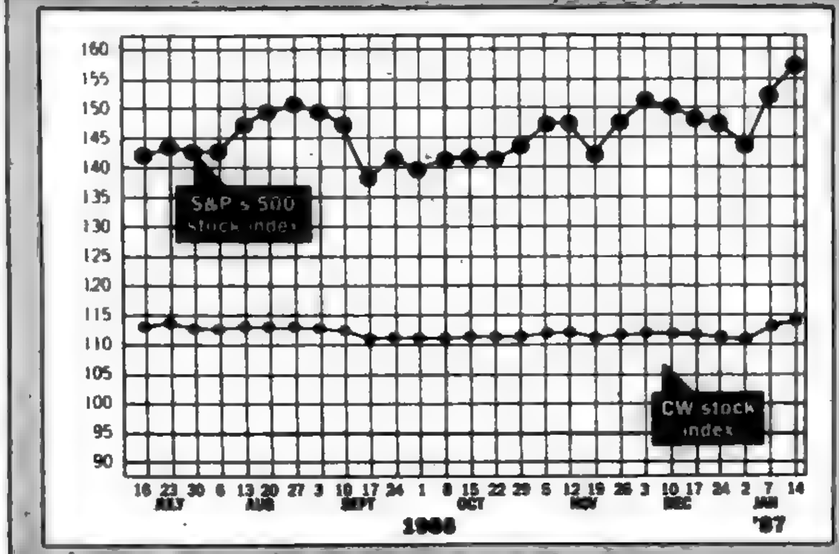
Mainframe hardware companies are expected to take significant fourth-quarter write-downs and charges, generally as a reflection of poor business conditions. "I am reluctant to say what my earnings estimates are because this is a very peculiar quarter," remarks Jay Stevens of Dean Witter Reynolds, Inc.

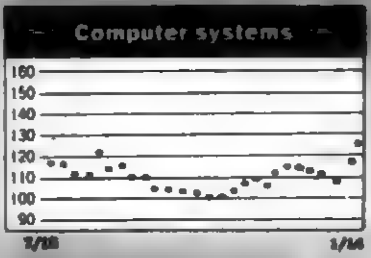
Among those companies taking write-offs are IBM (IBM — 120¾), because of its early retirement program; Honeywell, Inc. (HON — 61), because of its departure from information systems; and Unisys Corp. (UIS — 86¾), because of the merger of the former Burroughs Corp. and Sperry Corp.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

MITCHELL / HAYES

Computerworld stock trading index

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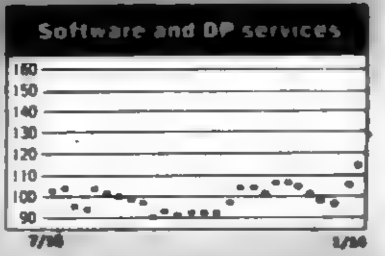
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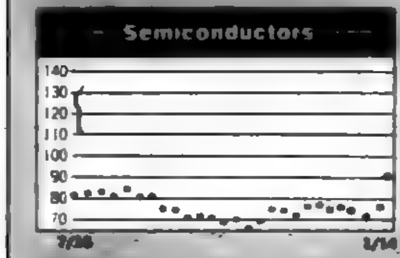
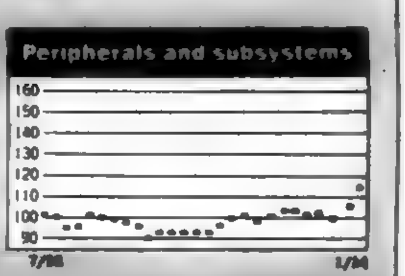
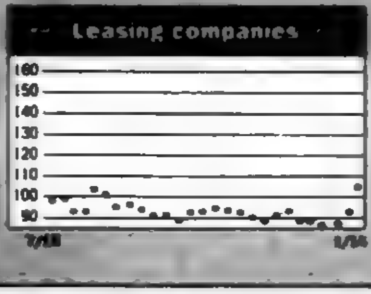
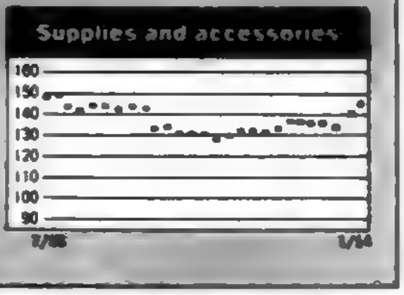

Semiconductors


Peripherals and subsystems


Leasing companies


Supplies and accessories

All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	1/7/87	1/14/87
Computer systems	118.3	**125.3**
Software and DP services	107.1	**114.5**
Peripherals and subsystems	108.6	**115.6**
Supplies and accessories	141.7	**146.8**
Semiconductors	78.7	**90.4**
Leasing companies	92.8	**104.5**
CW stock index	113.0	**114.5**
Standard and Poor's 500 stock index	152.7	**157.0**

Computerworld stock trading index

CLOSING PRICES WEDNESDAY, JANUARY 14, 1987

COMPUTER SYSTEMS

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 14 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4.75	+0.0	+0.0
O	ALTOS COMPUTER SYS	19	10	13.63	+1.4	+11.2
A	AMDAHL CORP	28	14	25.75	-1.0	-3.7
O	APOLLO COMPUTER INC	19	9	18.50	+0.5	+2.8
O	APPLE COMPUTER INC	48	22	48.13	+3.4	+7.5
N	AT&T	28	21	25.25	-0.5	-1.9
O	C P T CORP	7	3	4.25	+0.8	+21.4
N	COMPAQ COMPUTER CORP	24	12	23.50	+1.1	+5.0
A	COMPUTER CONSOLES INC	12	6	9.25	+0.4	+4.2
O	CONCURRENT COMP CORP	25	1	17.00	-0.5	-2.8
N	CONTROL DATA CORP	29	19	25.25	-1.6	-6.0
O	CONVERGENT TECH	14	4	8.25	+1.6	+24.5
N	CRAY RESH INC	100	59	98.00	+7.3	+8.2
O	DAISY SYS CORP	26	8	10.63	+1.1	+11.8
N	DATA GEN CORP	49	25	35.25	+1.1	+3.3
N	DATAPOINT CORP	9	5	5.75	-0.4	-6.1
N	DIGITAL EQUIP CORP	130	60	130.00	+18.6	+16.7
N	FLOATING POINT SYS INC	46	11	13.38	+1.8	+15.1
N	GOULD INC	31	15	19.25	+1.5	+8.5
N	HARRIS CORP	37	26	33.13	+0.9	+2.7
N	HEWLETT PACKARD CO	50	38	49.00	+4.8	+10.7
N	HONEYWELL INC	84	58	59.75	-0.5	-0.8
N	IBM	162	116	118.63	-4.9	-3.9
O	IPL SYS INC	4	1	2.25	-0.1	-5.3
N	ITT CORP	60	35	57.38	+0.8	+1.3
N	M A COM INC	19	12	13.38	+0.3	+1.9
N	MATSUSHITA ELEC INDL LTD	136	61	121.88	-4.9	-3.8
O	MENTOR GRAPHICS CORP	21	11	20.75	+2.1	+11.4
N	NBI INC	14	8	10.38	+1.0	+10.7
N	NCR CORP	57	40	53.38	+3.9	+7.8
N	PRIME COMPUTER INC	28	16	20.00	+1.6	+8.8
O	STRATUS COMPUTER	28	17	27.50	+1.5	+5.8
O	SYMBOLICS INC	15	4	4.88	+0.1	+2.6
O	TANDEM COMPUTERS INC	43	20	42.50	+4.8	+12.8
N	TANDY CORP	48	31	47.88	-0.3	-0.5
N	TEXAS INSTRS INC	148	103	134.00	+14.0	+11.7
A	ULTIMATE CORP	35	13	22.50	-0.5	-2.2
N	UNISYS	90	58	89.13	+2.5	+2.9
A	WANG LABS INC - B	22	11	14.00	+2.5	+21.7
A	WANG LABS INC - C	22	11	13.88	+2.5	+22.0
N	XEROX CORP	72	49	66.25	+3.3	+5.2

SUPPLIES & ACCESSORIES

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 14 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	27.38	+0.0	+0.0
N	BARRY WRIGHT CORP	25	14	18.50	+0.4	+2.3
A	DUPLEX PRODS INC	23	18	19.00	+0.5	+2.7
N	ENNIS BUSINESS FORMS INC	29	22	28.13	-0.5	-1.7
N	3M CO	121	86	120.13	-0.3	-0.2
N	MOORE LTD	28	19	22.88	+1.5	+7.0
O	STANDARD REGISTER CO	50	32	39.00	+2.8	+7.6
N	WALLACE COMPUTER SVCS	50	37	47.50	+4.8	+11.1

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Averages		
Computer Systems	5.92	
Supplies & Accessories	3.60	
Software & DP Services	7.97	
Semiconductors	14.78	
Peripherals & Subsystems	6.50	
Leasing Companies	12.85	
group average	8.57	
Indices	last week	this week
Computer Systems	118.3	125.3
Supplies & Accessories	141.7	146.8
Software & DP Services	108.1	114.5
Semiconductors	78.7	90.4
Peripherals & Subsystems	108.6	115.6
Leasing Companies	92.8	104.5
Composite Index	112.9	114.5
S&P 500 Index	152.7157.0	

DONE

SOFTWARE & DP SERVICES

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 14 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	5.00	+0.8	+17.6
N	ADVANCED SYS INC	19	12	18.25	+0.3	+1.4
N	AGS COMPUTERS INC	32	17	32.38	+1.1	+3.5
O	AMERICAN MGMT SYS INC	27	11	26.75	+2.8	+11.5
O	AMERICAN SOFTWARE INC	19	9	18.75	+0.0	+0.0
N	ANACOMP INC	7	3	4.00	-0.1	-3.0
O	ANALYSTS INTL CORP	10	4	9.50	+0.8	+8.6
O	ASHTON TATE	26	9	25.00	+0.6	+2.8
O	ASK COMPUTER SYS INC	15	9	13.00	+1.1	+9.5
O	ASTRADYNE COMP IND	3	1	1.88	+0.2	+15.2
N	AUTOMATIC DATA PROC	44	28	42.38	+3.1	+8.0
O	BOOLE & BABBAGE INC	8	4	7.25	+0.9	+13.7
O	COMPUTER ASSOC INTL INC	25	17	16.50	+0.3	+1.5
O	COMPUTER HORIZONS CORP	14	10	12.88	+1.6	+14.4
O	COMPUTER NETWORK TECH	10	4	4.38	+0.1	+1.4
N	COMPUTER SCIENCES CORP	50	30	48.75	+3.8	+8.3
O	COMPUTER TASK GROUP INC	19	11	13.38	+1.1	+9.2
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	16	10	11.75	-1.1	-8.7
N	CULLINET SOFTWARE INC	18	6	8.63	+1.9	+27.8
O	CYCARE SYS INC	17	7	10.00	+1.1	+12.7
O	DUQUESNE SYS INC	33	15	37.00	+1.5	+4.2
N	GENERAL ELEC CO	91	67	91.00	+0.0	+0.0
N	GENERAL MTRS CORP	50	24	28.63	+4.5	+18.7
O	HOGAN SYS INC	14	7	13.88	+2.0	+16.8
O	INFORMATION SCIENCES INC	4	1	1.25	+0.3	+33.3
O	INFOTRON SYS CORP	19	7	8.50	+0.5	+6.3
O	KEANE INC	16	5	6.13	-0.1	-2.0
N	LOGICON INC	39	22	26.88	+0.9	+3.1
O	LOTUS DEV CORP	68	20	57.25	+4.0	+7.5
O	MANAGEMENT SCI AMER	17	11	17.25	+3.5	+25.5
O	MCI COMM CORP	13	6	6.75	+0.1	+1.9
O	MICOM SYS INC	23	10	14.75	+0.0	+0.0
O	MICRO PRO INTL CORP	4	2	2.75	+0.1	+2.3
O	MICROSOFT CORP	62	26	80.00	+8.0	+11.1
O	NATIONAL DATA CORP	26	16	22.75	+0.0	+0.0
O	ON LINE SOFTWARE INT	17	10	15.75	-0.3	-1.6
O	ORACLE SYS CORP	28	13	27.00	+5.0	+22.7
N	PANSOPHIC SYS INC	36	25	33.25	+7.3	+27.9
O	POLICY MGMT SYS CORP	27	15	26.75	+1.8	+7.0
O	PROGRAMMING & SYS INC	11	6	9.00	+0.1	+1.4
O	REYNOLDS & REYNOLDS CO	42	25	33.75	+0.0	+0.0
O	SCIENTIFIC COMPUTERS INC	6	4	6.00	+0.2	+3.2
O	SEI CORP	28	15	21.50	+1.8	+8.9
O	SHARED MED SYS CORP	46	29	45.25	+1.8	+4.0
O	SOFTWARE AG SYSTEMS INC	22	10	14.63	+1.9	+14.7
O	SOFTWARE PUBG CORP	9	5	8.38	+0.3	+3.1
A	STERLING SOFTWARE INC	21	10	12.38	+1.4	+12.5
N	SUNGUARD DATA SYSTEMS	16	10	15.25	+0.5	+3.4
N	UCCEL CORP	30	15	29.38	+2.6	+9.8
N	URS CORP	18	11	17.13	+0.0	+0.0
O	VM SOFTWARE INC	27	12	27.00	+3.3	+13.7

SEMICONDUCTORS

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 14 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	34	13	18.00	+3.5	+24.1
N	ANALOG DEVICES INC	25	14	19.63	+2.4	+13.8
O	ANALOGIC CORP	15	10	11.00	+0.0	+0.0
N	APPLIED MAGNETICS CORP	20	13	18.38	+1.4	+8.1
O	AVANTEK INC	23	14	16.75	+0.1	+0.8
O	HADCO CORP	6	3	4.50	+1.4	+44.0
O	INTEL CORP	32	16	27.88	+4.6	+19.9
O	MICRO MASK INC	7	2	4.50	+0.3	+5.9
N	MOTOROLA INC	50	34	43.50	+6.0	+16.0
N	NATIONAL SEMICONDUCTOR	16	8	13.38	+1.8	+15.1
N	TERADYNE INC	30	16	19.13	+2.5	+15.0

PERIPHERALS & SUBSYSTEMS

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 14 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	7.13	-0.3	-3.4
A	ANDERSON JACOBSON INC	3	1	1.88	+0.1	+7.1
O	AST RESH INC	28	11	16.25	+2.1	+15.0
O	AUTOTROL CORP	10	5	6.00	+0.0	+0.0
O	AVANT GARDE COMPUTING	7	3	4.88	+0.0	+0.0
O	BANCTEC INC	13	6	10.88	+0.3	+2.4
N	BOLT BERANEK & NEWMAN	51	34	50.00	+5.0	+11.1
A	CETEC CORP	9	5	5.25	+0.1	+2.4
A	COGNITRONICS CORP	6	2	3.50	+0.5	+16.7
N	COMPUGRAPHIC CORP	27	16	21.25	+1.6	+8.3
N	COMPUTERVISION CORP	19	10	15.63	+1.1	+7.8
N	COMRAC CORP	18	12	13.50	+0.0	+0.0
A	DATAPRODUCTS CORP	18	11	14.13	+1.9	+15.3
A	DATARAM CORP	18	7	8.63	+1.5	+21.1
O	DATA SWITCH CORP	9	5	5.63	-0.5	-8.2
O	DATUM INC	7	4	5.38	+0.6	+13.2
N	DECISION INDS CORP	15	8	10.88	+1.3	+13.0
O	ENDATA INC	8	4	8.25	+1.3	+17.9
O	EMC CORP	24	11	22.00	+1.0	+4.8
O	EVANS & SUTHERLAND	31	18	30.50	+2.8	+9.9
N	FLOATING POINT SYS INC	46	11	13.38	+1.8	+15.1
O	GANDALF TECHNOLOGIES	8	5	8.00	+0.4	+4.9
N	GENERAL DATACOMM IND	15	8	9.25	+0.8	+8.8
N	HAZELTINE CORP	30	18	29.75	+0.0	+0.0
O	ICOT CORP	13	8	10.13	+0.8	+8.0
O	INFORMATION INTL INC	18	13	14.00	+0.1	+0.9
O	INTECOM INC	7	3	3.00	+0.0	+0.0
O	INTERLEAF INC	15	8	12.63	+0.5	+4.1
O	MEGADATA CORP	5	2	2.88	+0.1	+4.5
A	MSI DATA CORP	14	10	12.25	-0.6	-5.4
N	NASHUA CORP	28	15	25.00	+2.6	+11.7
O	NETWORK SYS CORP	17	10	15.88	+0.3	+1.6
N	NORTH AMERN PHILIPS CORP	46	35	44.63	+1.0	+2.3
N	NORTHERN TELECOM LTD	38	25	39.13	+1.9	+4.5
O	NOVELL INC	35	14	34.50	+5.8	+20.0
N	PARADYNE CORP	11	4	4.88	-0.1	-2.5
A	PENRIL CORP	9	4	4.38	+0.0	+0.0
N	PLESSEY PLC	38	22	28.75	+0.9	+3.1
O	PRINTRONIX INC	15	10	10.00	-0.3	-2.4
O	QMS INC	16	10	10.13	+0.8	+8.0
O	RAMTEK CORP	7	3	5.38	-0.3	-4.4
N	RECOGNITION EQUIP INC	20	10	19.25	+0.3	+1.3
O	SCAN TRON CORP	19	11	17.00	+1.3	+7.9
N	SCIENTIFIC ATLANTA INC	15	9	13.00	+1.4	+11.8
O	SEAGATE TECHNOLOGY	27	8	26.13	+4.1	+18.8
N	STORAGE TECHNOLOGY	7	2	3.75	-0.1	-3.2
O	SUN MICROSYSTEM INC	28	11	27.00	+0.9	+3.3
A	T-BAR INC	8	5	8.13	+0.4	+4.8
A	TAB PRODS CO	16	11	16.00	+1.9	+13.3
O	TANDON CORP	8	2	3.00	+0.5	+20.0
A	TEC INC	7	3	3.50	+0.0	+0.0
N	TEKTRONIX INC	77	55	76.50	+3.3	+4.4
O	TELEVIDEO SYS INC	4	2	2.63	+0.4	+16.7
N	TELEX CORP	77	52	76.88	+3.0	+4.1
N	TIMEPLEX INC	30	14	28.25	+1.5	+5.6
N	TITAN CORP	12	6	8.25	+1.3	+17.9
O	VISUAL TECHNOLOGY INC	1	0	0.44	+0.0	+0.0
O	WYSE TECH	21	11	20.38	+0.5	+2.5

LEASING COMPANIES

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 14 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	25	14	20.00	+2.9	+16.8
N	CONTINENTAL INFO SYS	12	7	9.63	+0.0	+0.0
O	FINALCO GROUP INC	5	2	3.44	+0.5	+17.0
O	PHOENIX AMERN INC	8	3	5.13	+1.1	+28.1
O	SELECTERM INC	12	5	5.50	+0.5	+10.0
N	U.S. LEASING	47	38	46.00	+1.8	+4.0

COMPUTER INDUSTRY

INSIDE

Ultimate "Picks" the right hardware suppliers for OEM success/**69**

TI settles suits, will license memory chip patents to Fujitsu and Sharp/**70**

U.S. Sprint joins FTS 2000 bidding with EDS as its partner/**72**

DEC's earnings surge 98%

Exceeds IBM's profit margin for first time

By Clinton Wilder

MAYNARD, Mass. — Continuing the industry-defying financial performance that has become its recent standard, Digital Equipment Corp. last week reported a 98% surge in profits in its second quarter ended Dec. 27.

The results, achieved on a relatively modest 22% sales increase, closed DEC's 1986 calendar year with four consecutive quarters in which net income increased by at least 85%. The quarter also marked the first time DEC's gross profit margins exceeded those of IBM, according to E. F. Hutton & Co.'s Michael Geran and other industry analysts.

Tomorrow, IBM is expected to report its second straight year of lower earnings, ending in what is widely considered to be a particularly weak fourth quarter. On the same day, DEC is scheduled to unveil its new high-end systems, consisting of clustered VAX 8700s that are directly targeted at the traditional IBM mainframe market.

DEC posted second-quarter profits of $270 million, or $2.02 per share, up from $136.1 million, or $1.08 per share, a year earlier. Sales rose to $2.27 billion from $1.86 billion in the second quarter of fiscal 1986. Revenue from services was particularly strong, increasing 36% to $736.1 million.

DEC held its year-to-year cost increase to a paltry 0.6%, despite hiring some 3,000 new employees during the quarter. The company's greatest gains in profit margin, however, came from a larger percentage of mid-range and high-end VAX systems in its product sales mix during the quarter, according to Mark Steinkrause, DEC's di-

See DEC page 92

INSTANT ANALYSIS

"We're gaining market share and improving profitability at the same time. Wall Street has a fond appreciation for that."

— **Mark A. Steinkrause, director of investor relations at Digital Equipment Corp.**

Merrill Lynch, ADP sign deal

By Alan Alper

ROSELAND, N.J. — Automatic Data Processing, Inc. (ADP) last week said it has agreed to develop a customized stock quote service system for investment and brokerage house Merrill Lynch & Co.

The agreement comes on the heels of the demise of International Marketnet (Imnet), a joint venture that Merrill Lynch entered with IBM to develop a financial information system for both internal use and to market to other brokerage houses [CW, Jan. 12].

The deal appears to jeopardize the continuation of Merrill Lynch's relationship with Quotron Systems, Inc. in Los Angeles, the firm's current supplier of financial information services and equipment. Merrill Lynch is Quotron's largest customer and accounts for approximately 25% of its revenue. Quotron, now owned by Citicorp, has a contract with Merrill Lynch that runs until 1988 and contains an option to renew for 1989.

A Merrill Lynch spokesman said the deal with ADP does not mean it is unhappy with Quotron. "Merrill Lynch historically has tried to improve upon what systems we have," he said. "Our strategy is if XYZ supplier has a better product, we go with the other product."

George Levine, Quotron's sales and marketing vice-president, said it is one thing for ADP to agree to develop a customized quote system and quite another to meet the stringent functional and delivery demands of a large customer such as Merrill Lynch. "Merrill Lynch and IBM did not succeed in their joint mission. I guess we have to see if ADP has the ability to improve upon that strategy," he said.

Wall Street sources last week said ADP has recently made its volume discounts more attractive in an effort to drum up new business in the financial services sec-

See MERRILL page 92

INDUSTRY INSIGHT
Clinton Wilder

Bank software is heating up

As more and more user corporations continue to blur the user/vendor line by offering information products and services, the competitive landscape in certain industry segments is becoming very confusing. Logically, the hotter the market is, the more unusual partnerships one finds springing up within it.

One of the more coveted markets now, especially for its growth potential in the 1990s, is high-end software for the banking and financial industries.

The IBM-Hogan Systems, Inc. OEM deal of 1986 has obviously been the focus of much attention and controversy. But another computer industry titan, Electronic Data Systems Corp. (EDS), has been quietly mounting its own assault on the same market.

Last week, EDS signed up its second user partner, $20 billion Minneapolis-based bank holding firm Norwest Corp., for its project to develop a retail bank processing system for — what else? — large financial institutions. EDS's first partner last August was Bank One, an affiliate of Columbus, Ohio-based Banc One Corp., which owns banks doing an annual $12 billion in business in four Midwestern states.

EDS is seeking other major regional banks to provide user evaluation and review the system's functional design. As formerly regulated regional banks quickly become major interstate busi-

See BANKING page 75

Wilder is Computerworld's *senior editor, computer industry.*

Court upholds injunction DEC sought against Emulex

By Alan Alper

CONCORD, N.H. — A U.S. District Court judge last week reinstituted an earlier injunction sought by Digital Equipment Corp. to prevent DEC-compatible peripherals maker Emulex Corp. from marketing products using allegedly misappropriated DEC technology.

The ruling overturned a November appeals court decision that removed, on procedural grounds, one provision of a preliminary injuction that was granted seven months earlier [CW, Nov. 17].

According to a DEC spokesman, the new injunction is more specific in forbidding Costa Mesa, Calif.-based Emulex from manufacturing and marketing any product benefiting from allegedly stolen trade secrets.

DEC filed suit against Emulex 18 months ago, alleging that Emulex infringed on its patents related to certain disk and tape controllers.

Suit amended

The suit was later amended to include misappropriation of trade secrets after DEC claimed that a former employee had allegedly taken information with him when he joined Emulex in early 1985.

Emulex said the ruling would have no effect on any of its current products or revenue. The firm added that the ruling does not prohibit it from shipping any of its products currently in production.

The preliminary injunction, however, will affect future products beginning with SMDI, a storage subsystem that was set to begin shipping this quarter.

Intel posts sixth straight loss

But analysts say industry could see turnaround

By James A. Martin

SANTA CLARA, Calif. — Intel Corp. reported last week a fourth-quarter net loss of $16.5 million, the company's sixth consecutive quarterly loss.

For the year ended Dec. 27, the semiconductor manufacturer reported a net operating loss of $173.2 million, compared with a reported net income the previous year of $1.6 million.

However, Intel's annual revenue declined to $1.27 billion, compared with $1.36 billion in 1985. Fourth-quarter revenue rose 12% to $355.6 million, compared with $317.9 million the year before.

Although industry leaders Intel and National Semiconductor Corp. have recently reported losses, the Semiconductor Industry Association said last week that semiconductor orders increased 8.8% and shipments grew 14.7% in the fourth quarter. This statement fueled speculation that an industry turnaround was imminent.

'A lot of confusion'

These conflicting reports have created "a lot of confusion," according to Drew Peck, semiconductor analyst with Gartner Securities in Stamford, Conn.

Some analysts have predicted Intel's revenue will increase 5% to 6% this year; all agree that its 80386 microprocessor should give the company a boost.

"But most expectations for their recovery are much too high," Peck said. "It will be a tough road for them to get much beyond a break-even point."

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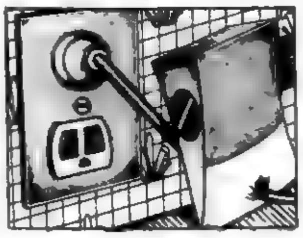
INSIDE



In Depth — Uninterruptible power supplies: How much are your DP operations worth? **Page 41.**

■ ■ ■

IRS places programmer tax change onus on brokerage firms. **Page 2.**

■

While hardware vendors report mixed results, software suppliers ride surging sales. **Page 94.**

■

Competing firms take common stand behind Unix standards at Uniforum '87. **Page 6.**

■

Amdahl rolls out entry-level Sierra challenger. **Page 12.**

■

Pay-for-support gains little support from Ashton-Tate customers. **Page 37.**

■

Tenants of a metropolitan office building learn varied lessons when fire hits the 42-story site. **Page 51.**

■

Hewlett-Packard aims to tie application-specific LANs to an X.25 packet-switched backbone and provide management tools to control them. **Page 10.**

■

A version of its Vines operating system for Intel 80386-based systems will debut from Banyan Systems by mid-year. **Page 15.**

■

The third release in 17 months of ADR's Ideal offers a 25% performance boost. **Page 27.**

■

The latest Prime Series 50 mini is its highest performance office environment system yet. **Page 13.**

■

MS-DOS alternatives prepare to assault the 80386 market. **Page 14.**

DEC aims higher

Clustered VAXs target 3090 arena

By Alan Alper

NEW YORK — Digital Equipment Corp. last week extended its VAX family of computers to mainframe performance levels by unveiling two clustered configurations of its VAX 8700.

The two Vaxclusters consist of four and eight VAX 8700 processors, providing performance of 26 and 52 million instructions per second, respectively.

They are positioned to match the performance of IBM's high-end 3090 Models 200 and 400.

The Vaxclusters — named VAX 8974 and VAX 8978 — represent a renewed attempt by DEC to provide mainframe-level performance following the halt in development efforts three years ago of the Decsystem-20.

With the clusters, DEC introduced a disk subsystem offering 2.5G bytes of storage in a box occupying 5¼ feet of floor space.

The company also showcased an ANSI-compatible structured query language implementation, software that manages distribution of relational data among multiple processors and enhancements to VAX DBMS and VAX RDB/VMS data base management systems.

Last week, analysts lauded DEC's move to extend its VAX clustering approach to the high end. DEC said it has already installed 5,000 Vaxclusters of lower performance machines.

"It gives them a nice way to pinpoint large accounts, which no doubt will help revenue and their profit margins," suggested Stephen Dube, an analyst with Shearson Lehman Brothers, Inc. in New York.

From a technology standpoint, however, some analysts said they expected more. "In reality, these systems don't run dyadically, and the disk subsystems still use conventional ferrite heads," noted Donald Haback, a vice-president of research with Nikko Securities Company International. "They have a long

See **DEC** page 8

Rebound at IBM seen hampered by CPU trends

By Clinton Wilder

ARMONK, N.Y. — After ending one of its worst sales years in a particularly dismal fashion, IBM faces major challenges to restore profit growth this year, according to analysts.

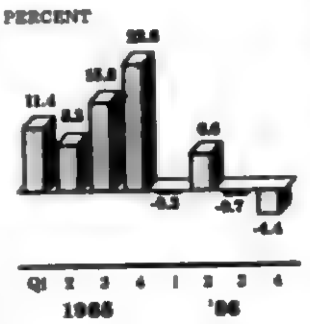
IBM said last week that its fourth-quarter earnings plunged 48% from year-earlier levels on a 1.2% decline in revenue. Although total 1986 sales increased by 2.4% to $51.25 billion, revenue from equipment sales dropped 0.4% from 1985 levels despite IBM's massive effort to convert its revenue stream from rentals to direct sales. It was the second consecutive year the company posted an annual decline in profits.

While many predict a second-half rebound based on reduced costs and new products such as the 9370 midrange system, others suggest that IBM's traditional approach to the computer industry has created fundamental barriers to future success.

"The company's strategy and cost structure was built on an expected 30% to 40% annual increase in mainframe processing demand," said analyst Thomas Rooney of Donaldson, Lufkin & Jenrette, Inc.

IBM Revenue

Equipment sales change compared with year earlier



CW CHART

"More and more large users are pulling applications off the mainframe onto departmental and smaller systems, and that trend will con-

See **IBM** page 91

Overdue Apple server goes to market

By Patricia Keefe

CUPERTINO, Calif. — After almost two years of promises, Apple Computer, Inc. is expected this week to unveil Appleshare, an Apple-branded file server first announced 23 months ago.

The server, along with several Apple products and about 20 third-party Apple-oriented connectivity products, will be announced in San Francisco this week at The Seybold Conference on Desktop Communications.

Appleshare is a key part of Apple's connectivity strategy. It is actually a Macintosh Plus that features what sources say is "one of the better user interfaces to a sophisticated file server."

Released in conjunction with the server will be enhancements to Apple's user interface driver, Finder, that are said to provide support for a multiuser environment.

Apple evenutally plans to incorporate a data base developed in France under the name Fourth Dimension and known at Apple as Silver Surfer, but the task was more complex than Apple thought, an Apple analyst said. "They want to include it eventually, but it's not ready," he added.

"The server is quite good; it will surprise a lot of people. Apple's got their act together this time," said an informed source familiar with Apple's plans.

In addition, Apple will announce PC Card, which will link IBM Personal Computers to an Appletalk network, allowing Macintoshes and IBM PCs to exchange files; Lasershare, a print spooler; DCA Filer, a card that links the Mac to Digital Communications Associates, Inc. files; and Apple Line 3270, which provides file transfer capability between the Mac and IBM 3270 environments.

In addition, the source said, products allowing Appletalk to run over Ethernet and fiber-optic cables will be unveiled.

The importance of these links lies in the integration of multiple environments — Apple, IBM and Unix — at the data and application levels.

Providing Appletalk links to Unix hosts and IBM-compatible micro-to-mainframe and 3270 environments will allow users to bring their Macintoshes in from the cold to function as part of the corporate DP system, whether operating in an IBM, multivendor or mixed-media environment.

"I think users will be very satisfied. They'll see [the Ap-

See **APPLE** page 7

3Com hit by merger fever again, woos Tops firm. Page 91

Users choke on Lotus copy scheme

By Peggy Watt

Many users of Lotus Development Corp. products are balking at the company's Extended Value Program, claiming the company's offer of non-copy-protected software requires them to function as piracy cops.

The Extended Value Program is part of an overall sales, training and distribution plan called the Multi-Value Plan.

A Lotus sales representative on the West Coast said at a Southern California corporate users group meeting that he has sold no contracts for Lotus's Multi-Value Plan, announced late last summer. While Lotus officials denied that was the case throughout the country, sign-up has apparently been sluggish

Some managers complain that Lotus's proposal to "limit legal liability" of corpora-

See **USERS** page 4

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IRS qualifies tax section; placement firms impacted

By David A. Ludlum

WASHINGTON, D.C. — The Internal Revenue Service ruled last week that brokers and other firms that place technical workers in contract jobs may have to hire those individuals as full-time employees under a controversial section of last year's tax reform act.

The IRS said Section 1706 of the law applies to the relationship between a technical worker and an intermediary, such as a broker, that places the worker in jobs.

It does not apply to technical service employees who work under contract directly for the company for which they provide services. Many such companies have already terminated contracts with independent consultants and specialists because of uncertainty concerning the scope of Section 1706.

The law makes it more difficult for the workers placed by brokers to function as independent businessmen for tax purposes. It excludes them from so-called safe harbors existing in a 1978 law that, in effect, allowed most taxpayers who had been working as independent contractors to continue doing so.

Independents face burden

Technical service workers — computer programmers, systems analysts, engineers, designers, drafters, consultants and others — who work as independents through a broker now face the burden of proving that they function as independent businessmen rather than as employees of the broker.

As was the case before 1978, they must meet 20 common law standards that the IRS uses to determine who is an employee. The standards concern the degree of control an organization has over a worker, including where and during what time work is done, whose equipment is used and how the worker is paid.

Independent workers who become employees will have income and Social Security taxes withheld from their pay and will lose an array of tax advantages and the ability to fund their own relatively generous pension plans. Many independents have expressed outrage over losing the freedom they now enjoy.

One group organized to fight Section 1706, Technical Consultants National Association (Tecna), still plans to lobby for repeal of the measure, according to Frank Lynch, a Boston attorney working with the group.

The IRS is urging independents who will become employees to file W-4 forms with their new employers as soon as possible, because without one, the employer is required to withhold income taxes at the highest rate that could apply.

The IRS said it will waive penalties on employers for unpaid Social Security taxes due for the first quarter of this year if the taxes are paid by April 30 and for other Social Security taxes not paid for "reasonable cause."

Also, employers face no penalties for failing to deposit workers' income taxes or workers' shares of Social Security taxes with the IRS if those amounts were not withheld from the workers' pay. Employers, however, may ultimately be required to pay all the taxes due.

Sole group excluded from safe harbors

The technical service workers singled out by Section 1706 are the only occupational group to be excluded from the 1978 safe harbors.

The safe harbors were intended to be temporary, serving until Congress passed a law defining employee status, but Congress has yet to do so, said IRS spokesman Wilson Fadely.

Section 1706 was put forth by Sen. Daniel Patrick Moynihan (D-N.Y.) who, in response to the controversy over it, issued a brief statement saying it was designed "to ensure that technical services businesses that do business in the same way are subject to the same tax rules."

HP cuts price of Model 840

By James Connolly

PALO ALTO, Calif. — Hewlett-Packard Co., citing production economies, last week cut the price of its HP 9000 Model 840 technical system 28% only two months after the reduced instruction set computer (RISC) began shipment.

"It was always our plan to reduce the price of the Model 840 after we had enough experience manufacturing it to fine-tune the production process. It just didn't take us very long to get the system into volume production and start achieving cost savings from the lower parts count and faster assembly time," said Carl B. Flock, marketing manager for HP's technical computer operation.

The price cuts, which apply only in the U.S., brought the list price of a base configuration down from $113,500 to $81,500.

One industry analyst said the HP price cuts also appear to be a result of the market's changing during the time between announcement and delivery of the Model 840, which was announced last May, four months after HP introduced its first RISC-based HP 3000 general-purpose systems. Shipments of the first of those general-purpose systems, the HP Model 930, were postponed from late 1986 to the middle of this year.

Analyst William Rosser of the Gartner Group, Inc., a Stamford, Conn.-based market research firm, said, "Whenever you have a long period between announcement and delivery, you may have to cut prices shortly after delivery just to keep up with the competition. The rest of the world keeps moving along, and HP wants to keep showing the world, 'Hey, this thing is something special.' "

Rosser said similar price cuts are likely for the HP 3000 Model 930 and other products with long lead times.

In this issue

NEWS

Uniforum '87 vendors want standard, public-domain Unix environment/ **6**
Unix operating system's security features to be improved/ **6**
DEC announces enhanced version of Ultrix operating system/ **6**
High-end configurations may not persuade users to change their DEC/IBM data center mix/ **8**
Avanti offers T1 switch to perform subrate digital multiplexing/ **10**
HP unveils corporatewide networking solution backed by 13 products/ **10**
Amdahl extends its IBM 3090-class mainframe line/ **12**
Prime introduces high-performance office system/ **13**
Ashton-Tate defends late shipment of Rapidfile/ **13**
AT&T price cuts spur speculation on future releases/ **13**
Firms ready 80386-based systems to rival delayed MS-DOS release/ **14**
Cullinet outlines computer-aided design strategy/ **15**
Banyan Systems to ship 80386-based enhancement of Vines 286/ **15**
Ansa Software, Microrim announce support for Lotus' The Application Connection/ **91**
3Com to acquire, ally with Tops developer/ **91**

NETWORKING

Fibercom announces multiport transceiver for PC, terminal fiber-optic communications/ **23**
Northern Telecom introduces uniform, building network wiring scheme/ **23**
Comsat, ITT unveil satellite-based overseas connections service/ **23**

SOFTWARE & SERVICES

ADR claims 25% performance boost in latest fourth-generation programming language release/ **27**
Vendors' choice of X Windows as standard system offering receives mixed reactions/ **27**

SYSTEMS & PERIPHERALS

Intel offers network server targeted at financial, governmental users/ **33**
Storage Technology's tape subsystem offers Unisys 1100 compatibility/ **33**
Amdahl's Multiple Domain Facility saves users time, money, space/ **33**

MICROCOMPUTING

Cost, value of Ashton-Tate's corporate pay-for-support program disputed/ **37**
Dbase users enhance systems with selection of adjunct products/ **37**

MANAGEMENT

Belford Cross is taking care of DEC's MIS business/ **51**
Fire in Boston's financial district alerts users to hazards, precautions/ **51**

COMPUTER INDUSTRY

Third-party microcomputer software support gains corporate attention/ **67**
Majority of hardware firms post strong fourth-quarter financial results/ **94**
Enmasse Computer abandons manufacturing and sales operations/ **94**
Quarterly earnings reports foreshadow healthy year for software, services industries/ **94**

IN DEPTH

How much is enough? Deciding to buy an uninterruptible power supply is a gamble — and the safety of your system hardware and corporate data is at stake. By Alan Radding/ **41**

OPINION & ANALYSIS

Ahl waits for the wind to be taken out of the pirates' sails/ **17**
Ulrich and Horwitt reflect on a hectic networking period/ **23**
Babcock reports on three styles of Cobol restructuring/ **27**
Gibson investigates 'The Case of the Dastardly DASD'/ **33**
Zachmann reviews Revolutionary Software's Cruise Control/ **37**
Young explains the need to assess DP management style/ **51**
Djurdjevic watches DEC take control of IBM's market share/ **94**

DEPARTMENTS

Editorial/ 16
New Products/ 53

PAGE 17 ILLUSTRATION BY ALAN WITSCHONKE

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Users choke on copy scheme

From page 1

tions desiring non-copy-protected software actually boosts their liability.

They point to sections requiring a corporation to promptly investigate any allegations by Lotus that the firm's "employees, contractors or agents" are pirating Lotus products. Some managers object to Lotus's demand that corporations reimburse the vendor for each illicit copy made by an employee.

Under the Extended Value Program, users can qualify to receive a utility disk that removes copy protection from Lotus's 1-2-3 or Symphony.

Qualifications

In order to qualify, corporations must have at least 100 copies of the latest version of 1-2-3 or Symphony, have policies against software piracy and sign a contract with Lotus to ensure that the firm is notified by Lotus of the piracy.

Firms are liable for only the retail price of the number of copies illegally made.

"The wording of the document is something that no one in their right mind would sign," said a corporate acquisitions manager who asked not to be identified because he still hopes to negotiate a workable contract.

Todd Greeno, manager of office technology at Pfizer, Inc. in New York, is eager for unprotected versions of the more than 500 copies of Lotus programs in his office. But he said he "won't go to extremes" for the privilege.

"I want software publishers to make my job easier, with the understanding that our company strictly prohibits illegal copying. We educate our users and bring the issue to light frequently," he said.

The implication of guilt

Several managers said they strongly resented what they call an implication of guilt.

"No company should sign a contract for presettlement of transgressions that haven't happened," said Herbert Turner, systems analyst for Southern California Edison Co. in Rosemead, Calif. He handles site licensing and estimates the utility company has 2,000 copies of Lotus

"We have issued strong policies for three years," Turner said. "Ours even states violation could lead to termination. But we can only do so much in terms of training, reminding and disciplining." He said he wonders whether a company would have to pay Lotus if an employee sold illegal copies of the company software.

Some managers said their colleagues are nit-picking.

"The spirit of the agreement limits liability to copying on the business premises," said Robert Corr, director of technical services for Pacific Operations with Electronic Data Systems Corp.

"I think you're stretching it a bit to say a company is liable for an employee's action off the premises of the company and without the consent of the company. That employee would have committed several other crimes, including theft of company property and copyright theft," Corr observed.

His objection is to the continued inconvenience even of unprotected software under Lotus's plan.

"They won't give you an un-copy-protected disk," he said. "They give the user a utility to remove the copy protection. That imposes a cost and burden on corporations to go through these rather cumbersome procedures. It would be much easier if they just shipped un-copy-protected software," Corr said.

Lotus replied that its rules are simple.

"What's required is a policy in place against illicit copying and a set of procedures to address violations as an internal matter," said Mike Kolowich, vice-president of marketing and business development.

He said Lotus does not ask to be notified of violations discovered and handled by the customer company, but if Lotus refers a complaint to the user, the vendor wants a report of the results.

"We don't want to interfere, but where we remove physical barriers to our software, we want the company to do its work in making it known to employees that illegal copying is tantamount to theft of company policy," Kolowich said.

Still, a lot of corporate attorneys are taking a close look at the contract.

"Lately, anything that even looks like software provisions, I send to my attorney," said Joe Nixon, software acquisitions officer of the information services for the Commonwealth of Pennsylvania at Harrisburg. He said he faces the added ethical concerns of a governmental agency.

"You are expected to be above reproach," he said. There is no stated antipiracy policy, "but it's against the law, so we don't do it."

The acquisitions officer for a major defense contractor with more than 400 copies of Lotus products said the company's legal department advised against signing the contract.

The troubling provision requires a licensee to monitor its employees, contractors or agents in allegations of illegal copying.

Any U.S. Department of Defense contractor has too many subcontractors to accept that responsibility, the legal department reportedly said.

Inconvenience over liability

"We're concerned about the legal risk of agreeing to investigate allegations made by Lotus and to present findings to them," the acquisitions officer said. "That put us up for a potential lawsuit from an employee." The company chose the inconvenience of copy protection over what it perceived as increased liability.

Lotus's Kolowich said the provisions are being misinterpreted.

"We're not asking for people or evidence to be turned over to us, we're just asking to be paid back at the retail price," Kolowich said.

He said, however, that Lotus is still open to individual negotiations, and several customers expect revisions.

"I really look at this as being a trial balloon," said Southern California Edison's Turner. "And I think this one was a failure. They want feedback from us as to what they are willing to buy."

EDS's Corr said he expects Lotus to succumb to pressure and eventually drop copy protection entirely.

"It's a vendor's right to impose any terms they can. Our alternative is not to buy the product," Nixon said. "Until users get tired of these kind of contracts and dig in their heels, there won't be changes," he concluded.

Federal agencies gain 1-2-3 access

CAMBRIDGE, Mass. — While corporate users debated the merits of Lotus Development Corp.'s plan for the removal of copy protection, government users last week gained access to a nonprotected version of 1-2-3.

Many government agencies have policies against purchasing software that includes copy protection, and Lotus has lost sales as a result.

The version of 1-2-3 Release 2.01 for the federal government has no copy protection. Instead, the package has an initial screen that reads "Property of the U.S. Federal Government" and provides regulations against unauthorized duplication. Like the earlier release of 1-2-3, the package has a suggested price of $495.

A government version of Lotus's Symphony will be available later this year, according to the company.

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Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171 617/879-0700

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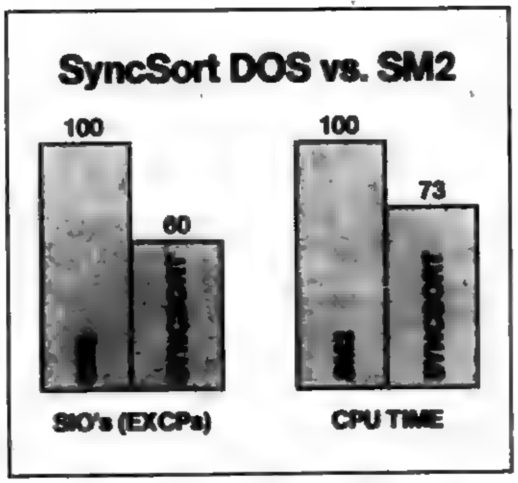

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Vendors pull together to boost Unix standards

Firms at Uniforum willing to cooperate

By Elisabeth Horwitt

WASHINGTON, D.C. — Exhibitors at Uniforum 1987, The International Conference of Unix Users, demonstrated that they are willing to surrender market dominance based on proprietary products in favor of a standardized, public-domain Unix environment.

"People are finally realizing that they've got to blow competition away on some other issue than interoperability," commented Daniel Lynch, president of Cupertino, Calif., consulting company Advanced Computing Environments.

One major thrust behind the standards is vendors' realization that a fragmented Unix cannot effectively compete in the mid-range system arena against emerging proprietary products from the likes of Digital Equipment Corp. and IBM, according to Geoff Morris, chairman of Unix vendor consortium X/Open.

"Unix vendors want to provide a standardized, mid-range solution before the big-system vendors finish moving their proprietary solutions down and shut off that market," Morris said.

Support for Unix standards

During the conference held here last week, companies gave at least verbal support to emerging Unix standards that eventually will enable customers to port applications across a variety of Unix-based hardware.

Perhaps more significant was the growing number of companies willing to cooperate with competitors — or even adopt a competing product — in order to hasten commercial availability of the multivendor programming and networking products their customers demand.

One Uniforum '87 announcement exemplifying the new spirit of cooperation was made by sometime competitors Microsoft Corp. and Interactive Systems Corp.

The two companies will jointly develop and market a Unix-based operating system for the Intel Corp. 80386 microprocessor as well as a version of Microsoft Xenix System V that incorporates the functionality of AT&T's Unix System V.3. "It makes sense for us to work together rather than fragment Unix," noted Microsoft Xenix general manager Paul Maritz.

Even AT&T has announced plans to merge its Unix System V with Portable Operating System Environment (Posix), an open industry standard currently being developed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE).

At a press conference held last Tuesday, AT&T spokesman William O'Shea reiterated AT&T's endorsement of Posix and the company's intentions to conform to the standard.

An IBM spokesman voiced that company's intention of supporting the standard, "once it is signed off."

However, industry representatives questioned the significance of vocal industry support of a standard that is still very much in its embryonic stage. The initial Posix module, 1003.1, just specifies operating system calls based primarily on System V, with a few from Berkeley Unix, according to DEC Ultrix technical engineer Glenn Johnson, referring to Unix Version 4.2 from University of California at Berkeley. The real obstacles, he added, will occur when IEEE starts working on Posix 1003.2, which incorporates a standardized user shell.

"Posix is great for application portability — we just wish there were more of it," said a Uniforum '87 attendee from the government sector. "It seems like, so far, they only have a small piece of what is needed."

But there remains the question of how to standardize around higher level functions such as the networking interface and distributed file system.

It might take IEEE years to develop such protocols from scratch, but the market will not wait for such action. Instead, some vendors have adopted as de facto standards already-existing commercial products that perform the functions mentioned above.

A growing number of products incorporate Streams, AT&T's specifications for interfacing a networking environment, with Unix System V.3's networking interface, Transport Level Interface. Both Convergent Technologies, Inc. and Wollongong Group, Inc. demonstrated Streams-compatible interfaces between Unix V.3 systems and Transmission Control Protocol/Internet Protocol networks.

While AT&T appeared to be gaining ground with Streams, the vendor's distributed file system Remote File System (RFS) lost some ground at Uniforum '87 to the emerging de facto standard, Network File System (NFS) from Sun Microsystems, Inc. AT&T and Sun's archrival, Apollo Computer, Inc., announced at Uniforum that both would support NFS.

Also during Uniforum '87, AT&T announced that it had joined X/Open, which has published a Portability Guide specifying a Common Applications Environment for Unix. X/Open's membership now consists of 11 hardware vendors including DEC, Hewlett-Packard Co., Unisys Corp. and seven European manufacturers.

X/Open members are committed to implementing the Common Applications Environment on their Unix systems by the third quarter, according to Morris.

Software issues

On the software side, however, conflict is brewing due to X/Open's decision to incorporate into its standard certain protocols that already exist in proprietary commercial products.

The environment's incorporation of IBM's SQL facilitates interfaces with SQL-based data base management system products from Relational Technology, Inc., Informix Software, Inc., Oracle Corp. and Unify Corp., according to Morris. However, three out of four of the above products may have trouble interfacing with one component of the environment, C-indexed sequential access method (C-ISAM), a method for managing indexed files that was developed by Informix.

According to Oracle spokesman Michael Wallace, the use of C-ISAM, a proprietary protocol, in an industry standard "seems funny and may make competitors shy away."

Unix groups, AT&T plan to plug holes

By Mitch Betts

WASHINGTON, D.C. — Two Unix industry groups and AT&T announced last week that they will take steps to improve the security features of the Unix operating system, which security experts say is notorious for being "full of security holes."

Various efforts to improve Unix security were aired at a well-attended panel discussion at Uniforum 1987, The International Conference of Unix Users, held here last week. Panelists said the openness and flexibility that made Unix popular in the research community make it less than secure, particularly for use in sensitive government applications.

If computer security is defined as the controlled sharing of data, said Skip Egdorf, a member of the computer security group at Los Alamos National Laboratory in New Mexico, then "Unix is all sharing and no control." Security features of Unix have improved since it first emerged from the research community, he said, but it still has far to go.

One attempt at beefing up Unix security will be handled by the X/Open Security Working Group, a panel of the X/Open international consortium of computer vendors. Iveta Trautmanis, program development manager at Unisys Corp. and chairwoman of the working group, said the panel will first identify the security needs and then develop standards. Unisys is the partnership of former Burroughs Corp. and Sperry Corp. Trautmanis said the goal is to meet the security standards of the U.S. government's National Computer Security Center and the requirements of European privacy and data integrity laws.

Similarly, /Usr/Group, an international association of Unix vendors and users, has a new security subcommittee that intends to submit draft security standards to standards organizations, according to subcommittee Chairman Steve Sutton, a computer security consultant with Addamax Corp. in Champaign, Ill.

"Unless we standardize on security interfaces, we will run into problems with the interchange of data between systems with different security policies," said Steven M. Kramer, vice-president of research and development at Secureware, Inc. in Atlanta.

Lisa A. Kennedy, a systems engineer at AT&T in Summit, N.J., said that although AT&T's Unix System V has some basic security features, such as user identification, passwords and discretionary access controls, some customers require more rigorous security.

For example, she said, customers are demanding more extensive audit facilities, mandatory access controls and certification by the National Computer Security Center. Kennedy said AT&T plans, in future versions of Unix, to enhance the existing security capabilities, seek government certification of System V and work with the various standards-setting groups to improve Unix security.

DEC wraps Ultrix around entire VAX line

By Mitch Betts

WASHINGTON, D.C. — Digital Equipment Corp., in an announcement made here last week at Uniforum 1987, The International Conference of Unix Users, unveiled a version of its Ultrix operating system that includes significant enhancements and spreads Unix throughout the popular VAX family.

According to analysts at International Data Corp., a market research firm in Framingham, Mass., DEC wants to sell more mid-range systems to the federal government and the automotive and aerospace industries, which are heavy users of Unix.

In addition to running on all VAX machines, from the Microvax II to the VAX 8000 systems, Version 2.0 of Ultrix-32 includes a VAX C/Ultrix compiler said to decrease execution times for C-based programs.

Roger Heinen Jr., a DEC software engineer, said the C compiler is intended for "customers who desire to extract the utmost performance from their VAX hardware." He added that the product announcement reflects the fact that DEC is tired of losing application benchmark tests to other hardware vendors due to its earlier compiler technology.

The vendor said Version 2.0 also incorporates Network File System support, an implementation of the popular file sharing feature developed by Sun Microsystems, Inc.

In addition, Heinen said, the new version adds features that align Ultrix, which is based on the University of California at Berkeley Unix Version 4.2, with other industry standards, including AT&T's System V Interface Definition and the IEEE 1003 specification.

Also announced at Uniforum was Version 2.0 of Decnet/Ultrix, a networking software product that allows Ultrix users to link their systems to DEC's other software systems.

The vendor said it also includes a gateway between Decnet networks and Internet networks based on the Transmission Control Protocol/Internet Protocol.

The price of Ultrix-32 Version 2.0 ranges from $4,000 for eight users on the Microvax II to $70,000 on the VAX 8800. The C compiler is bundled with Version 2.0 at no additional charge. The price of Decnet/Ultrix Version 2.0 ranges from $600 for the Vaxstation II/GPX to $7,965 for the VAX 8800.

Apple server goes to market

From page 1

ple announcements] as a serious offering," the source added.

Also expected at the conference this week is the announcement of a diskless workstation from 3Com Corp. in Santa Clara, Calif. 3Com is said to have a high-end IBM PC AT-compatible diskless workstation featuring an Enhanced Graphics Adapter, 3Com's network interface and the Lotus/Intel/Microsoft Expanded Memory Specification up to 1M byte. "It has everything except the disk and monitor," a 3Com dealer said. The product is targeted at data base applications and those in which there are security considerations.

Novell, Inc. in Orem, Utah, 3Com's local-area network rival, currently offers a low-end diskless workstation for $700. Its purpose is to lower the cost of adding more nodes to a network.

The dealer was told 3Com's diskless product would cost about $2,000. "Under $1,500 seems to be the price range more acceptable to the market," said Claire Fleig, research director for the International Technology Group in Los Altos, Calif.

Mac-compatible 3+

3Com will also make an announcement concerning its promised Macintosh-compatible version of its 3+ network software. The product has been in beta test for several months but will have to undergo changes to make it compatible with Centram Systems West, Inc.'s Tops network operating system, said Robert Bressler, vice-president and general manager of 3Com's software division (see related story page 91).

In a separate announcement last week, 3Com said it has signed a letter of intent to purchase Centram (see story page 91).

Meanwhile, Novell is also working on Mac-compatible network software. Informed sources said Novell initially was going to launch Macnetware at the Seybold show but is not ready because it has once again run into difficulties with Apple. This is Novell's second attempt — announced at Novell's Networld trade show in October — to port Netware to the Mac environment.

An earlier attempt was abandoned by frustrated Novell officials faced with minimal cooperation from Apple. A source close to both companies said Novell has run into the same problems, but a Novell source said both companies are committed to the project. "It's just that Apple needs to clarify its networking protocols, like the interface for the operating system and the device driver."

Despite the wealth of Apple communications-related announcements at Seybold, users should not expect to see all the missing pieces of Apple's connectivity strategy. "They may see the beginnings of that strategy," International Technology Group's Fleig said, adding that the rest of the picture should unfold during this year.

"Apple is in a good position as far as its presence in the market," Fleig said. Apple has completed its turnaround phase and now has the opportunity to move forward — as opposed to last year, when it was struggling and racked with rumors, she added. "Business people are looking at Apple's products, which will give Apple a little more time to bring its strategy together than it might have had 48 months ago."

Less clear is the impact Appleshare will have on the third-party Apple file server market.

"I'd be concerned if I were 3Com or any vendor whose claim to fame is linking the Apple and IBM worlds," one source close to Apple and 3Com said. 3Com has a file server with a built-in Appletalk connector and sells products linking the Mac to the IBM world.

Third-party vendors with low-end file servers lacking the feature richness of Appleshare will probably do fairly well, the source said.

"I think there is still a need for several people to provide file servers," Fleig said.

Fowler resigns after serving six years as FCC chairman

By Mitch Betts

WASHINGTON, D.C. — Mark S. Fowler, chairman of the Federal Communications Commission for the past six years, recently announced he will leave the FCC this spring. His successor is likely to be another ardent supporter of communications deregulation.

The favorite candidate to replace Fowler as chairman is Commissioner Dennis Patrick, who is leading the effort to further deregulate AT&T. Another contender is Commissioner Mimi Weyforth Dawson.

Fowler has expressed interest in becoming an entrepreneur rather than an industry lobbyist when he leaves the FCC.

He announced his resignation shortly before he was to face a bruising round of reconfirmation hearings in the Democrat-controlled U.S. Senate.

A Republican who has called himself "Mr. Deregulation," Fowler has in recent years encouraged the commission to reduce regulatory constraints on the seven regional holding companies so they could offer more services to business and residential customers.

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User doubts face DEC's bid to capture data center from IBM

By James Connolly

While Digital Equipment Corp. apparently wants to steal market share from IBM in the large corporate data center, users reported last week that the introductions of the VAX 8974 and VAX 8978 are unlikely to have an immediate impact on IBM installations in their companies.

Immediate customer reaction to the announcement was less than enthusiastic, as managers in companies that run DEC equipment or combinations of DEC and IBM systems wondered whether the four- and eight-CPU configurations will address their specific needs.

The customers expressed greater interest in the simultaneous announcement of the 2.4G-byte SA482 disk subsystem, which they see as a replacement for existing DEC RA81-based 456M-byte disk systems.

The key question raised about the high-end VAX systems was whether the performance will meet DEC's claims. The vendor said the 8974 offers 20 to 25 times the power of a VAX-11/780 and that the 8978 is up to 50 times more powerful than the 11/780.

Competing with 3090

Since the 11/780 has been generally rated at 1 million instructions per second (MIPS), DEC's claims placing the 8974 in the range of 20 to 25 MIPS and the 8978 at up to 50 MIPS make the machines appear to be competitive with IBM's high-end 3090 Model 200 and Model 400 mainframes.

Errol Sandler, director of scientific management information systems at G. D. Searle & Co. in Chicago, noted that the image the new configurations offer to applications and users will determine their power.

"I've been beating the bushes to find out what it is all about. I want to know whether it is in effect a single processor or a VAX 8800-style master-slave machine," said Sandler, whose company runs research and development on VAX 8600s and VAX 8650s and general business operations on IBM hosts. He said Searle officials have talked to other vendors about using non-IBM equipment for general data processing but that the DP operation remains heavily IBM.

However, Sandler said he has been waiting for the higher capacity disk drives largely because he hopes the new drives will be more reliable than the RA81 and will reduce the number of drives needed to support his data storage requirements.

Another manager who said he is wary of the performance claims is Angelo Privetera, director of information systems for Ball Aerospace in Boulder, Colo.

"I would need to actually benchmark the systems. I still think that in a business environment with a variety of applications, you need to benchmark each system based on your own environment," Privetera said. Ball uses VAXs to support scientific and engineering users and to handle general business applications relating to those users. Ball runs most business and financial applications on IBM mainframes.

Privetera noted that while DEC has received national attention for trying to drive into IBM's data center market, he has seen a greater attempt by IBM to push into DEC's traditional markets in science and engineering.

'Above what we need'

Another manager questioned about the announcements said he is unlikely to move up to the 8974 and 8978. Roy E. Johnson, information systems director for Grinnell Mutual Reinsurance Co. in Grinnell, Iowa, said, "From what I can tell, they are above what we need." Johnson's firm runs its own insurance software on seven VAXs.

However, Johnson said he has noticed a DEC penetration into IBM's market share in other insurance firms.

Johnson also said a shift to the larger disk subsystem is unlikely since his company has excess capacity on its RA81s.

DEC aims high

From page 1

way to go to catch IBM."

Grant Saviers, DEC vice-president of storage systems, said a subsystem — the SA482 — would be the last generation of DEC large-scale storage products to use ferrite heads. IBM uses thin-film heads on its high-end 3380 direct-access storage device, which has enabled it to provide 2.5G bytes of storage per actuator.

Aimed at the data centers of large commercial and scientific corporations, the clustered systems are designed to handle traditional mainframe applications such as accounting, electronic funds transfer, management of large data bases, data processing and research and development, the Maynard, Mass.-based firm said.

The multiprocessor systems do not perform parallel processing but operate as independent processors, the firm added.

Although the systems seemed aimed directly at IBM's large system market, the company downplayed any confrontational intentions. "The strategy is not specifically to replace IBM systems, since people have made significant hardware investments, but to allow VAX/VMS systems to gracefully coexist with IBM," said Rose Ann Giordano, DEC vice-president of consultant and information marketing.

DEC approach applauded

Yet Thomas Nies, chairman and founder of Cincom Systems, Inc., whose firm markets software to IBM mainframe and VAX users, said his customers feel DEC is taking a better approach to computing, particularly in production environments. He said it is not a question of how many MIPS a system offers but how much power is provided for applications processing after accounting for systems software.

"DEC delivers more MIPS," he said, noting that 85% of the MIPS offered on the new Vaxclusters are usable for applications processing, compared with only 60% on the high-end IBM 3090s.

With the Vaxclusters, DEC is offering a one-year hardware warranty, one-year software support and a resident systems engineer to help tailor application development to business needs.

The four-processor VAX 8974 comes standard with 128M bytes of main memory, expandable to 512M bytes; the new SA482 2.5G-byte storage subsystem; dual HSC70 controllers; a TA78 dual-density tape drive; a Decserver handling up to 200 terminals; a Vaxcluster Console system, consisting of a Microvax II, Ethernet networking capability and VMS and Decnet software licenses; and a VAX Performance Advisor software license. Up to 16 8700 processors can be clustered, DEC said.

The eight-processor VAX 8978 comes with 256M bytes of main memory, expandable to 1G byte, two storage subsystems, four I/O controllers, two dual-density tape drives and two Decservers, handling 400 terminals. Up to 32 8700 processors can be clustered, the firm said.

Big systems arena

DEC's target market and starting point

Systems	Units (installed base)
[illegible]	[illegible]
IBM 3090	773
[illegible]	[illegible]
DEC VAX 8600/ 8650	2,640
[illegible]	[illegible]

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By purchasing the multiprocessor packages, which include disk and tape storage, operating systems and networking software licenses, customers will spend between 10% and 15% less than if they purchased the components separately, analysts said. Available 90 days after receipt of order, the VAX 8974 is priced at $2.6 million, while the VAX 8978 lists for $4.7 million, the firm said.

Each processor in the system can be upgraded to the VAX 8800, although DEC did not provide pricing or availability schedules.

The new SA482 storage array consists of four head-disk actuators providing 2.5G bytes of storage, 36% more storage than previous DEC products. Each HSC70 I/O controller supports eight data channels and can accommodate up to 20G bytes of on-line storage.

While the new SA482/HSC70 subsystem is an integral part of the new Vaxclusters, it can also be used with other VAX and PDP-11 systems because it conforms to Digital Storage Architecture and Standard Disk Interconnect. Available immediately, the SA482 lists for $84,000.

DEC's ANSI-compatible SQL — VAX SQL — is a software development tool to be used with VAX RDB/VMS relational data base management systems and VIDA VAX-to-IBM Data Access product. It can be used with local and remote data bases and is available immediately for a licensing fee of $1,770.

Enhanced VAX DBMS

DEC has enhanced VAX DBMS and RDB/VMS for use with VAX SQL. DBMS Version 3.2 is said to run twice as fast as earlier versions and to more easily restucture data bases.

In addition to offering an SQL interface, RDB/VMS Version 2.2 now has a VAX C compiler and support for distributed data base management capabilities through another new software package called the VAX Data Distributor.

Data Distributor manages the automated distribution of relational data among multiple processors running the VAX/VMS operating system. It will begin shipping next month and is priced at $1,800 for the Vaxstation II workstation to $27,000 on the VAX 8800.

VAX Performance Advisor, performance analysis software for single and multiprocessor VAXs running the VMS operating system, is currently available. Licenses begin at $5,500, the firm said.

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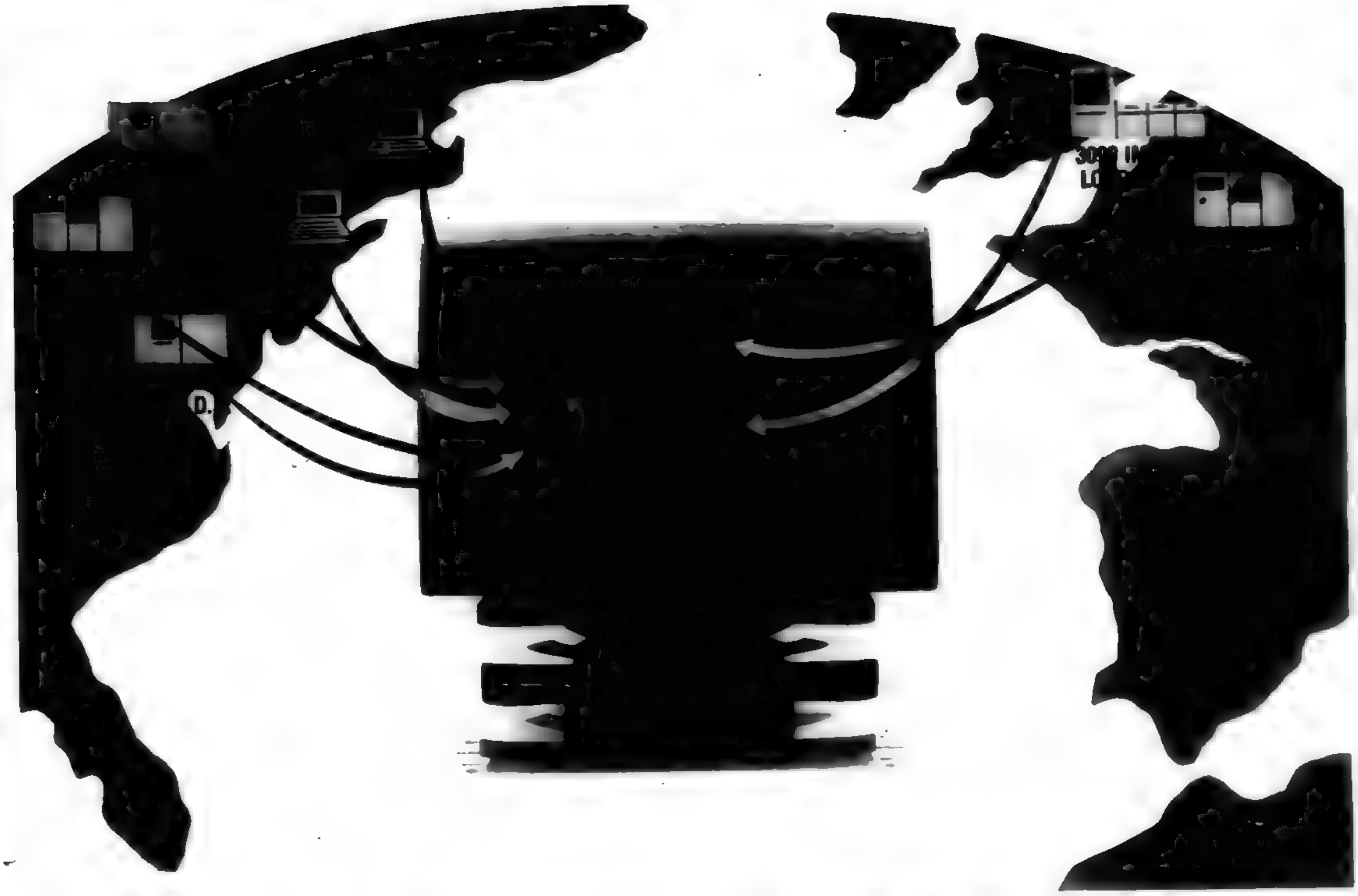

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Avanti ONX switch acts as building block for networks

By Stanley Gibson

NEW YORK — Avanti Communications Corp. unveiled last week its Open Network Exchange (ONX), a sophisticated T1 switch that performs subrate digital multiplexing.

Designed as a building block for networks that combine public carrier services with private corporate networks, the switch can reconfigure subrate digital multiplexing lines in an almost infinite variety of voice, data and video combinations without bundling them into 64K bit/sec. channels, according to the vendor. The ONX divides each T1 aggregate into multiple groups of bandwidth, each assignable to specific service destinations.

The ONX switch is the first to offer port modules compatible with Bell Communications Research Corp.'s standard for subrate digital multiplexing at standard speeds including 2.4K, 4.8K, 9.6K and 56K bit/sec., according to George Kushin, Avanti vice-president. When AT&T's subrate digital multiplexer is tariffed this year, Avanti will be the first to work with it, Kushin claimed.

The ONX allows the network to gain access to all of the value-added services now offered by various carriers, such as AT&T's Megacom, Software Defined Network and M24/44. The switch is also compatible with AT&T's Digital Access and Cross-Connect System, according to the vendor.

The ONX can switch a specific subrate digital multiplexing channel within a 64K bit/sec. channel of one T1 aggregate to a completely different 64K bit/sec. on another T1 aggregate. The ONX can be used to create networks of more than 100 nodes with more than 7,400 active channels per node, he added.

"Avanti has made a quantum leap over their previous capabilities. They've made a networking product, where the vast majority of products are point to point," said John Sundwall, vice-president of the DMW Group, Inc.

Avanti also unveiled the Open Network Management System/PC, a network management program designed to complement the ONX.

The ONX also supports IBM's Netview PC network management system.

Prices for the ONX, which will be available in May, range from $35,000 to $100,000, depending on the configuration and number of ports.

HP unveils network strategy

By Donna Raimondi

PALO ALTO, Calif. — Hewlett-Packard Co., determined to prove that it is at least the equal of Digital Equipment Corp. in networking prowess, has unveiled a corporatewide networking solution backed by 13 new products.

HP's corporatewide network consists of local-area networks supporting the needs of sales/marketing, business/office, engineering and manufacturing; an X.25 packet-switched backbone connecting the subnetworks; network diagnostic and testing tools; and a centralized host-based network management system that collects data from the diagnostic devices.

Among the HP introductions were the following:

- An X.25 private packet network, priced from $100,000 to several million dollars, that can carry a company's entire data communications between HP and multivendor systems and networks.
- Multiplexers, packet assembler-disassemblers (PAD) and other network interface equipment.
- Management tools, including a $359 statistics software package for the HP 4952A protocol analyzer, for link troubleshooting on X.25 and for IBM Systems Network Architecture networks.
- An X.25 network performance analyzer to detect network performance degradation costs $1,200. It operates with the $14,150 HP 4953A protocol analyzer with Option 001 extended memory.
- Network Services for the DEC VAX computer system, which provide HP-to-DEC communications in manufacturing, engineering, and office environments, costs from $6,000 to $11,000, depending on the VAX model in use.
- Support services that integrate new products and existing products and services to create tailored networking solutions.

Personal computer network vendor 3Com Corp. is an early customer of HP's new X.25 and network management products. Keith Smeby, manager of 3Com's telecommunications research and development of the information systems/data processing department, is evaluating the X.25 network to allow remote sites throughout the U.S. to communicate with each other and with the company's headquarters. Computer equipment consists of HP, DEC and IBM systems. "We are now running HP-to-HP across the X.25 and some HP-to-IBM. Those were fairly easy to do. Now we are working on HP-to-DEC," Smeby said.

According to Smeby, the network will be manageable at least from a PAD-to-PAD communications point of view. "I'm not sure we will be able to get down to devices outside of the X.25 network. We would like to do that."

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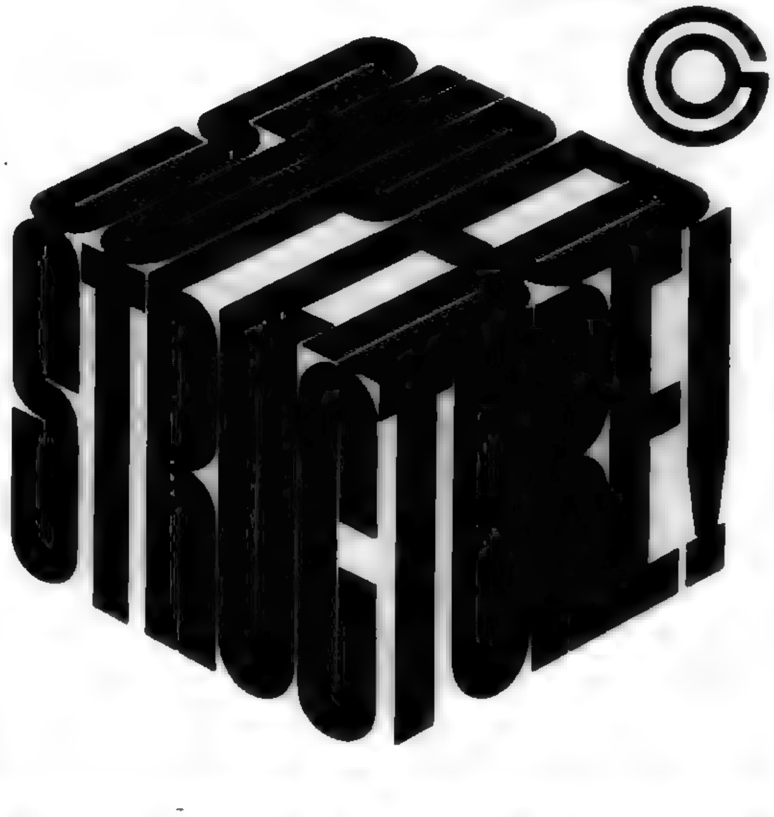

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* Washington University Center for the Study of Data Processing as reported in the 11/15/86 DATAMATION, pp 79-86.

Amdahl lowers entry point, adds 3090-class uniprocessor

Aims to lure low-end, expanding buyers

By Jeffry Beeler

SUNNYVALE, Calif. — Amdahl Corp. last week extended its IBM 3090-class mainframe line at the low end with the addition of an entry-level uniprocessor that Amdahl claimed yields roughly 30% better price/performance than the 3090 Model 180.

With throughput estimates of more than 21 million instructions per second (MIPS), the Amdahl 5890-190 provides up to 54% the execution rate of Amdahl's existing 5890-300 dual processor.

Though much less powerful than the 41-MIPS Model 300, the 190 is said to be better suited than the two-way CPU complex to applications in which transactions have to be processed serially.

"For environments where each execution step depends upon the completion of the one that immediately preceded it, users gain nothing by having more than one engine," said Dennis Stein, Amdahl's manager of processor systems marketing. "What those kinds of users need when the time comes to upgrade their systems is a bigger uniprocessor."

In a formal statement that coincided with its Jan. 20 announcement, Amdahl characterized the 190 as the largest uniprocessor it has ever made — a distinction that previously belonged to its 5860, which will continue to be sold.

Faster than 5860

Compared with the existing 5860, which executes one machine cycle every 18.5 nsec, the 190 is rated at 15 nsec and boasts improvements to both its cache algorithms and pipelining techniques, Stein said.

The combination of a reduced machine cycle time with other design refinements, he explained, makes the 190 approximately 50% faster than the 5860, which executes 14 MIPS.

The introduction of an expanded Amdahl uniprocessor creates a natural growth path for 5860 users who are locked into serial processing requirements but who need more power than their current engines can deliver, Stein said.

Announcement of the 5890-190 also lowers the entry point to Amdahl's 5890 mainframe series — a much-needed move, according to Steve Terry, corporate systems services manager at Unisys Corp.'s Peripheral Products Division and a 5860 user. Unisys is the result of the merger of the former Burroughs Corp. and Sperry Corp.

Upgrades to the previous entry-level 5890 machine, the Model 200, were not available for users of the Amdahl 580 series models that competed with the IBM 3080 family.

'Letting users grow'

Now, however, "Amdahl is clearly giving its users a way of entering the 5890 with a lower MIPS rating and then allowing them to grow to larger members of the family," Terry said. "Their strategy is excellent, because they have many users in the 5- to 10-MIPS range plus another large group at around 15 MIPS and need to get their entry point as low as possible."

A similar view of the 5890-190's debut was expressed by Daniel Benton, a securities analyst with New York-based Goldman, Sachs & Co. "An awful lot of users of 580-series mainframes will probably see Amdahl's latest announcement as a bridge to the 5890 line," he said.

But as an upgrade path, the 5890-190 may prove most attractive to users of Amdahl's 5840 and 5850 uniprocessors, Benton added. Both the 7.5-MIPS 5840 and the 10-MIPS 5850 are deliberately degraded versions of the 5860.

Although the 5890-190 will probably go primarily into Amdahl's own installed base, it may also snare some users who might otherwise have acquired IBM 3090 Model 150s or Model 180s, according to John Jones, a senior analyst with Montgomery Securities, Inc.

"In fact," Jones said, "the single-processor 190 is only slightly less powerful than IBM's dual-processor 3090 Model 200 and costs substantially less." Moreover, with a maximum capacity of 48 channels and 256M bytes of main memory, the Amdahl mainframe offers greater expandability than the Model 180, which holds only up to 32 channels and 64M bytes.

After it reaches its expansion limits, the 190 can be upgraded further to a 5890-300, which in turn can become a 70-MIPS 5890-600, a four-way processor complex that marks the top of Amdahl's mainframe line.

The 5890-190 is geared chiefly for IBM CICS, batch and other applications containing "transactions that are queued and then executed one at a time," Amdahl's Stein said.

Like the other three members of the 5890 family, the 190 supports Expanded Storage and Amdahl's Multiple Domain Feature, which allows up to four discrete operating environments to reside concurrently in the same CPU.

In a basic configuration incorporating 16 channels and 32M bytes of main memory, the machine costs $2.63 million, with shipments scheduled to begin in March.

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Prime beefs up Series 50 with 2755 office machine

By Stanley Gibson

NATICK, Mass. — Prime Computer, Inc. beefed up the mid-range of its Series 50 32-bit superminicomputers last week by announcing the 2755.

Prime claims the machine is its highest performance office system, offering an average of 20% to 25% better performance than its predecessor, the 2655 superminicomputer, at an average price increase of 4%.

The supermini is designed to exist outside a computer room, in offices or other work areas where up to 128 terminals can be directly attached.

A departmental system

"It can handle complex computing problems for a business that may not be prepared to support the cost of a computer room system. But it's not limited as a stand-alone; the 2755 can operate effectively as a departmental system in a broader network that includes personal computers and corporate mainframes," said Stephen C. Kiely, vice-president of systems marketing and development for Prime.

The machine's performance increases — up to 35% more than the 2655 — are the result of reduced memory-access time, enhanced handling of machine instructions and an enlarged cache memory. The 2755 CPU executes approximately 1.6 million instructions per second (MIPS), compared with 1.3 MIPS by its predecessor, according the the vendor.

The 2755's features include 64K bytes of cache memory, quadruple that of the 2655; 16M bytes of main memory, double that of the 2655; and support for up to 128 directly connected terminals, also double that of the 2655. Maximum on-line disk storage is 4.2G bytes.

It can also provide for up to 63 remote users connected via Primenet software, a distributed network for both local- and wide-area communications.

Peripheral support

The 2755 is hardware and software compatible with other Series 50 computers and supports the same peripherals as other machines in the 50 series.

Users of the 2655 can change their system to a 2755 by using an in-cabinet upgrade. The 2655 was introduced in October 1985.

Available for immediate shipment throughout the world, a basic configuration of the 2755 system ranges in price from $95,050 to $133,200.

AT&T cuts Unix PC prices

By Patricia Keefe

MORRISTOWN, N.J. — AT&T Information Systems has slashed the prices of its Unix PC 7300 and 3B1 by as much as 32%, also reducing prices 12% to 17% on its PC 6300 and PC 6300 Plus.

The cuts coincide with reports that AT&T will soon announce an enhanced version of its Intel Corp. 80286-based 6300 Plus that will feature IBM Personal Computer AT bus compatibility.

The first-ever price reductions on the Unix PC and 3B1, both manufactured by Convergent Technologies, Inc. in San Jose, Calif., have also fueled speculation that AT&T this year will quietly drop the Unix PC and what remains of its foundering relationship with Convergent.

AT&T spokesman Mark Siegal declined to comment on speculation that the Unix PC will be killed, characterizing the Unix PC price cut as a response to market conditions.

"What we have found with all our computers is that price is becoming an increasing factor in the purchasing decision," Siegal said.

But in an interview last month with CW Communications International News Service, Bruno Lamborghini, chief economist for Ing. C. Olivetti & Co., said the Unix PC would be phased out in 1987.

AT&T owns a 25% interest in Olivetti. In October, in a move lauded by analysts, AT&T strengthened that relationship by turning over responsibility for future personal computer development to Olivetti. Lamborghini said he expects U.S. sales to improve now that Olivetti is in charge.

Ashton-Tate finally ships Rapidfile

By Douglas Barney

TORRANCE, Calif. — According to beta-test users, Ashton-Tate's Rapidfile software was not rapid enough, a problem which delayed the product's shipment until last week.

"We decided we were going to lose a lot more credibility if we shipped when it wasn't ready than to miss our date by a few weeks," said Mike Arrigo, Ashton-Tate's product manager for Rapidfile.

Rapidfile, a $395 file management package, was originally scheduled to ship last December, but users' and analysts' criticisms of the time it took to load files from Dbase III, the dominant microcomputer data base package, caused Ashton-Tate to rework the package.

"We improved the time it takes to load a Dbase file. Because it is a disk-intensive operation, you get the most amount of improvement on a floppy-based system, up to 10 times, and on a hard disk, it is twice as fast," Arrigo said. "We did some benchmarks in our test department, and in an extreme case, a 60,000-record file that used to take 40 minutes to load now takes four minutes."

Ashton-Tate also speeded up the product's file sorting. "We saw increases of 15 to 20 times in sort speeds on very large files," Arrigo said.

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Firms ready systems to rival delayed MS-DOS release

Shipments scheduled to start next month

By David Bright

Microsoft Corp.'s industry standard MS-DOS personal computer operating system will soon have some competition.

While corporate interest in the new class of Intel Corp. 80386-based personal computers is growing fast, Microsoft's new version of MS-DOS, which will take partial advantage of the new systems, may not be released for eight months or more, according to most reports.

The new version is expected to provide multitasking and eliminate the 640K-byte random-access memory barrier of the current versions. Even then, the operating system will probably be designed for the 80286-based IBM Personal Computer AT and compatible systems.

Alternatives

In the meantime, several 80386-based alternative operating systems — some of which are said to be MS-DOS-compatible — will become available in the first and second quarters of this year.

Considering the time lag with the new MS-DOS, along with some of its expected limitations, developers of alternative operating systems may suddenly have a "window of opportunity," says Dataquest, Inc. analyst Norm DeWitt.

It is DeWitt's understanding that DOS 5.0, as the new version is often called, will provide multitasking for applications that have been rewritten for it. Only one MS-DOS 3.X application will be able to run at the same time as the new programs. "This may mean that the end users are very likely going to be forced to go out and buy all new software to take advantage of the multitasking capability," he says. DeWitt adds that developers at this point report they have found that 3.X applications run slower on an 80386-based system than they do on an 80286-based machine.

Up to now, most systems managers simply have not had enough information about the new operating systems to make a decision. Although many microcomputer managers have vowed to stick with the standards and wait for IBM and Microsoft's next moves, some managers say they may investigate the new software.

At Eaton Corp.'s world headquarters in Cleveland, PC support center manager Fred Zickert says he may take a look at the new systems if they offer MS-DOS compatibility. "Certainly we're not afraid of them," he says. "If they strike our interest, we will be taking a look at them because right now we are beginning to get a backlog of requests [for 80386-based machines]."

Other managers already seem to have made up their minds as to which direction to take, however. There are too many unknowns and no turning back once the alternative systems are installed, notes Ed Macke, manager of PC systems at Northrop Corp.'s Defense Systems Division in Rolling Meadows, Ill. Macke says he would not have time for the extensive testing that would be necessary.

The competing operating systems are being readied at such companies as Softguard Systems, Inc., The Software Link, Inc., Pick Systems and Theos Software Corp.

Operating systems that run Unix and MS-DOS applications simultaneously on 80386-based systems are also being developed by a Microsoft/Interactive Systems Corp./Phoenix Technologies, Ltd. triumvirate, as well as by Locus Computing Corp. and Microport Systems, Inc.

Softguard Systems' VM/386 environment will use the 80386's virtual-machine feature to perform multitasking with MS-DOS and other operating systems at the same time, according to the company.

Claimed to be a superset of MS-DOS, The Software Link's PC-MOS/386 will reportedly also run several MS-DOS programs simultaneously and run 32-bit applications using standard MS-DOS commands.

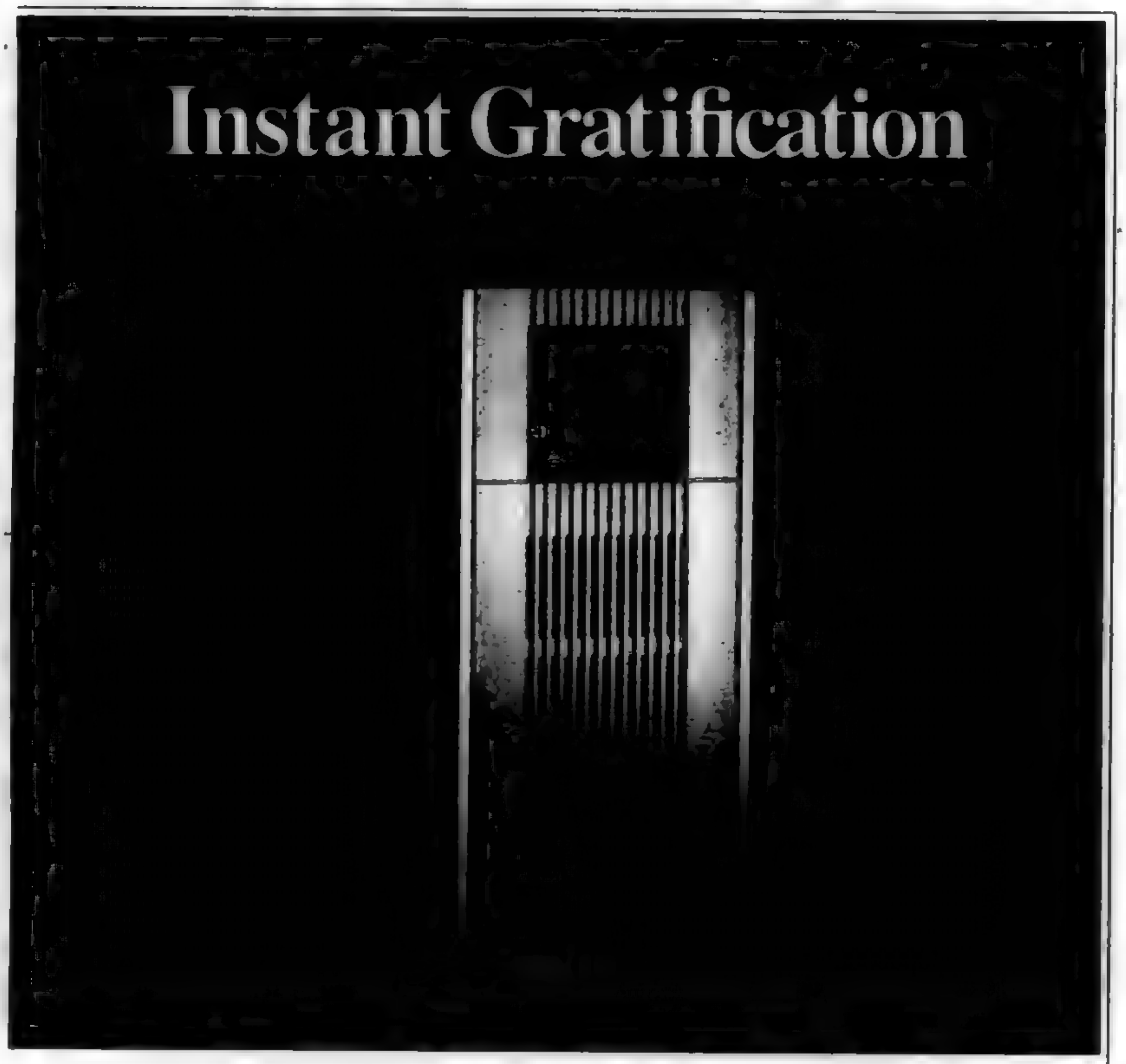
Software Link to ship system

The Software Link plans to ship its operating system next month. Softguard also expects to ship a single-user subset of VM/386 next month for running 32-bit applications, while the target date for VM/386 is June.

Pick Systems may have its non-MS-DOS-compatible Pick 386 operating system ready in the second quarter, says sales manager John Marshall. Pick Systems' software already boasts a strong following, with more than 2,000 applications from microcomputers to mainframes, according to Marshall.

The Theos system was derived from Oasis, a highly acclaimed multiuser operating system common on Zilog, Inc.'s Z80-based systems in the late 1970s and early 1980s.

Theos Software's Theos 386 currently runs on a multiuser microcomputer system and will, in the future, be ported to 80386-based PCs as well, according to Theos President Susan Catalano. The company also provides an MS-DOS emulator that runs under its 80386 and 80286 operating system versions.



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Cullinet seeks joint ventures in aggressive CIM strategy

By Rosemary Hamilton

WESTWOOD, Mass. — Cullinet Software, Inc. last week outlined a highly ambitious computer-integrated manufacturing (CIM) strategy and paid product introductions will begin this spring.

The announced CIM plans were part of a status report on the corporate strategy Cullinet announced last September. The CIM plan is based on the challenging goal of eventually offering more than 30 additional CIM products resulting from either product acquisitions or joint ventures.

Cullinet's CIM scheme starts with the premise that the firm cannot offer customers all the necessary software components of a CIM solution, company officials said. "We have the technical foundation and many applications," said Charles Nedell, director of application product services. "What we don't have is many other applications that we don't intend to do because there are good products already out there."

According to Fred Gafner, a CIM product manager, Cullinet has identified 55 CIM-related applications, from computer-aided design (CAD) to job scheduling on the shop floor. Of those, Cullinet currently markets 22 packages, which make up the Cullinet Manufacturing System, as well as its products for repetitive manufacturing environments.

Strategic partners

The remaining 33 applications will eventually be offered to Cullinet customers and will result from either product acquisitions or joint development and marketing arrangements with hardware and software vendors, Gafner said. Cullinet would not release specific information on these potential product acquisitions or strategic partners.

However, Gaftner said Cullinet is currently negotiating with some of the major CAD vendors, including Cadam, Inc., to form strategic alliances and develop gateways to link the vendors' software environments. A gateway product that would, in effect, function as Cullinet's end of the link is about to be tested, Gafner said. It is a joint effort between Cullinet and a software development company, the name of which Gafner said he could not disclose.

Tom McDoniel, director of commercial products, said he sees these partnerships as more promising than the Cullinet agreement with Lotus Development Corp., a partnership that also involved a gateway product and eventually collapsed.

"The Lotus agreement concerned competitive products," McDoniel remarked, "whereas these will be with vendors who offer something we don't plan to."

Of the 33 applications Cullinet plans to offer, the vendor said it will pursue strategic partnerships for 17 of the applications and is seeking to buy either technology rights or actual products for the remaining 16 applications.

In addition to the CAD area, a strategic partnership is expected to be forged with a shop-floor data collection vendor, said Gafner, who explained that customer surveys have identified this application and CAD as the top two priority areas.

There are at least a half dozen applications at the cell level on factory floors, such as those applications that govern numerical control equipment, that also lend themselves to joint ventures because "they're very hardware driven, and we're not in the hardware business," Gafner said.

On the product acquisition side, Gafner said the two priority areas are forecasting and project management, although he could not announce specific plans other than to say discussions are under way.

Banyan to ship 386 products

By Patricia Keefe

WESTBORO, Mass. — Banyan Systems, Inc. will ship an Intel Corp. 80386 version of its Vines distributed network operating system by midyear, followed by an 80386-based file server by year's end, a company official said last week.

"Users don't care [about particular processors], but they want performance. We think the 386 is a good solution," said Robert Stearns, vice-president of marketing.

Specifically, Banyan users can expect to achieve higher performance and more storage capability and to be able to run more local-area networks concurrently under Banyan's 386-based solution, Stearns said.

For example, Banyan's current server can support 20 serial ports. The 386 server will double that capacity, support more peripherals and feature more sophisticated communications applications.

Vines 386 is simply an enhanced version of Vines 286 running in 386 mode, Stearns noted. "It's not a terribly difficult task."

Like its competitors, Banyan is not waiting for IBM to release its much-anticipated 386-based personal computer.

"I'm not worried about [IBM's plans] with the 386. They have a lack of server technology in general. Whatever IBM does will not directly impinge on us," Stearn said.

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VIEWPOINT

EDITORIAL

The look and feel of a can of worms

The pair of lawsuits filed by Lotus Development Corp. alleging illegal cloning of 1-2-3 has created a stir befitting the potentially enormous consequences of the suits. There are a lot of worms stirring within the documents Lotus filed in federal court. The only birds likely to leave this debacle feeling satiated are the lawyers.

No, this isn't the basic software copyright suit, where the plaintiff charges unlawful copying of code. Rather, Lotus is contending that a couple of moderately successful packages are illegal because they look and feel like 1-2-3.

The first thing the judicial system will have to decide is exactly just what "look and feel" means. Once that problem is licked, the court will have to determine if a company can lay exclusive claim to the look and feel of its software. The courts will then pass judgment on the matter. And five years later, when the appeals process has come to a conclusion, they will announce the winners and losers.

However, we won't have to wait five years to feel the repercussions of this suit. One company developing an Intel Corp. 80386-specific operating system sent out press material last week, stating that its operating system is not a superset of Microsoft Corp.'s MS-DOS — as previously described — but rather an independently developed system.

There just aren't that many companies willing or financially able to go toe-to-toe in court with the Lotuses or Ashton-Tates or Microsofts of the world.

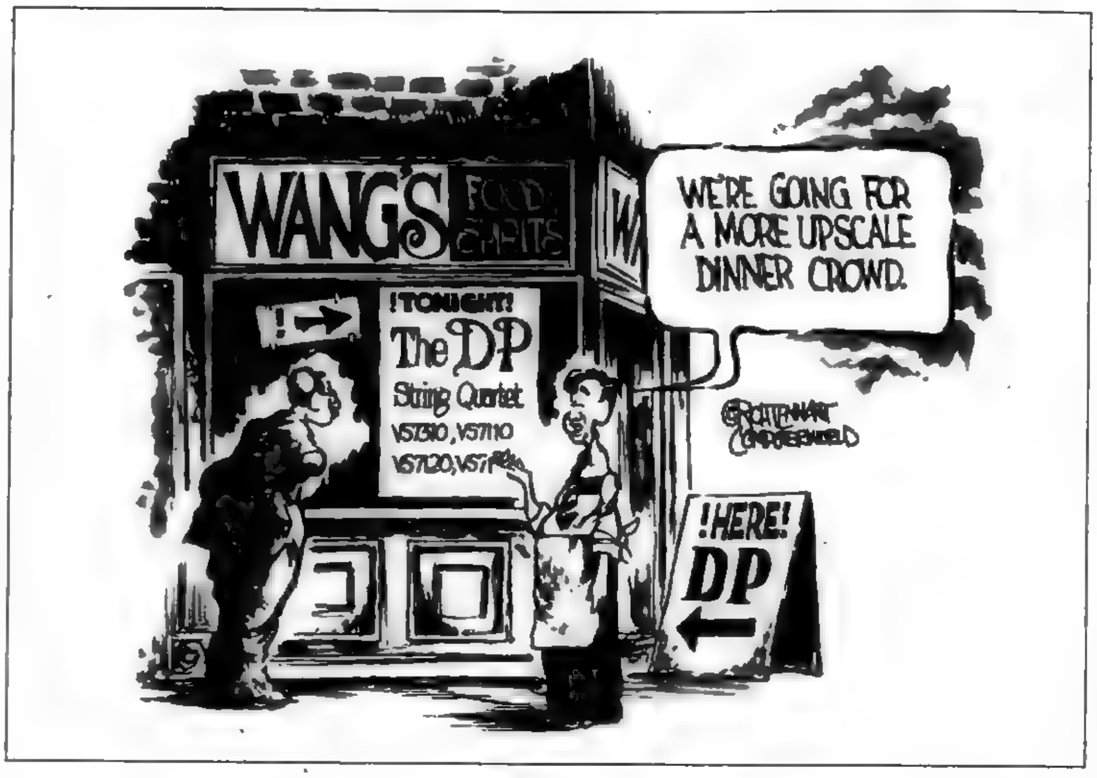
Further, the Lotus suit is sure to make some current and potential users of the alleged imitators skittish as they wonder if future enhancements of and support for the alleged copycats will be available.

Clearly, Lotus or any other company should enjoy the protection of the law when someone steals what's rightfully theirs. In Lotus's case, the company has much to lose to relatively cheap knockoffs of its 1-2-3 cash cow.

Users also stand to lose tremendously if protection can't be guaranteed for costly research and development efforts aimed at producing advanced computing solutions that imitators simply steal. The computer industry has been the scene of some of the most blatant and outrageous of copyright violations. Software is a prime candidate for such rip-offs, because actual package production costs are so low — once a market is established, that is.

But in its filings in court, Lotus says that the two packages in question are "copies — albeit, inferior copies." At a press conference in which the suits were discussed, company officials stressed that the packages posed no great threat to Lotus.

So if the packages are inferior and pose no great threat, just what is Lotus after? The answer would seem to be the market the company essentially created and now feels it should essentially own.



LETTERS TO THE EDITOR

Tax reform vs. competitive sabotage

My thanks to *Computerworld* for the article, "Tax reform dooms DP free-lancers" [CW, Dec. 15].

I am dismayed to see, once again, how the actions of just a few self-serving individuals adversly affect the livelihood and prosperity of so many. I strongly resent the insidious manner in which the technical service firms managed to sabotage their competitors under the guise of the tax reform bill. They managed to get the Joint Committee on Taxation to put Section 1706 into the bill, which makes it illegal for their competitors to continue doing business. The public was never told about this until after the fact.

Not only are the individuals running the technical service firms unwilling to attempt to compete in the normal marketplace, they are unwilling to expose their political activities to public scrutiny and debate.

What sense does it make to claim that the use of subcontractors gives some consulting firms an unfair advantage over others?

If the larger technical service companies thought it was more profitable to use subcontractors, they could have used them themselves, rather than trying to force everyone else to do business the way they do.

If the Independent Computer Consultants Association does not launch an all-out effort against Section 1706 of the tax act, it not only will be failing to serve its members but will simply disappear, along with those it represents.

While the stated purpose of Section 1706 is to collect more taxes, it is clearly an effort to remove competition. It will have the effect of taking money from the pockets of practically everyone involved.

The independents who become contract employees will make less money or will leave data processing, and the smaller, more efficient consulting businesses will vanish because it isn't practical for a small firm to keep year-round employees for unpredictable short-term projects.

With the lower end of the price scale removed, only the higher priced technical service companies will remain, with these higher costs passed on to the client.

Clearly, when there are dollars involved, ethics, morality and common decency don't even seem to exist.

Phil Nowak
Chicago, Ill.

Parlez-vous videotex?

In response to Michael A. Conniff's article, "Videotex: Beyond the word" [CW, Nov. 3], I believe Conniff to be a little bit lost in the videotex world. Saying that "the French government came ashore . . . calling their solution everything from 'antiope' to 'telematics' to 'minitel,' " gives me the feeling Conniff also doesn't know the differences between them.

Antiope is a private service available on a television through Hertzian waves. It has nothing to do with videotex. Telematics is a general term that merely means telecommunication. It has still nothing to do with videotex except that videotex is a technology in the telematics scope. Minitel is the device name of the terminal through which people access videotex services. For Conniff's own knowledge, there is only one word regarding French videotex: It's Teletel.

In addition, French videotex is becoming a multimillion dollar industry. Videotex traffic in France totaled 2,325,254 access hours, with 1,724,193 Minitel terminals in active use. Featuring over 2,000 services ranging from bulletin boards to electronic banking, shopping, mailing and specialized data bases, videotex, in France, works.

Laurent Van Huffel
Manager of Marketing Support
United Software Systems and Services Corp.
New York

A key player in parallel processing

Your article, "Parallel Processing" [CW, Dec. 22], was both interesting and disappointing. It was interesting from the point of view that you believe this type of architecture's time is about to come and that the major vendors are slowly but surely moving toward this technology. It was, however, disappointing that Encore Computer Corp., an early leader in developing the technology and a successful key player in this area, was only given a name mention as an example of multiprocessing.

Please keep in mind that Defense Advanced Research Projects Agency (also mentioned in your article), after a highly competitive bid, chose Encore and our Multimax technology as the company and architecture of choice to build a 1,000 million-instructions-per-second, general-purpose system. As a result of this $10 million award, Encore will be

Continued on page 18

VIEWPOINT

Waiting for the wind to go out of software pirates' sails

By DAVID H. AHL

How much is piracy costing the American computer industry?

It depends on whom you listen to. The Department of Commerce estimates that all piracy — including that of records, tapes, books, computers, software and the like — costs U.S. vendors $1.3 billion per year, according to Harvey Bale Jr., assistant U.S. trade representative. Computers and software represent more than half of that total, about $800 million.

However, according to an analysis by Apple Computer, Inc., the cost is much higher. Albert Eisenstat, Apple senior vice-president, says hardware and software piracy has cost the U.S. computer industry in excess of $20 billion in the last five years, with an attendant loss of some 750,000 jobs.

Legitimate packages

A 1985 study by Future Computing, Inc. projects software losses alone at about $800 million per year. The study further estimates that for every legitimate personal computing software package in use, one unauthorized copy exists. However, a study by Infocorp covering the same period indicates that software publishers are losing only about $170 million per year — a fraction of their $5 billion in revenues. Microsoft Corp. seems to agree with this assessment, according to corporate spokesman Marty Taucher, who says, "We've never run into copying as a major problem."

On the other hand, The Association of Computer Retailers reports that software, which represented some 25% of members' sales in 1984, has dwindled to only 6% of sales in 1986. A recent issue of "Electronic Education" was entirely devoted to the problems of piracy. The articles noted two disturbing results of piracy: the abandonment of the education software market by several major publishers and the reduced incentive for software authors to develop new, innovative packages.

It is clear that certain portions of the market are affected more than others. Publishers and retailers of educational, home and widely used business packages seem to be deeply affected, while value-added resellers and producers of custom packages seem to be largely unaffected.

What is also clear is that user friendliness and copy protection are incompatible. Protected software is difficult to load and use on hard-disk systems. Key lock and code identification systems are also objectionable to both users and retailers alike — to users because they are cumbersome to use and to retailers because they must stock extra parts and furnish additional end-user hand holding.

Some vendors, like Microsoft and Ashton-Tate, believing piracy is a relatively inconsequential problem, decided to put the desires of their customers first and removed copy protection from their packages. Other vendors, like Lotus Development Corp., fearful of making it any easier for pirates to copy their packages, continue to employ copy protection and are pressuring ADAPSO to formulate industrywide copy-protection standards.

Apple has also taken a hard line in legally fighting the fake Apples produced throughout Asia. This problem, of course, is different from software piracy, but there is overlap since successful hardware copying will inevitably spark software copying. Today you can buy a pirated copy of nearly any software package you wish — Framework II, Lotus 1-2-3, MS-Word, Turbo Lighting and even Xenix — in Hong Kong at 50% to 90% less than the U.S. price.

What will be the long-term effect of widespread piracy? For guidance, one can look to the music and film industries. Both proposed legislation to tax tape recorder and blank cassette sales to reimburse entertainers for lost revenue caused by copying. The entertainment industry pointed to the dire consequences of diminishing artists' incentives to perform: There would be fewer movies and recordings from which consumers could choose.

The consumer electronics industry responded by forming "Right to Tape," a well-funded lobbying group opposed to any restrictions on copying. Enactment of legislation is a long and painful process; after many years, practically nothing has happened.

Meanwhile, film studios are as busy as ever, concerts are more popular than ever, and, if there is a dearth of recordings, it is simply because the compact-disk presses can't keep up with demand. Filmmakers discovered that it was actually more profitable to sell more units at a lower price. Rarely is one priced above $29.95; two years ago, $79.95 was the norm.

Temporary shifts

While there are differences between the audio/video and computer software markets, there are enough similarities to draw some conclusions. First, software authors will not desert the market. While they may make some temporary shifts — education to business, for example — in general, innovation will not die.

Second, manufacturers are going to reduce prices to a point where piracy really doesn't pay off. In doing so, they will be surprised at how much additional demand they generate.

Third, technology will eliminate some of the problem. Just as compact disks provided an inadvertent solution for the entertainment industry, they, or another device, are likely to solve some of the piracy problems in the software industry.

My view is to forget about piracy. A free market and technology are much stronger forces and will make piracy a no-reward venture.

Ahl founded Creative Computing Magazine *and is the author of more than 20 books on recreational, educational and professional computer applications.*

The information business: Captivating and confounding

GUEST OPINION

By MICHAEL A. CONNIFF

Think of yourself as a strategic planner for a hardware manufacturer, and the internal think-tank talk has turned from the annoying present — networking, systems integration, software services and desktop publishing — to the imminent future. You are now charged with dusting off the crystal ball and coming up with a clear vision of the concepts that will drive the company into the next century.

A difficult task, but, if you are IBM, Digital Equipment Corp., AT&T or even Apple Computer, Inc., you have a ready answer: information. Your company is in the business of solutions, you say, and you need to bundle your hardware and software with information services. It's nothing more than taking systems integration, networking and software services a step further.

Given the logic of such a strategy — a logic that all four found irresistible — why have all these vendors stumbled so awkwardly in the information business?

IBM took the joint-venture route with name-brand partners: International Marketnet Service, the brokerage automation joint venture with Merrill Lynch & Co., has been a dud to date; CBS, Inc., IBM's joint-venture partner with Sears Communication Network, Inc. in Trintex Co., the consumer videotex service, has pulled out of the project.

A familiar role

DEC tried to become a publisher of compact-disk/read-only memory (CD-ROM) titles but abandoned the publishing business per se in favor of the more familiar role of supportive vendor.

AT&T tried and failed twice, first with a real-estate information service and then with a joint marketing agreement with Quotron Systems, Inc., which was discontinued when the financial quote provider was acquired by Citicorp, N.A.

IBM seems to bring its own brand of elephantiasis to the information business. DEC, a dutiful cow nudging its calves, tries to push technology along, at times to its own near-term detriment. AT&T's response to the information business is invariably Pavlovian, salivating for the T-bone steaks regulators say they can't have.

Why can't the vendors stay away? By all estimates, the information business still promises the open-ended growth now a distant magnetic memory in the vendors' past. They look at the chocolate-covered nougats like CD-ROM, consumer videotex and financial information services, and they can't keep their hands off.

Perhaps the demise of information services at Apple, where all things seem magnified, is the most instructive. Desktop publishing and desktop communications have dominated the publicity emanating from Cupertino, Calif., but Apple has also devoted resources to "desktop information."

Apple Information Services, under the leadership of an Apple vice-president, consisted of 15 people dedicated to Apple proselytization in the information industry. Apple evangelists spoke of the wonder of the Macintosh user interface as a data retrieval tool. Apple dispatched 10 people, including a business development consultant, marketing manager, director of engineering, network operations manager, software manager, vice-president, software engineer and manager of software engineering, to a small information industry conference on CD-ROM.

But there was a problem — desktop information wasn't really at the heart of their business. Apple Information Services was soon scrambling for matching funds from outside the company that would enable the unit to become a separate subsidiary — and to eventually enter the world of MS-DOS-based software.

Disbanded and dispersed

"We almost got the money," said one former Apple employee. Times-Mirror Co., the newspaper, cable television and publishing powerhouse, almost bought in. But it was not to be. Apple Information Services has been disbanded, its employees dispersed throughout the company or dispatched in search of other non-Apple work.

If vendors observed a few simple rules, they could save their companies time and resources:

- Don't get taken in by the glamour and growth of the information business. It is a complex and confounding field, even for executives with experience under their belts.
- Resist the impulse to establish equity positions with brand-name companies just because it looks good on paper.
- Pursue strategic marketing agreements that don't encourage the establishment of an entirely new and impenetrable bureaucracy.

Conniff is a consultant based in Burlington, Vt.

Continued from page 16

making incremental "footprint" announcements in terms of system performance as we meet our three-year commitment. We are, however, just as committed to the software side of parallelism as we are to the hardware side, and will continue to place major emphasis on our operating system development.

Kenneth H. Goldner
Director
Industry Marketing
Encore Computer Corp.

Classifying processing

As the article, "Parallel processing" [CW, Dec. 22], points out, there are many definitions of parallel processing. Actually, you can throw in the concepts of vector, array, multi- and matrix processors.

Unfortunately, the major problem is that people confuse parallelism in processing with parallel processors. I have an IBM Personal Computer XT microprocessor with an 8087 match coprocessor that can process simultaneously but is not a parallel processor.

I disagree with IBM that the project is a parallel processor. I feel that it actually is a vector processor. Also, I don't think the delineation should be as large a mystery as is stated. A text book called *Computer Architecture and Parallel Processing* by Hwang and Briggs presents a technical analysis of parallel and vector architectures.

They state three schemes were devised to classify computer architectures. Flynn (1966) bases his classifications on the multiplicity of instruction and data streams in a computer system. Feng's scheme (1972) is based on serial vs. parallel processing. Handler's classification (1977) is determined by the degree of parallelism and pipelining in various subsystem levels.

All of the classifications would consider the IBM GF11 processor a multiexecution unit — or single-instruction, multidata stream — vector processor. Only one instruction is decoded by one control unit at a single point in time. It is acted upon by execution units, not processors. The execution unit only carries out the single instruction. It has no control unit and therefore can't decode its own instruction.

A parallel processor would incorporate multiple processors, each of which is composed of a control unit and an execution unit. Multiple instructions would simultaneously be decoded and sent to their own execution units.

As a person who is trying to understand the subject, I will welcome all articles that are as interesting and thought-provoking as this.

Tony Jeffcott
Vice-President, Technology
Intech Leasing Corp.
Stamford, Conn.

Ametek's applications

The feature story, "Parallel processing" [CW, Dec. 22], did a fine job of addressing the issues of multiprocessing, but the research into commercial vendors unfortunately omitted a number of major players, including Ametek, Inc.

Had Ametek's System 14 not been omitted from the story, readers would have learned about an Intel Corp. 80286-based parallel processor that was commercially available in 1986. Important applications in technical and commercial markets include physical simulations of heat flow, oil fields, transsonic aerodynamics and a wide variety of Fast Fourier Transfer applications.

Al Hernek
Manager, Marketing and Sales
Ametek
Arcadia, Calif.

Open systems problem

I must confess that I found John L. Kirkley's Viewpoint, "Friendly vs. forward-looking: The Mac and AT square off" [CW, Dec. 22], highly amusing. "Friendly vs. forward-looking?" At least on the Macintosh, desk accessories know how to live with each other. He offered an interesting comparison — an enthusiastic user eager to show off what can be done now with a MacIntosh and an equally enthusiastic tech wizard saying, in effect, "Look what we'll have in a year or so!"

The point of contention seems to be open vs. closed operating systems. The Mac system is closed because it has few optional parts. In fact, if it even has a name, it's managed to escape me. The Microsoft Corp. MS-DOS system is open because it has a plethora of optional parts.

There's only one thing wrong with the open idea. The Mac system already has the parts needed to supply user-friendly software in a standardized graphic environment. To achieve the same thing under the IBM/MS-DOS architecture, one must first shell out enough money for graphics peripheral equipment to have bought an Atari Corp. ST or Amiga, then call the MS-DOS wizard to patch the peripheral drivers into DOS and hope the graphics applications work together. If this seems extreme, remember that MS-DOS is a direct descendant of an operating system that was intended to run on a 20K-byte, nongraphics, 8080-based microcomputer.

To the gurus, the Mac system may appear limited, but the Mac users seem to be pretty happy on the whole. They could care less about what DOS does or doesn't have, technically speaking, so long as the job gets done. If a system with an extendable, multitasking DOS with integral color graphics and a mouse is what you need today, go out and buy an Amiga.

Tim Holloway
Principal Associate
MTS Associates
Jacksonville, Fla.

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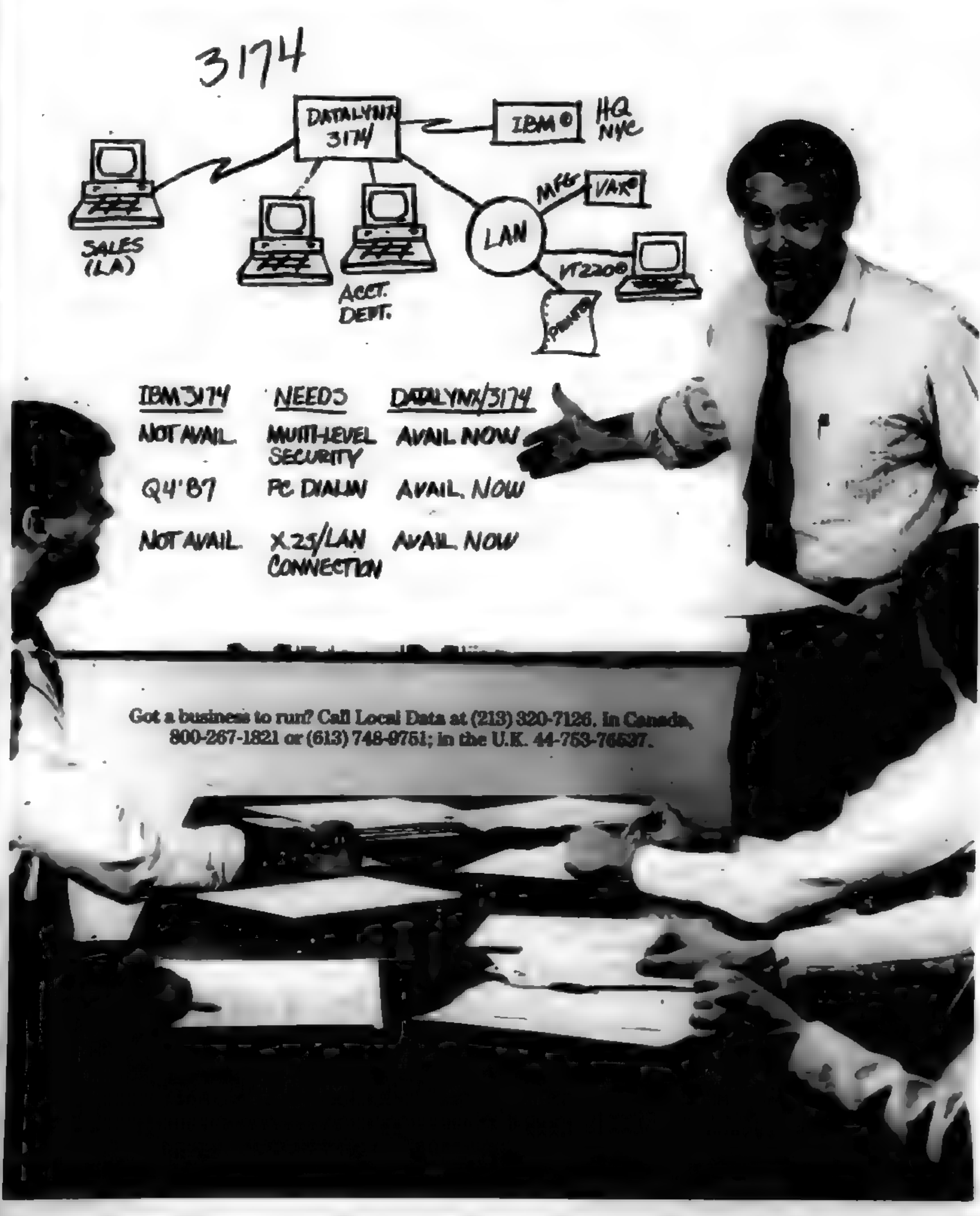

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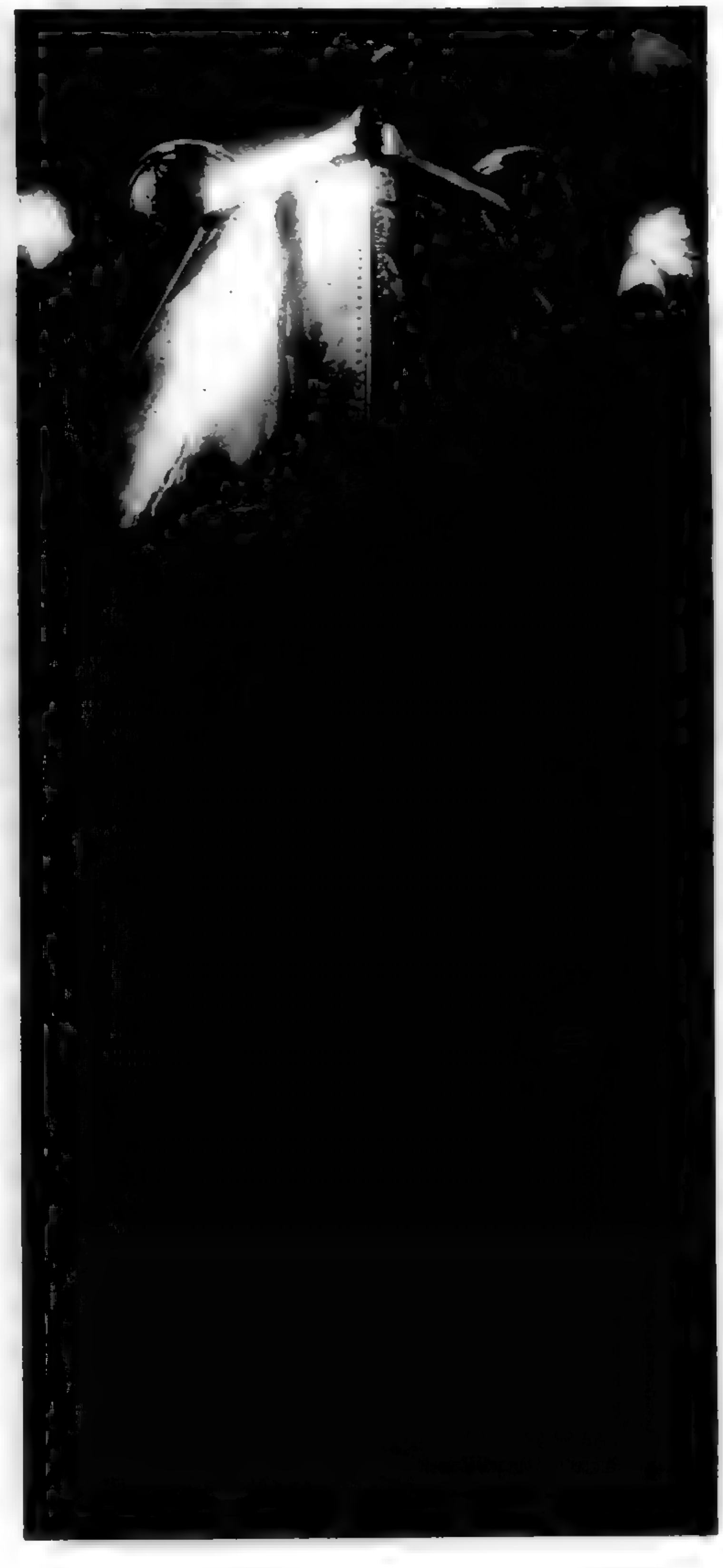

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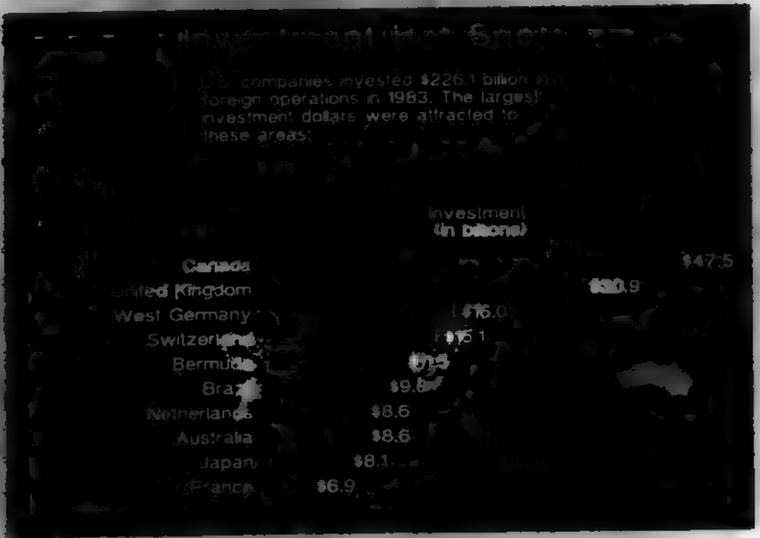

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NETWORKING

DATA STREAM
Walter Ulrich
and Elisabeth Horwitt

Reflections on a hectic year

The three-year period ending at midnight Dec. 31 was the most hectic in the history of the communications industry. During that time, communications managers had to learn to deal with the divestiture of AT&T and the subsequent regulatory and market confusion as competition intensified and vendors sought new fields of endeavor.

Of those three years, the last was particularly hectic. New technologies emerged. Several promised breakthroughs even became commercially available. Industry segments experienced repositioning, growth and shakeout. Users had trouble keeping track of it all. Here, in broad strokes, is the communications industry of 1986:

With profits down 12% in the first nine months, IBM had a tough year. Nonetheless, Big Blue announced communications-related products at a stunning rate. Among the most significant are PC Netview and the 9370. PC Netview could be looked at as IBM's Trojan horse: Promising a network management interface standard, it puts Big Blue in control of other vendors' telecommunication equipment.

The 9370 is part of IBM's counterattack against Digital Equipment Corp. in the departmental processor and networking arenas. Not only does the low-end system fill in an important gap in IBM's office systems strategy, but it

See **REFLECTIONS** page 25

Ulrich is president of Houston-based management and technology consulting firm Walter Ulrich Consulting. Horwitt is Computerworld's *senior editor, networking.*

Multiport transceiver out

Terminals, PCs to gain fiber-optic connectivity

By Stanley Gibson

ROANOKE, Va. — Fibercom, Inc. announced last week a multiport version of its Whisperlan transceiver that provides a cost-effective way for IBM Personal Computers and terminals to communicate over the company's fiber-optic-based Ethernet local-area network (LAN), according to Albert Bender, Fibercom president.

Whisperlan/MPT supports up to eight asynchronous devices at a cost of $225 per Ethernet connection, as compared with the original Whisperlan transceiver, which connects one device at a cost of $750, Bender said.

Whisperlan/MPT is not a network server on which a group of devices share access to one network connection; rather, it is a segment of a fiber-based IEEE 802.3 Ethernet: "A LAN in a can," according to Bender. This means that devices connected to a transceiver can talk to one another just through the transceiver or transmit to other nodes on the greater Ethernet LAN.

"The multiport transceiver will make Whisperlan appealing to the PC world," Bender said, adding that he believes the product will be attractive to businesses for connecting PC LANs to fiber-optic backbones.

An existing Ethernet PC network, as well as single Ethernet devices, can connect to a Whisperlan/MPT port, according to Bender.

Each Ethernet device can be located 150 feet from a transceiver.

Whisperlan/MPT is intended to work with Whispernet, Fibercom's product that implements standard 10M bit/sec. Ethernet over fiber-optic cable. However, Bender said all Whisperlan products are fully compatible with Digital Equipment Corp.'s

See **MULTIPORT** page 25

Hybrid cabling system debuts

By Patricia Keefe

MORTON GROVE, Ill. — Taking its cue from IBM, AT&T and Digital Equipment Corp., Northern Telecom, Inc. introduced its version of a uniform building network wiring scheme employing a combination of fiber-optic cable and standard twisted-pair wiring.

Called Integrated Building Distribution Network (IBDN), the Northern Telecom scheme is similar to those of its competitors. "Let's face it, the wire topology and basic connection technology is set by the 100-year-old telephone network," said Robert Newton, program director of local-area communications for the Gartner Group, Inc. in Stamford, Conn. During the next five to 10 years, he predicted, building wiring schemes will move toward fiber-optic only.

The building wiring schemes, according

See **HYBRID** page 24

Comsat, ITT unveil overseas satellite links

By Elisabeth Horwitt

ITT World Communications, Inc. in Secaucus, N.J., and Comsat International Communications, Inc. in Washington, D.C., have announced what reportedly are the first digital satellite-based overseas services between the U.S. West Coast and the Pacific Basin countries.

ITT's Worldsat service, unveiled earlier this year, now offers satellite-based connections between the U.S. and "any country served by Intelsat Business Service," said Beth Enrich, Worldsat product manager. Intelsat Business Service is a consortium of European carriers offering international satellite-based services.

Worldsat offers links between the West

See **OVERSEAS** page 24

INSIDE

First field trial of the ISDN primary rate interface begins/**24**

NEW THIS WEEK

- Server Technology offers Netbios-compatible version of its Easylan network software
- For more on this and other new products, see pp. 59-62.

INSTANT ANALYSIS

"Everyone and his brother is trying to say that what his company is doing is Open Systems Interconnect."

— Vick Boerema, manager, technical requirements, technology and standards, Northern Telecom, Inc.

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Overseas satellite links unveiled

From page 23

Coast and either Europe or the Pacific Basin and between the East Coast and Europe. Comsat, which already offered East Coast-to-Europe services, recently added a West Coast-to-Far East offering. Customers in other parts of the country will be able to access the Far East gateway in San Francisco through Comsat's domestic network, according to Eric Novotny, Comsat director of new business development.

Both ITT and Comsat are implementing coast-to-coast terrestrial links to supplement domestic satellite-based connections. A terrestrial link is necessary for data and voice communications applications that cannot tolerate transmission delays that occur during the double satellite hop needed for an East Coast-to-Far East connection, for example, Novotny explained.

Comsat's West Coast-to-Far East services will offer rates comparable to the U.S.-to-Europe offerings, Novotny said. Typically, a 56K bit/sec. line between the East Coast and a European country costs $5,000 per month for Comsat's portion of the link and approximately the same amount for the European carrier's portion.

ITT charges $4,250 per month for its portion of a 56K bit/sec. or 64K bit/sec. overseas link.

Both Comsat and ITT's overseas offerings are based on the Intelsat Business Service. Both support digital transmissions of voice, data, video and facsimile at rates of up to 1.5M bit/sec. or 2M bit/sec., depending on the variety of T1 standard available in the destination country.

Hybrid cabling system debuts

From page 23

to Newton, are loss leaders for switch makers hoping to sell equipment to users. "All the people who sell structured wiring systems are basically losing money on it," he said, adding that money is made on the installation of cable.

The hybrid cabling system used in Northern Telecom's IBDN allows terminals and computers to communicate with each other exactly as they would over coaxial cable with no degradation in speed, according to William J. Viviano, vice-president and general manager of Northern Telecom's Cook Electric Division, a telephone equipment and peripheral computer products firm.

Under the IBDN plan, twisted-pair wiring up to a distance of 2,000 feet would support a Northern Telecom Meridian SL-1 integrated services network with a distribution speed of 2.56M bit/sec. A combination of twisted-pair and signal converters would be used to accommodate such systems as IBM's 370 at 2.35M bit/sec. and System/34, 36 and 38 at 2.4M bit/sec.

The plan also includes software enhancements for planning, engineering and cable management.

GTE, Mountain Bell test ISDN primary rate

By Elisabeth Horwitt

PHOENIX — GTE Communications Systems Corp. and divested Bell operating company Mountain Bell last week began what reportedly is the first field trial of the Integrated Services Digital Network (ISDN) primary rate interface.

The primary rate defines 23 64K bit/sec. channels plus one 64K bit/sec. or 16K bit/sec. D channel that carries signaling information. It was designed to link digital private branch exchanges, communications processors and other devices that perform high-volume communications, according to Mountain Bell spokesman Robert Meldrum.

The trial involves the transmission of digitized voice and data between a GTE central-office digital switch at a Mountain Bell office in downtown Phoenix and a private-network switch located at GTE headquarters in North Phoenix, about 13 miles away. The use of fiber-optic cable connections between the two sites allows transmission over that distance, Meldrum said. Other site trials have involved distances of only a few miles, he added.

'Using ISDN to streamline'

GTE and Mountain Bell will be participating as ISDN customers during the trial, using ISDN primary- and basic-rate interfaces as part of their internal communications systems. "From our perspective, we're using ISDN to streamline our communications," Meldrum said. The trial is one of six scheduled for this year by regional holding company U.S. West.

The next site trial planned by U.S. West, scheduled to start in February, will be an internal test involving five Mountain Bell locations in the Denver area, according to Meldrum. The trial will test ISDN networking over a digital adjunct switch attached to an ordinary analog central office switch.

Other ISDN trials have used digital switches, "but most central office switches out there are analog, and it would be too expensive to convert to all digital; so this is an important test," he added.

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Reflections on a hectic year

From page 23

is also the first IBM host to directly support non-IBM communications protocols such as Ethernet and Transmission Control Protocol/Internet Protocol.

IBM's joining the Corporation for Open Systems was another strong sign that the company will not stand aloof from the standards evolution.

Superior financial performance plus a string of solid product announcements made DEC the darling of the financial analysts and the consulting community. Major DEC networking announcements in 1986 included centralized network management tools and better integration of the IBM Personal Computer with the VAX VMS environment through the Vaxmate. DEC also took the lead in Open Systems Interconnect (OSI) support, completing its seven-layer OSI suite with an X.400 electronic mail interface.

Supporting major architectures

Wang Laboratories, Inc., Hewlett-Packard Co., Data General Corp. and the rest were not far behind in announcing support of the two major communications architectures: OSI and IBM's. The announcements of LU6.2 support have been deafening, but users still await real applications that will make peer-to-peer networking under Systems Network Architecture a reality.

With the merging of Sperry Corp. and Burroughs Corp. into Unisys Corp., the obvious next step will be the integration of the two vendors' product lines.

AT&T did a great job on communications technology but has fared poorly in the marketplace. At the end of the year, AT&T announced a $3.2 billion write-off and the elimination of more than 27,000 jobs. Of course, AT&T's major competitors, MCI Corp. and U.S. Sprint Communications Co., also announced write-offs and/or losses last year and are clearly feeling the pressure of AT&T's rash of rate cuts.

FCC eased up

The Federal Communications Commission eased up considerably on AT&T and the divested Bell operating companies. AT&T Communications and Information Systems divisions now can jointly market and support their products. AT&T and the regional carriers now can use one accounting system for regulated and nonregulated ventures, provided they can satisfy the FCC that no cross-subsidization is taking place

Everyone talked up Integrated Services Digital Network (ISDN), and in November, the first ISDN trial was initiated in Phoenix. AT&T claims that it will offer true ISDN services this year, but subcommittees are still struggling to reach a consensus on protocols, and general availability is slated for 1988.

The time for reflection is gone. The new year is a time to put strategies in place and tactics into action. The manager who fails to play by the new and ever-changing rules of the communications game will be reading the want ads before the year is out.

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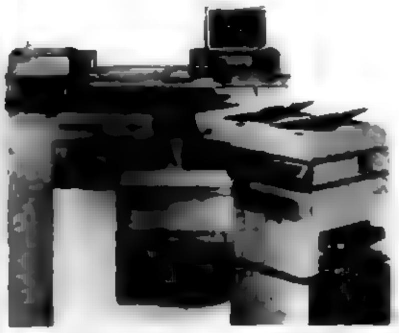

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Multiport transceiver out

From page 23

Decnet, Lanbridge 100 and Decconnect. In addition, he said the system works with AT&T's Premises Distribution System wiring scheme and IBM's Cabling System.

One of Fibercom's early customers, Tennessee Technological University in Cookeville, installed a fiber-optic backbone composed of eight Whisperlan transceivers to connect a seven-building campus. From each transceiver, Ethernet cable runs to DEC Delni boxes and from there to DEC terminal servers.

The Whisperlan/MPT replaces the DEC Delni and single-port Whisperlan in configurations such as the one described above, according to Kevin Hamilton, Fibercom applications engineer. The Delni is an eight-port concentrator to which eight Ethernet devices can connect.

A possible drawback of the network is that network operations are interrupted each time a node is added. However, network switches and multiport transceivers can be installed strategically so that nodes can be added as work-area networking needs grow, Fibercom's Bender said.

Among the advantages offered by the network are greater maximum distances between nodes and the elimination of repeaters that are necessary components of coaxial cable-based Ethernets, Bender added.

Fibercom may introduce Manufacturing Automation Protocol or IEEE 802.5 token-ring transceivers in the future, according to Bender.

Whisperlan/ MPT costs $1,800 and will be available for shipment in 60 days. At $1,800 per node, eight devices can connect at $225 each. A single-port Whisperlan costs $750.

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1986 and 1987 Digital Review Target Award Winner

SOFTWARE & SERVICES

SOFTALK
Charles Babcock

Restructuring roundtable

In the debate on Cobol restructuring that took place recently in Chicago, it was clear that certain benefits accrue to those who take the restructuring approach.

Restructuring amounts to constructing a heirarchical or tree-like structure out of the tangled Cobol that sometimes travels under the epithet spaghetti code. A restructuring program will analyze the application, eliminating recursive logic, premature exits or backward jumping loops. The aim is to get a program that functions the same as an unstructured program but is much easier to read and maintain.

IBM endorses the concept of restructuring and has issued its own product, Cobol/SF, but it only works on VS Cobol II, a thinly installed version of the language. IBM refused to send a speaker to the debate because it was being videotaped, according to a spokesman for the organizer, Peat, Marwick, Mitchell & Co.

While there was agreement on the benefits of restructuring, there was little agreement on approach. At times, it seemed as if the contrast evident in the personal style of the three debaters was carried through to the products they had written as well.

Eric Bush, the young and professorial chairman of Language Technology, Inc., showed the surest wit and evinced the most cerebral approach to restructuring; at times, it seemed as if the oversize mustache on Bush's face was just one more sign of his determination

See **RESTRUCTURING** page 28

Babcock is Computerworld's *senior editor, software & services.*

ADR updates 4GL offering

Claims improved speed, throughput, CICS activity

By Charles Babcock

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) has announced the third release in 17 months of its fourth-generation programming language, Ideal, claiming it offers a 25% performance boost.

The claimed performance improvement comes on the heels of a 35% performance increase cited by ADR in the previous release last April. Users of the IBM CICS application-oriented fourth-generation language, such as L. L. Bean, Inc. of Freeport, Maine, claimed a gain of as much as 65% in execution time with that release. Together, the two releases reflect a 100% improvement in system throughput, according to Joseph W. Farrelly, vice-president for research and development at the mainframe systems house, located here.

A spokesman for ADR said the performance improvement stemmed from shortening the instruction path for the parts of the language that were most consumptive of machine resources, improving its ability to interact with the CICS environment and reducing I/O requirements.

Farrelly said Release 1.4 puts compiled Ideal programs and panel definitions into operating system load modules rather than Ideal's own library. The load modules have been link-edited and can be managed directly by CICS, reducing the amount of communications needed between Ideal and CICS, he added.

Farrelly said response time has been improved 20%, CPU utilization reduced 15% and temporary storage I/O cut 25%. The three combined yield an overall 25% gain in system throughput, he explained.

In addition, Release 1.4 incorporates commands that let a user automatically distribute an Ideal report over an ADR/Email network. Although the number of ADR/Email users is limited to 282, Farrelly said ADR thinks the importance of electronic mail will grow and that Ideal's usefulness is enhanced with the commands.

See **ADR** page 28

Users unsure of windows standard

By Rosemary Hamilton

While applauding their vendors' efforts to offer a standard windowing environment, some workstation users said last week they are not yet certain that the windowing system chosen, X Windows from MIT, would be their choice.

"It's nice that the manufacturers are actually agreeing on what could be a standard," said Mark Plotnick, a member of the technical support staff at the AT&T Bell Laboratories facility in Murray Hill, N.J. However, Plotnick said his department plans to evaluate both the X Windows system and the recently introduced Network Extensible Window System (NEWS) from Sun Microsystems, Inc.

"I haven't heard much about the vendors' announcement, but it sounds very nice," added Chuck Royalty, a technical staff member at Boeing Computer Services Co. "Assuming we adopt X, it would help the whole spectrum of things by letting us use software in other places."

Earlier this month, the major players in the technical and engineering workstation market — with the notable exceptions of IBM and Sun — announced a campaign for a standard windowing system. The group, which includes Digital Equipment Corp., Hewlett-Packard Co., Apollo Computer, Inc. and Data General Corp., said it intends to push for acceptance of X Windows as an international standard. By doing so, the group contends, there would be a standard environment in which windows could be displayed and to which applications could be written.

IBM did not participate, although a spokesman said the vendor is pursuing X Windows development efforts.

Some users said they will continue to review alternatives to X Windows. Tom

See **USERS** page 28

INSIDE

Unisoft package supports Berkeley and AT&T Unix/**29**

DEC broadens its Baseway sales/**29**

NEW THIS WEEK

- Interleaf offers Release 3.0 of its Technical Publishing Software
- Prime releases its implementation of Common LISP
- For more on these and other new products, see pp. 59-62.

INSTANT ANALYSIS

"VM was supposed to be a bridge to MVS. But VM has so much flexibility that some companies in the VSE world are turning to VM instead of MVS. That is something that IBM didn't fully anticipate."

— Donald W. Sullivan, general manager, Uccel Corp. VSE Systems

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Oracle launches ALLIANCE program for software VARs

Oracle Corp., supplier of the ORACLE distributed relational DBMS and application development tools, has announced a new program for software value-added relicensors dubbed the Oracle *Alliance* program. The program offers broader markets, simpler, faster selling cycles, and shorter time-to-market for VARs who build or convert their applications to use Oracle's products.

According to Larry Harman, Oracle's Director of the VAR program, "We offer major business benefits to VARs who choose to use ORACLE with their products. Chief among these benefits is ORACLE's portability and the portability of ORACLE-based applications, allowing applications and data to be shared among different machines. Oracle also provides the link software to exchange database information among the different machines."

Broader VAR Markets

ORACLE runs on the widest array of hardware: IBM mainframes under MVS and VM, most vendors' minis under both proprietary and UNIX operating systems, and PCs under MS/DOS. Oracle also developed SQL/RT, marketed by IBM on the RT PC.

Harman states, "Only with ORACLE can an application developer produce software on one system and *inherit* a vast market of users of multiple vendors' hardware. Basically, we let our software VARs do *blindfold selling.*"

"Blindfold Selling"

The company described "blindfold selling" as the ability of a VAR's salesman to walk into an end-user site blindfolded and say, "I don't know what types of hardware you're using, or how many types there are, but my applications run on all of them."

Harman points out that VARs have a tough decision to make concerning what hardware to implement on. With ORACLE, that decision needn't be made. Software VARs who establish a niche in a particular vendor's install base can take advantage of ORACLE's portability to sell in other hardware environments.

Shorter Time To Market

The company also cited the high level of productivity offered to VARs by Oracle's broad range of application tools, including a forms system, integrated spreadsheet, graphics and other tools. These yield development and maintenance efficiencies that translate into shorter time-to-market and lower costs.

And, Harman adds, "ORACLE is the most complete and mature SQL-based DBMS on the market. SQL is becoming a national standard, so developing applications with an IBM-compatible, portable DBMS makes business sense in both private-sector and public-sector markets."

Harman concludes, "Generous discounts plus support, training and co-marketing combine to make the Alliance program an outstanding opportunity for software VARs."

Oracle Corporation, founded in 1977, builds and markets the ORACLE distributed relational DBMS, 4GL and DSS tools. ORACLE was the first commercial SQL-language DBMS, and is compatible with IBM's DB2 and SQL/DS DBMSs.

ORACLE provides a standard software environment across a wide range of computers and operating systems, including IBM mainframes, minicomputers from DEC, DG, ATT, HP, Stratus, IBM, Apollo and many others, and IBM PCs. ORACLE runs with IBM's MVS and VM/CMS, DEC's VAX/VMS and DG's AOS/VS among others, as well as with UNIX on most systems.

All versions of ORACLE, from the mainframe to the PC implementation, are identical. ORACLE is the only relational DBMS which provides the complete portability of data and applications across a wide variety of systems. Oracle's SQL*Star architecture links dissimilar systems running ORACLE.

Oracle Corporation markets its products worldwide through 30 direct sales offices, 11 distributors and the Authorized Oracle Dealer network. In addition, ORACLE is sold by numerous hardware manufacturers, including IBM, Honeywell, Sperry, Stratus and Prime.

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For additional information, contact Larry Harman, Director, VAR Marketing, Oracle Corporation, 20 Davis Drive, Belmont CA 94002 or call 800-345-DBMS

Restructuring roundtable

From page 27

to impose a new order on the way things might have looked in the past.

His product, Recoder, takes the most radical approach to restructuring, according to observers familiar with all three products.

Recoder is capable of breaking paragraphs in the program apart and reassembling them in a more logical order, sometimes creating paragraphs with new or replicated code to maintain a consistent logical path through the program.

W. Henry Morgan, vice-president of Group Operations, Inc., was a middle-aged gentleman with a practical, worldly air about him that could have been worn equally well on a favorite uncle or kindly Chicago ward heeler.

First to market

His company was the first to bring a restructuring product to market and Group Operations sits on a sizable lead over its competitors in terms of Superstructure's installed base.

Morgan frequently assured his listeners that a program looks more like the original after going through Superstructure than what emerges from competing products, a claim that might seem dubious to those who seek dramatic improvement.

Nevertheless, it addressed one of the hidden issues in restructuring, the threat to maintenance programmers that an old, familiar program will be run through a Cuisinart-type process and emerge as an unrecognizable puree.

Allow programmers to compare

Morgan urged that maintenance programmers be allowed to compare the output of all three products before a purchase decision is made.

The third protagonist was J. Cris Miller, a principal of Peat Marwick's Catalyst Group in Chicago and author of Structured Retrofit.

Miller was nattily attired in a three-piece suit, and his responses grew in forcefulness as he found his footing in front of the large audience.

He also appeared to be under the most pressure and most determined to uphold the company flag at all costs.

His product fell somewhere between Language Technology's and Group Operations', observers familiar with Retrofit said.

One user's analysis

One observer, who has evaluated all three products, was struck by the appearances of the speakers and offered the following analysis of how each company will fare.

"If the decision is going to be made by top management, then Bush, with his intellectual approach and his ability to supply numbers about the effects of restructuring, is going to win the deal.

If the decision is going to be made by maintenance programmers, they are going to be most comfortable with the Group Operations product. And if the decision is going to be made by a committee, then Peat Marwick has the best shot at it."

ADR updates 4GL offering

From page 27

Beta-test users said one convenience of Release 1.4 is its date-field processing capability. Ideal's internal functions can define date fields to be processed arithmetically rather than requiring a programmer to "go out and call in an assembler routine," said John J. Doherty, a programmer analyst at Wheels, Inc., a Des Plaines, Ill., fleet leasing firm.

"We like it. It's a feature they should have had a long time ago," said another beta-test spokesman, Ron Linehan, manager of systems development at the National Academy of Sciences in Washington, D.C.

Neither site had Release 1.4 applications in production use in order to sample whether they lived up to the claimed performance improvements. "It's very fast, from what I can see of how applications used to run under Release 1.3. But we haven't measured the speed," Doherty said.

Wheels is an ADR/Email user with terminals in its customers' offices. The new communications commands in Ideal will make it possible for customers to seek Ideal reports on the cost of different leasing packages, Doherty explained.

Farrelly said ADR's recent development efforts have concentrated on performance gains but that future development is likely to concentrate on added functionality.

Users unsure of windows standard

From page 27

Wadlow, a systems engineer at the computer-aided systems division at the Palo Alto, Calif., research facility of Schlumberger Ltd., said his department has been beta-testing Sun's NEWS product and that he believes it is move technically advanced than X Windows.

IBM announced late last year the incorporation of X Windows code in its Academic Information System 4.2, the Unix-based operating system for its RT Personal Computer, which is used in academic environments.

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Both modems are compatible with the popular "AT" command set, as well as the IBM command set. And they have been tested for compatibility with leading PC communications software such as Crosstalk™ XVI, Microsoft® Access, Kermit, Smartcom® and Smartcom II®

Berkeley, AT&T Unix systems supported by Unisoft package

By Elisabeth Horwitt

BERKELEY, Calif. — Software announced last week by Unisoft Corp. enables a wide range of hardware systems to run AT&T's Unix System V.3 operating system, as well as applications written for University of California at Berkeley Unix Version 4.3, the company claimed. The emerging Unix industry standard, Posix, will also be supported by the product.

Use of Uniplus+ System V Release 3 cuts by 20% the time it takes to implement the latest AT&T and Berkeley versions of Unix on new types of hardware, according to Unisoft President and Chief Executive Officer Robert R. Ackerman Jr. The product also offers in-house developers a way to run both Berkeley 4.3 and Unix V.3 applications on the same system.

Uniplus+ V.3 will, in the future, incorporate both Posix and the X/Open Group's specifications for a standardized Unix-based application environment, according to Ackerman. Supported by a growing number of hardware and software vendors, Posix is "98% to 99% the same as Unix," with some Berkeley Unix elements added, according to Ackerman. The Institute of Electrical and Electronics Engineers, Inc. and Unix users group /Usr/Group hope to resolve the differences between Unix V.3 and Posix and to produce a fully functional standard by year's end.

Uniplus+ Version V Release 3 incorporates Unix V.3 and Berkeley 4.3 features such as shared libraries and mandatory and advisory file and record locking.

Networking features include Transport Level Interface and Transport Provider Interface as well as Streams, which encompasses a set of tools for developing communications services within the operating system kernel. The product also includes a new release of Unisoft's B-Net, a networking system based on Transmission Control Protocol/Internet Protocol, as well as an implementation of Sun Microsystems, Inc.'s Network File System (NFS). NFS provides remote file access between different Unix systems.

Also available with the product is Unisoft's PC Interface, which enables an IBM Personal Computer to communicate with systems based on Uniplus+.

Standard Uniplus+ V.3 features include the Korn shell, one of the two major shells used with Unix V.3; full windowing capabilities; a smartboard executive; slave application processor support; power-fail recovery; and international language support. Performance is also improved through a large block-file system, which increases fourfold the number of bytes that can be read at one time.

Uniplus+ V.3 will be available in the first half of this year.

DEC broadens Baseway sales

MAYNARD, Mass. — Digital Equipment Corp. recently announced that Baseway, its software development package for factory automation applications, is available to OEMs.

At the same time, Scientific Systems Services, Inc. in Melbourne, Fla., said it will sell Baseway and plans to market it to discrete manufacturers such as those in the automotive, appliance and aerospace industries.

Originally designed for the automotive industry, Baseway has been available to end users since 1984. The system runs under VMS.

DEC said it will sell the software separately, with prices starting at $13,000 for a Microvax II version, or as a complete package. The $100,000 package includes Baseway, a Microvax II, a PDP-11 model to act as the controller for factory floor devices and licenses for VMS and Decnet.

— **Rosemary Hamilton**

or

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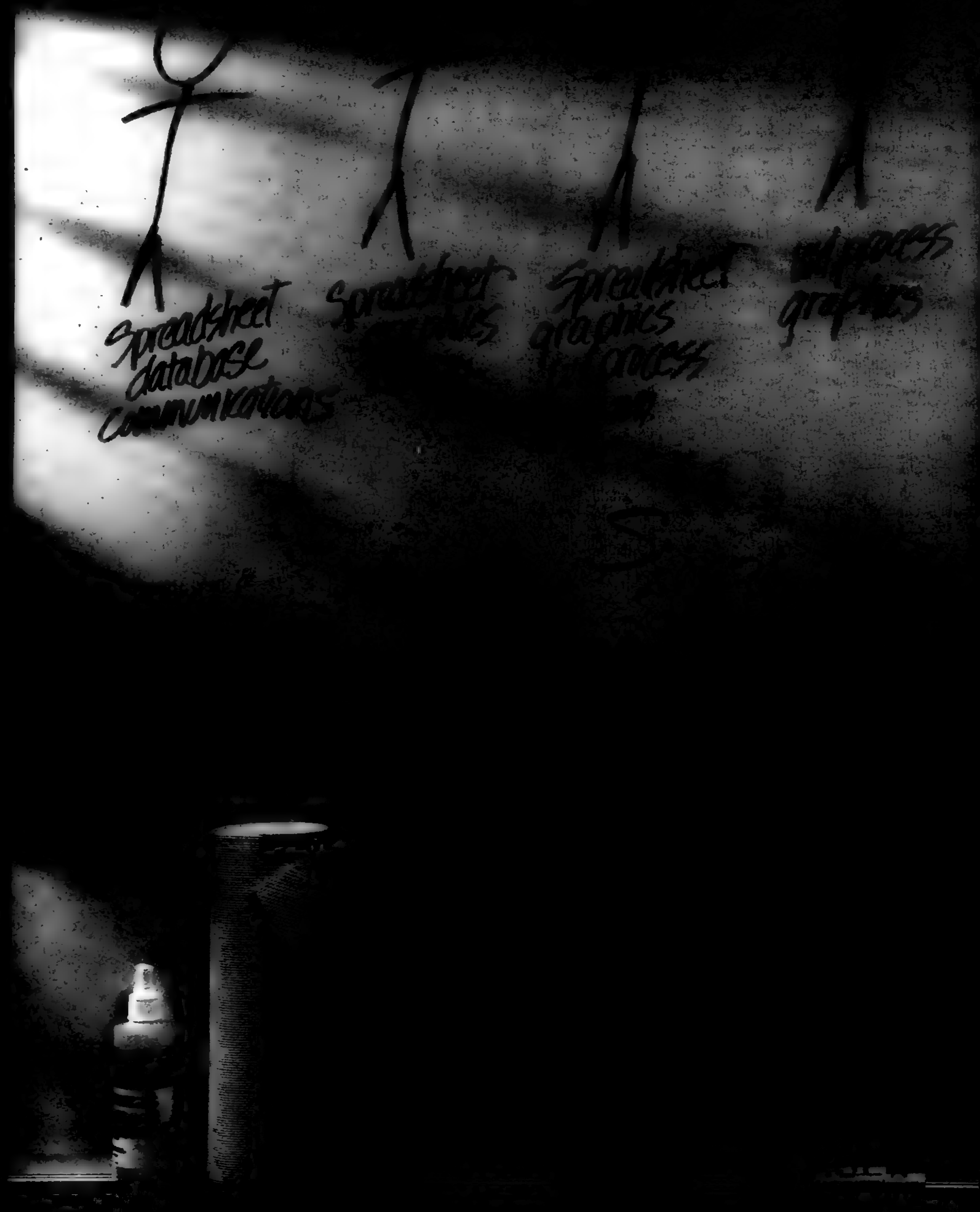
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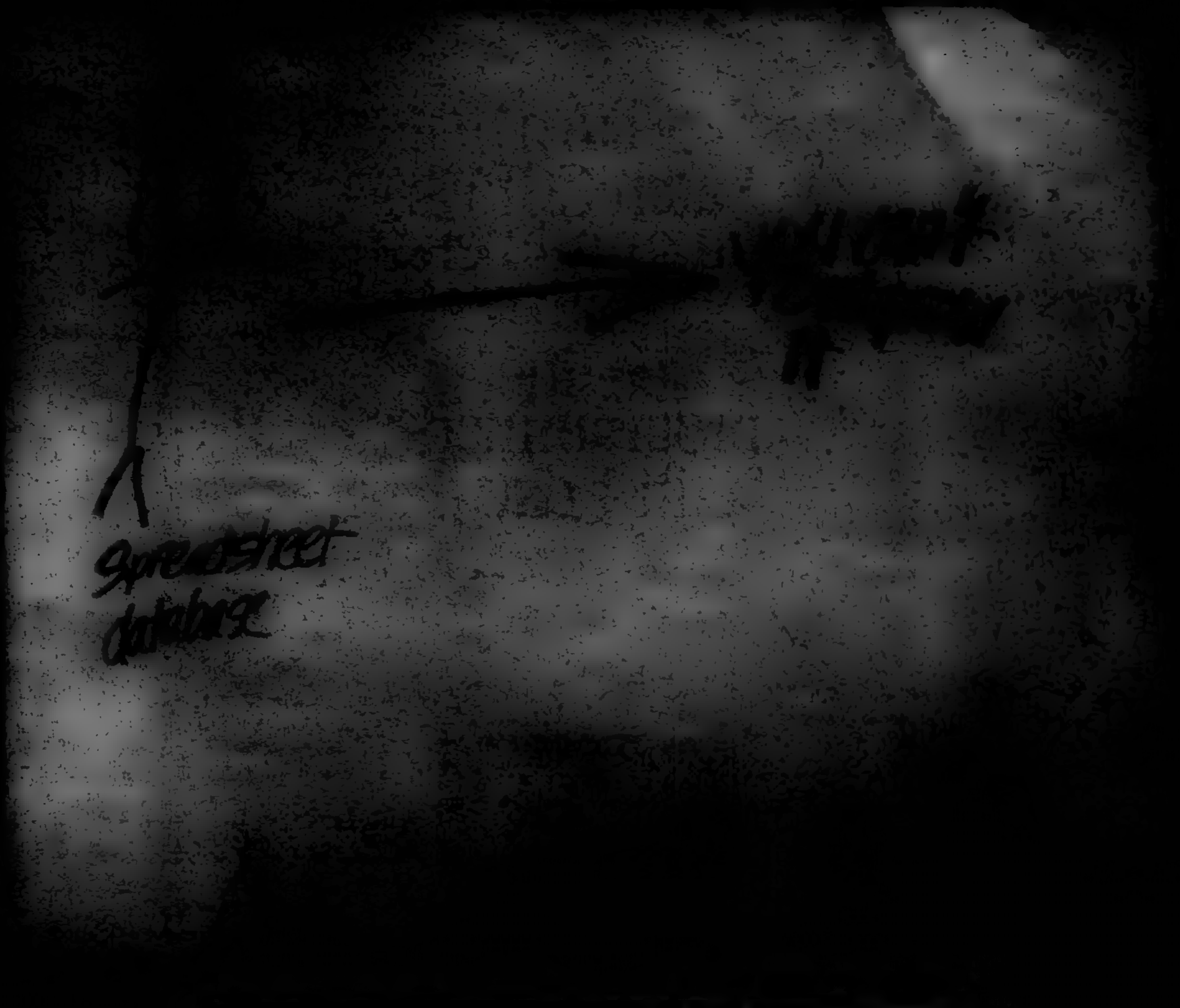

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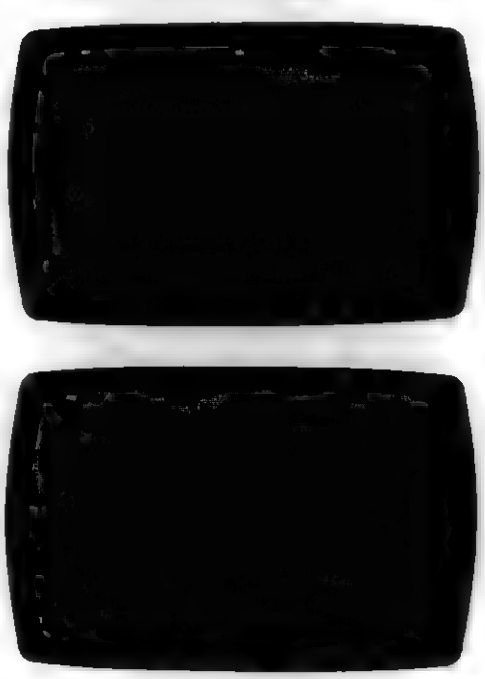

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SYSTEMS & PERIPHERALS

HARD TALK
Stanley Gibson

Solving the DASD mystery

In this Sherlock Holmes centennial year, it is fitting that a long-standing mystery be solved. Indeed, the denouement of a plot that might be called "The Case of the Dastardly DASD" is at hand.

In September, IBM began a program of replacing parts on all outstanding Models AO4, BO4 and AA4 of its standard 3380 direct-access storage devices (DASD), signaling the beginning of the end of a 4-year-old problem.

Difficulties with the head disk assembly that led to head crashes originally cropped up in 1983. At first, the cause was thought to be certain fungicides in computer room air-conditioning coolants that deposited tin oxide on the disk heads. Later, it was determined that the fungicides would merely speed up the development of the real problem, which was that flame-retardant chemicals, antimony and bromine, came loose from the plastic air system parts to which they were bonded.

According to Reliability Research, Inc., a consulting firm in Norwalk, Conn., the first instance of a customer being told that antimony and bromine were at fault occurred in June 1985. Even before that, however, a manufacturing change was made, altering the design of plastic air-intake parts. But not until last September, according to the firm, was an engineering change on existing head disk assemblies made,

See SOLVING page 35

Gibson is a Computerworld senior writer.

Intel offers network server

Targeted at financial, federal organizations

By James Connolly

HILLSBORO, Ore. — Building on the base technology of its 2-year-old System 300 series of supermicrocomputers, Intel Corp. last week announced a departmental network server targeted at functional departments in large organizations.

The Opennet Multiserver reportedly integrates equipment and functions previously available separately and features enhancements for some of those features. In addition to announcing the server, Intel officials said they plan to make processor upgrades available for the server and the 300 series in April.

The board-swap packages will allow users to install Intel 80386 processors in place of the Intel 80286. No prices for the package are available yet.

Claude Wimberly, marketing manager for Intel's systems operation, reported that Multiserver is targeted at large government and financial organizations. He claimed Multiserver is particularly well-suited to environments in which several personal computer Ethernet networks need to be linked to each other or to a minicomputer or mainframe host system.

Single, central link

Key features include menu-driven administration, transparent network file access, virtual-terminal capabilities for personal computers to run applications on the server and the ability to serve as a single, central link between personal computers and larger systems.

"Personal computers can now share department resources such as expensive laser printers, as well as communicate with corporate-level mainframes. The system allows users to work on files without bogging them down with having to know where the files are located in the network," Wimberly said.

The server runs Intel's version of Microsoft Corp. Xenix. It supports 140M bytes of disk storage, a 60M-byte tape backup and a 320K-byte floppy disk drive and uses an 8-MHz 80286 CPU. Prices range from $15,000 to $30,000.

Storage Technology subsystem offers Unisys 1100 compatibility

By James Connolly

LOUISVILLE, Colo. — Storage Technology Corp. (STC) last week introduced a tape subsystem designed for use with Unisys Corp. 1100 mainframes or in mixed environments with Unisys, IBM and Control Data Corp. systems.

The 4700 Tape Subsystem is based on STC's existing Storagetek 4600 tape subsystem but features a greater range of compatibility with the 1100 family of mainframes produced by the former Sperry Corp. arm of Unisys.

"One of the outstanding features of the 4700 is its versatility. It can be attached simultaneously to multiple Sperry and IBM mainframes for shared access and storage capability. This tape-pooling ability is unique to the industry," said Carl Raine, STC vice-president of worldwide marketing.

Raine also said cooling, power and space requirements are reduced by 40% in comparison with Unisys products. He said the 4700 does not require raised flooring or stand-alone control units.

The controlling drive, the 4700A70, costs $47,500, and the 4700B70 costs $21,000. Both drives operate at 200 in./sec.

INSIDE

Ibis Systems unveils a disk subsystem using Intelligent Standard Interface/**34**

Memorex adds to 3270 peripheral offerings/**34**

NEW THIS WEEK

- Informer Computer Terminals offers portable workstation

● For more on this and other new products, see pp. 59-62.

INSTANT ANALYSIS

"They dug themselves a grave, but it is too soon to bury them. They are starting to claw their way out."

— John McCarthy, Forrester Research, Inc. analyst, on Wang Laboratories, Inc.

Multiple Domain Facility saves users time, cost, space

By Jeffry Beeler

In little more than two years, Amdahl Corp.'s Multiple Domain Feature (MDF) has worked its way into 30% of Amdahl's 580 series mainframe sites and, users say, has helped to save on software costs, unneeded equipment, systems programmer time and floor space.

Customers also cite the product's ability to allow them to run production and development tasks concurrently on one system — a practice most users normally shun.

In addition, the feature's overhead typically consumes only 2% to 3% of a system's resources, compared with at least 10% for its nearest equivalent, IBM's VM host operating system, according to customers.

Introduced in November 1984, MDF divides a mainframe into two or more discrete domains within which similar or dissimilar operating environments can run concurrently and independently. The product does in hardware for Amdahl what VM does in software for IBM.

How a processor's resources are distributed among constituent logical machines is left to the user. Moreover, customers can later shift resources from one domain to another to reflect changes in applications.

Although the product was designed to suit an assortment of uses, it has gravitated to some uses more strongly than others. In one of its more popular applications, customers reserve part of their system for IBM MVS production jobs and use the rest to convert existing programs to IBM Extended Architecture (XA).

A typical case involves National Computer Services, Inc. (NCS), a Chicago-based commercial time-sharing provider that uses MDF to create two domains in its Amdahl 5860 uniprocessor. The company supplies its clients with remote job entry, a time-sharing option and CICS services on one domain. From the other, it moves applications and customers to MVS/XA, a process that is roughly 50% to 60% complete.

The time-sharing service considered other XA conversion aids. One alternative would have been to acquire a second 5860. "But obviously, that option would have been much more expensive than using MDF," observes Paul Sarris, NCS's chief executive officer.

Also setting aside part of its MDF-equipped mainframe for a migration effort was Republic Bank Corp., a Dallas-based bank-holding company. Republic found the feature helpful during its 19-month conversion, which ended in October, says Republic Bank's senior vice-president, John Gala. "MDF greatly facilitated our conversion by allowing us to do our XA and production work in parallel during prime shifts," Gala says.

Another common MDF application is distinguished by the presence of a different IBM operating system in each logical machine. For example, Federal Express Corp.'s Colorado Springs development center houses a dual-processor Amdahl 5880 running MVS and IBM VM/CMS.

NCS and Republic Bank restrict their mainframe operating environments to MVS and MVS/XA, but Federal Express parcels its resources between MVS and VM/CMS. The 5880 supports three domains — for MVS application testing, quality assurance and system software testing — plus a fourth for VM development, according to Denis Mattingly, Federal Express's senior manager for technical services.

In a third MDF application, users maintain a uniform operating environment across all their domains but run a radically different software

See FACILITY page 34

Ibis disk subsystem compatible with CDC Intelligent Standard Interface

WESTLAKE VILLAGE, Calif. — Ibis Systems, Inc. has announced a high-speed disk drive subsystem using an interface designed to be compatible with Control Data Corp.'s Intelligent Standard Interface.

The Ibis-II, based on the Ibis Model 1400 disk drive, reportedly features a capacity of 1.4G bytes and a peak data transfer rate of 12M byte/sec. The interface added to the Model 1400 was developed under a 1985 contract with CDC spin-off ETA Systems, Inc. ETA Systems and Ibis worked together in defining the requirements for the Ibis-II interface, which CDC specified in 1982.

The subsystem was designed for use with ETA Systems' ETA-10 supercomputer and Star Technologies, Inc. array processors. Star has accepted delivery of the Ibis-II, and ETA Systems installed the subsystem on the first field-test version of the ETA-10 at Florida State University this month.

The 12M byte/sec. transfer rate is intended to meet the need to transfer large blocks of data in scientific applications. The drive can be formatted in 4K- or 16K-byte sectors.

The Ibis-II with Intelligent Standard Interface-compatible interface costs $70,000.

Memorex adds modular unit

Rollout allows users to customize terminal

SANTA CLARA, Calif. — Memorex Corp. recently announced the 2180 modular terminal, a monochrome version of its 2180C color terminal announced last fall. Both are plug-compatible replacements for the IBM 3180 display terminal.

The terminals have a modular design that lets users customize their terminals by interchanging logic modules and keyboards. They are designed for high-volume data entry and interactive processing, according to Memorex.

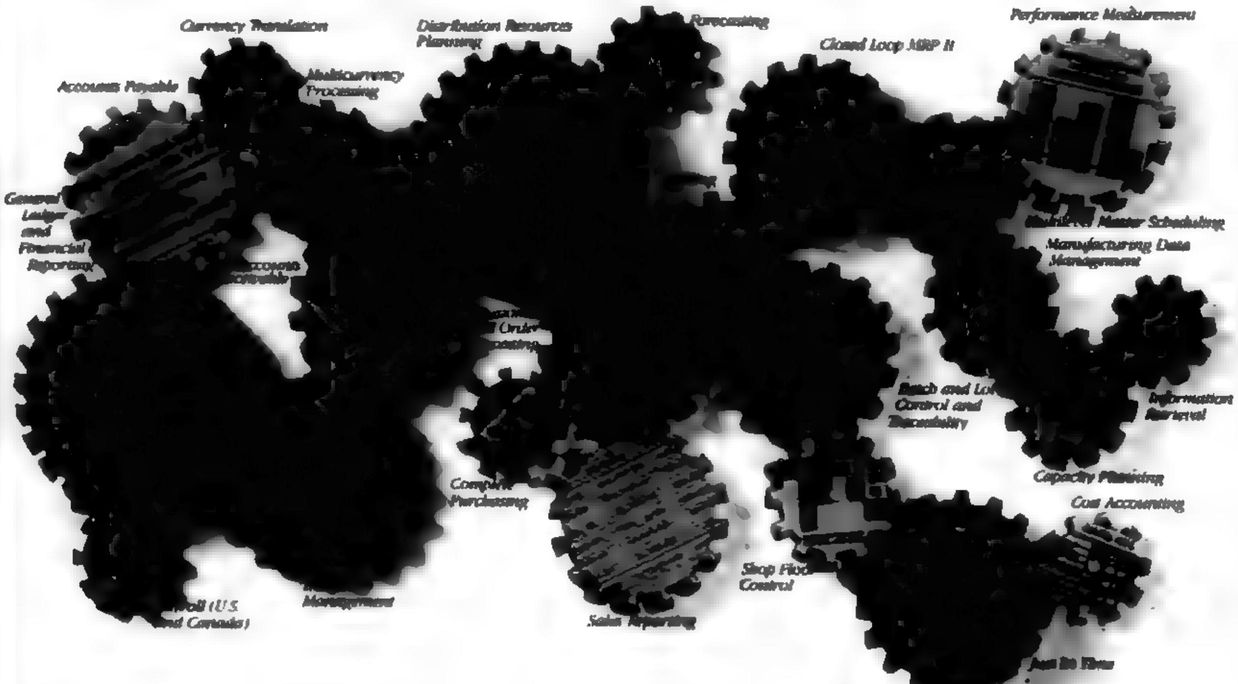
The 2180 has a tilt-and-swivel monitor to adjust the viewing angle, an extra port to attach I/O accessories and light-pen support.

Users have a choice of six keyboards: three 122-key keyboard styles and three 88-keyboard styles, according to the vendor.

The terminals are available at a single-unit price of $1,995.

In addition, Memorex announced the 2173-B screen printer, which replaces the current 2173 model, offering more features at a lower price.

The screen printer features serial and parallel interfaces and full-size or half-sheet printing. The 2173-B is listed at $425 with a serial interface and $400 with a parallel interface.



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Facility saves users time, money

From page 33

subsystem within each. Memorex Corp. in Santa Clara, Calif., executes manufacturing process control systems under CICS on one side of its 5860 and standard accounting functions under TSO on the other.

"We assigned each application its own domain because CICS and TSO usually don't share environments particularly well," according to Steve Terry, Memorex's manager of corporate systems services.

Like many other users, Memorex and Federal Express used MDF to consolidate separate mainframes into one. Before installing MDF almost a year ago, Federal Express's Colorado installation operated four IBM 3033s, one for each of its four MVS and VM programming systems. The company has since transferred all activity to the 5880, Mattingly says. The consolidation translates into a 50% increase in the amount of usable data center floor space.

The advantages of consolidation are not limited to floor space economies, however. By cutting the number of CPUs, users can eliminate redundant operating system and program licenses and avoid attendant overhead.

During its pre-MDF days, Memorex ran manufacturing jobs on an Amdahl 470V/6 and commercial applications on a 470V/8. By moving both systems to its 5860, the storage products vendor has been able to cancel one set of licenses and use the other to control both domains.

"The cancellation has cut our software costs well in excess of $50,000 to $60,000 per year," Terry notes. Because it now operates one CPU instead of two, Memorex has also seen a decline in its systems-related utility bills.

Not all of MDF's benefits, however, are readily quantifiable. At NCS, for instance, the product has simplified life for systems programmers and, in doing so, has raised its level of customer service, Sarris says.

Until recently, systems programmers often worked nights to minimize contention for resources during the day. MDF allows development and time-sharing activities to coexist on one machine but shields the latter from development problems.

SYSTEMS & PERIPHERALS

Solving the DASD case

From page 33

leading to the wholesale preventive maintenance that is still in progress.

From the first occurrence of the problem, it took IBM two years to discover the cause of the problem and perhaps another two years to institute preventive maintenance, which was begun well after the drive ceased production.

Now, IBM has a new generation of drives, Models D and E, and Big Blue is interested in selling these to its users. To stimulate sales, IBM is offering to replace the front HDAs (the ones susceptible to crashes) on all drives for users who have had a history of crashes. For others, IBM is performing the parts replacement so that customers may resell their units with a clear conscience.

For some users, it is a good deal to sell an old rebuilt drive and put the money toward a more powerful new one, particularly if they are taking their systems down and backing up data, to make way for the parts change or HDA replacement. If IBM had replaced HDAs earlier in their life cycle, it would merely have been an expense for the vendor. Now, it can be viewed as a stimulant to sales.

Big Blue's bottom line

IBM has spread the problem out over several fiscal years, so that Big Blue's bottom line has been insulated from an immediate adverse impact. In the process, users, as a group, were never told the nature of the problem until IBM had a new drive to sell them, nor were they protected by adequate preventive maintenance from head crashes, which broke out in some users' shops like small epidemics.

According to Reliability Research, a key role in resolving the problem was played by a users' bulletin board. Users exchanging notes on HDA problems were armed with plenty of information when IBM reps came calling to expound the company line on the problem.

With hundreds of messages being exchanged on this topic on the bulletin board, IBM was not amused, according to Tom Gallaudet of Reliability Research. IBM was being sent a disk of the forum's dialogues, but when the 3380 came under heated discussion, IBM asked not to be sent any more forum records, Gallaudet recounts.

Clearly, IBM is happiest dealing with each customer in isolation, on a one-to-one basis. But imagine how absurd it would seem if General Motors Corp., for example, were to become annoyed every time two Chevy owners talked with one another about their cars.

If users cannot call on Mr. Holmes of Baker Street for assistance, at least they can combine their own powers of deduction with many other managers through means such as bulletin boards and users group meetings. Few doubt that IBM is looking out for its interests. Users' interests are no less important.

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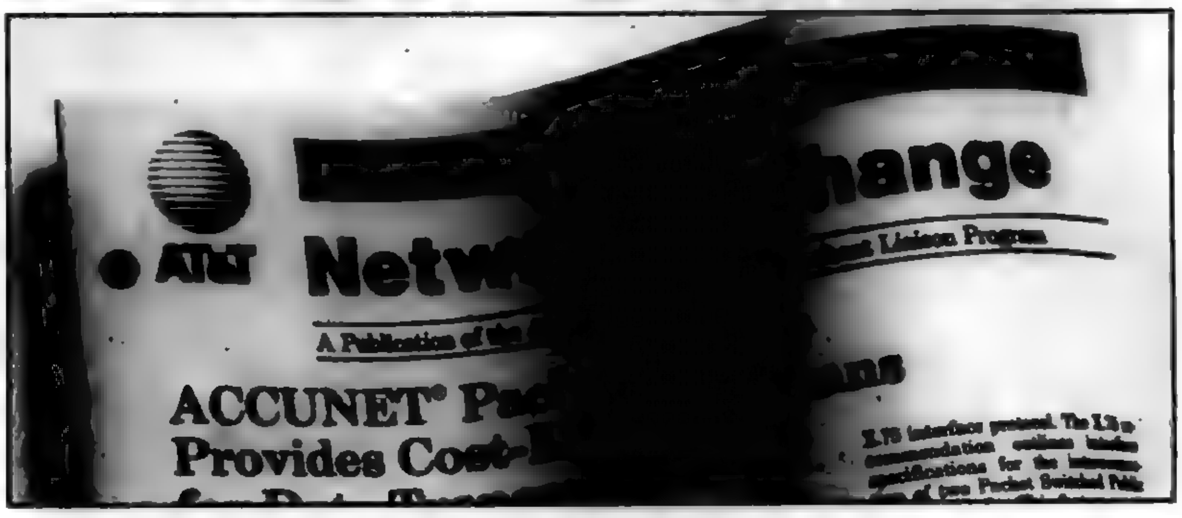

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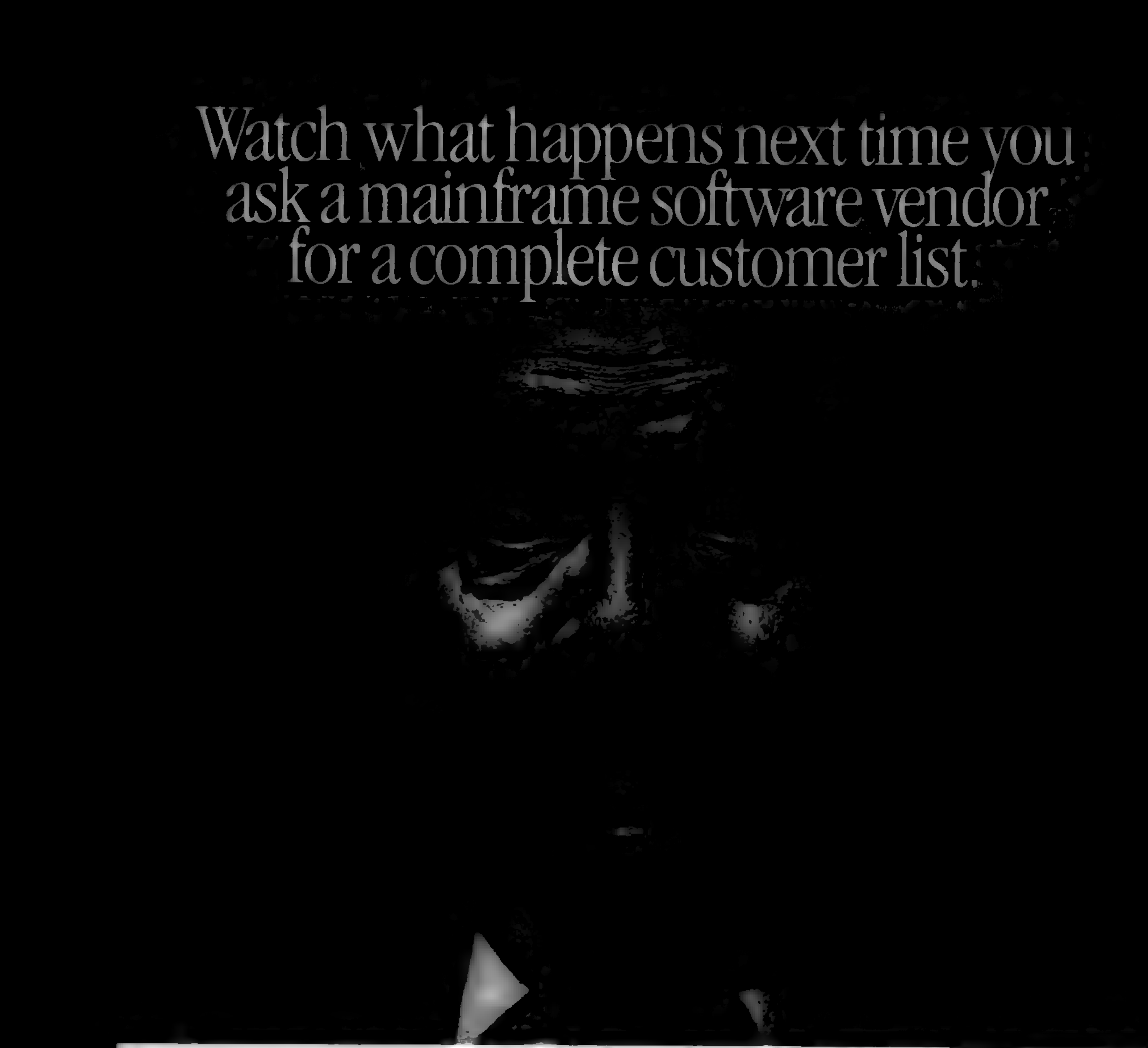

Watch what happens next time you ask a mainframe software vendor for a complete customer list.

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MICROCOMPUTING

MICRO BITS
William Zachmann

Cruise control for cursors

To be honest, slow cursor movement and cursor run-on weren't problems I thought I had. So when I received a copy of Revolution Software, Inc.'s Cruise Control, it sat in software limbo, unopened, for weeks.

This ignorant and uninformed attitude lasted until I finally broke the shrink-wrap and tried Cruise Control. It is another of those ingenious utilities for IBM Personal Computers and compatible systems that, once you use it, makes you wonder how you ever got along without it.

The primary functions of Cruise Control are straightforward in both concept and execution. In the first place, it greatly accelerates cursor movement when you are using the cursor-control key on the keyboard.

A lot of applications software simply processes repeating cursor-control keys at the standard autorepeat rate of the keyboard. This can be interminably slow if you want to move the cursor a long distance, such as across many rows or columns of a spreadsheet or in a word processing document.

Cruise Control traps cursor-key presses and feeds them to the application at a rate up to the maximum speed that the application can process them. For all but a few older programs, this means cursor movement rates can be greatly accelerated.

In addition, Cruise Control lets you adjust the cursor rate to your own preference. It uses a special key in combination with others (the "5" key on the

See **CRUISE** page 39

Zachmann is vice-president of research at International Data Corp.

Support program debated

Users dispute cost, value of Ashton-Tate offering

By Doug Barney and Peggy Watt

TORRANCE, Calif. — Users continue to have mixed reactions to Ashton-Tate's corporate pay-for-support program, with some refusing to participate citing high prices and others saying they believe support is worth the price.

Despite the user criticism, Ashton-Tate claimed the program announced in August has exceeded expectations. "We are not into the hundreds yet, but we are moving toward the first hundred," said Karen Orton, director of services and support for Ashton-Tate. "We are not selling millions of dollars worth of this stuff, but we never intended to."

Corporate users had until the end of last year to decide whether to pay $4,000 for the corporate support plan before free corporate support runs out. For individual end users, free support expired on Dec. 1.

Many users remain uncomfortable with the new concept of paying for support. "We will never pick it up. The frustration for most users of waiting on the phone puts a bad taste in your mouth," said Bob Merkel, project engineer at Professional Control Corp. in Germantown, Wis. "When they come out with a pay plan, it is kind of a slap in the face."

Like many users, Professional Control will provide its own support. "You just have to spend more time discovering and working out the bugs yourself," Merkel said.

"We did not sign up for the Ashton-Tate program; we can't justify $4,000 and we have good internal support. That [policy] needs to be put into some licensing program," said Alan Gross, president of the Microcomputer Managers Association International, New York, and a micro manager for a firm he asked not to be identified.

Another user argued that the program has to become more flexible and less costly. "I told Ashton-Tate that I am not interested. Until it is more flexible and I can pick what I want at a reasonable cost, I won't pursue it," said a computer support manager with a large banking firm.

But other users, mainly with large corporations, argue that support is worth the price. "The contract is signed," reported Judy Galgano, manager of office automation for Grumman Corp. in Bethpage, N.Y. "We have felt in the past that we have gotten a pretty good level of support, and we

See **CUSTOMER** page [illegible]

NEW THIS WEEK

- CMS offers a 60M-byte hard-drive subsystem for IBM PCs
- For more on this and other new products, see pp. 59-62

INSTANT ANALYSIS

"We're trying to create mass software — for the Macintosh — for the rest of us. The programs for $400 are for the rich of us."

— Philippe Kahn, president of Borland International, on the Borland philosophy

Adjunct products beef up Dbase

By Peggy Watt

Users of Ashton-Tate's Dbase products are enhancing the powerful microcomputer data base development system by drawing from a growing selection of adjunct products.

"When Dbase doesn't do the job, we look around for something else," says Thomas G. Pantazi, systems analyst for end-user computing at Grumman Data Systems, a division of Grumman Corp. in Bethpage, N.Y. He says he prefers compatible — not replacement — products.

Like many managers, Pantazi says he has too much invested in Grumman's more than 700 microcomputers running Dbase to switch data base management systems entirely. He uses outside compilers to speed up Dbase execution and editing tools from Wallsoft Systems, Inc. to splice programming changes.

Grumman recently standardized on Alpha 3 from Alpha Software Corp. in Burlington, Mass., as a front end for Dbase data bases. "It helps the end user who doesn't know much about Dbase to handle the system," Pantazi says about the menu-driven Dbase-compatible package. "As the users grow, functionality can grow, but they can retain the architecture."

Just as the Lotus Development Corp. 1-2-3 aftermarket has spawned a selection of helper programs, Dbase supplements keep

See **ADJUNCT** page 38

Oracle Corporation's new end-user interface, Easy*SQL, makes the ORACLE relational database management system (DBMS) instantly accessible to novice and casual users.

Oracle pioneered the SQL language with its 1979 release of the ORACLE relational DBMS. With its Easy*SQL product, Oracle becomes the first company to make a true SQL-compatible database available to users at all levels of computer literacy within an organization.

ORACLE's database facilities are available through three distinct user interfaces: Programmer interfaces; command and forms-oriented interfaces for trained end-users; and now Easy*SQL, for the large number of end users who are unfamiliar with SQL but need the benefits of a relational DBMS."

EASY*SQL: SIMPLE INTERFACES, YET FULL SQL FUNCTIONALITY

Easy*SQL's state-of-the-art visual interface includes point-and-select menus; pop-up windows (mouse support on the PC); automatic hints and context-sensitive help; ad hoc relational query capabilities; report writing, table creation and maintenance; user-selectable color graphics; bar, pie and line charts; data entry and updates using fill-in-the-blanks techniques. It even includes the Query Preview Facility.

QUERY PREVIEW FACILITY

Easy*SQL's Preview facility is one of the notable query features tailored for the novice user. During the creation of a database query, the user can press a Preview key, causing the opening of a window in which up to 5 records satisfying the query are displayed.

ORACLE'S EASY*SQL: THE 1ST NOVICE-USER INTERFACE TO THE 1ST SQL-BASED RDBMS

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The rapid execution of the Preview facility lets a user make certain that the query s/he is interactively "building" is, in fact, a correct expression of the user's desire.

PORTABILITY

Like all Oracle Corporation products, Easy*SQL runs identically on mainframes, minicomputers and PCs.

CONNECTABILITY AND COMPATIBILITY

Easy*SQL includes the Easy*Link intelligent micro-mainframe link announced last June. Easy*SQL menus let users access other Oracle programs, including the company's SQL*Calc Lotus-compatible spreadsheet. Finally, while normal output of user queries is directed to the user screen, the user may redirect the output to standard PC data files, including DIF, PRN, SYLK and WKS formats.

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Adjunct products beef up Dbase

From page 37

popping up. But while the Lotus add-ons are often utilities to make spreadsheet-work easier, several Dbase users say they turned to third-party products because of deficiencies in Dbase.

Foremost among these is the lack of a compiler. Ann F. Bruner, a systems analyst with the Massachusetts trial courts system, says she has turned to such third-party compilers as Clipper from Nantucket, Inc. in Culver City, Calif.

However, with networking plans in the works, Bruner says she hesitates to stray far from the original product in order to avoid compatibility problems later on.

Not all users are concerned with maintaining compatibility. Companies that compile all their data bases with Clipper no longer need Dbase; therefore, continued compatibility does not matter, says Alan Gross, president of the Microcomputer Managers Association International. However, even managers who say they use Clipper keep their copies of Dbase current.

Shortfall

Ashton-Tate President Edward M. Esber Jr. acknowledges Dbase's shortfall. "Compilers are a legitimate need for the customer," he says. "The compiler market is rapidly approaching the level that Ashton-Tate should take a look at it."

But Esber says he does not intend to squash the growing aftermarket. "We want to nurture those people. They survive off the niches of Dbase," he adds. "But as the market grows, we may want to co-opt some of it."

Dbase's ubiquity is also some managers' reason for eyeing third-party products. "Anybody can get a book on Dbase and learn to make modifications in a data base," and curious users sometimes do, according to Kingsley Mar, manager of research and development for the Systems Resource Management Group of Wells Fargo Bank, National Association in San Francisco. "We use Clipper to lock the code. It's like child-proof caps," Mar says.

Want speed increased

Other users say they want the increased speed of a data base compiled with alternative Dbase compilers. They mention Foxbase from Fox Software, Inc. in Perrysburg, Ohio, and Quicksilver by Wordtech Systems, Inc. in Orinda, Calif.

"I have to do a lot of work with our existing code to compile it," says Jim Thompson, a systems analyst with Thompson Consulting Group in Santa Monica, Calif. "Foxbase could make that painless, and the programs will still run with Dbase."

Many third-party products "are better than Dbase but have the users understandably concerned about future compatibility," says Adam Green, a data base expert and industry observer who has written several books on Ashton-Tate products.

Green claims that users will pay more for that promise, whether from Ashton-Tate itself or an add-on vendor.

"People would prefer their compiler from Ashton-Tate," agrees R. F. Gully, a consultant with The Quilcene Corp. in Walnut Creek, Calif. "They want the support and consistency and have some product loyalty."

Dbase upgrades

Dbase upgrades have included some of those features previously offered only by outsiders, such as a program generator in the recent version.

However, for complicated applications, some users still turn to outside, full-featured application generators such as Genifer from Bytel Corp. in Berkeley, Calif.

Ashton-Tate even invited some of its apparent rivals to its recent developers' conference in Los Angeles. "They actually help promote the Dbase standard," says Roy E. Folk, Ashton-Tate executive vice-president.

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Cruise control for cursors

From page 37

numeric keypad is the default key) for this and other control functions.

By pressing the combinations of "5" and "+" or of "5" and "-", you can increase or decrease the speed of cursor movement. This can be done from within the application program.

Cruise Control also lets any key function as an autorepeat key at any time. You simply press "5" and the key you want repeated. It will then be repeated until you press another key. If you want to page through a document with the Pgdn key, for example, you simply press "5" and Pgdn.

Eliminating buzz

The final basic function related to cursor control is the elimination of the annoying buzz from outrunning the keyboard buffer or getting to the end of a cursor movement range that goes on after you have released the key. Cruise Control gets rid of that.

Different application programs handle cursor control in somewhat different ways. Some, for example, create their own keyboard buffer, larger than the standard Microsoft Corp. MS-DOS or IBM PC-DOS buffer. Cruise Control lets you set, when the program is started, or change, via the "5" key in combination with the Tab key, the way Cruise Control does its job internally.

In this way, you can adapt Cruise Control to provide the best performance with any particular application program. Revolution Software provides a current list of the best strategy to use with most commonly used software.

The ability to toggle through with the hot-key facility, however, makes it easy to learn which is best simply by trying them all.

Installation is easy. All you really need to do is to copy the CRUISECOM file — it isn't copy protected — into the appropriate directory in your system's search path. An INSTALL program is included as well.

Technical support is provided through a number at Revolution Software's offices in Randolph, N.J. Chances are, however, that most users will find it unnecessary. The program is straightforward and unlikely to cause difficulty even for inexperienced users.

At a cost of $29.95, Cruise Control performs a useful set of functions and is well worth its modest price. It has certainly earned itself a permanent place in my system utilities directory.

Support plan debated

From page 37

hope it gets better."

The pay-for-support program is still somewhat of an experiment at Grumman. "This is the first year. We will check it out and decide what to do next year," Galgano said.

For Galgano, a key benefit to the program is access to prerelease copies of software for evaluation. Another benefit is more product training from Ashton-Tate.

But Galgano has a couple of suggestions for Ashton-Tate. "I would like to see more flexibility in the number of people that we can have on the list to call," she said. Currently only four employees are authorized to call for technical support. "And I hope to be notified in advance of known problems with the software," she said.

Another pay-for-support customer is Nynex Corp.'s Service Co. in Boston. "We support over 2,000 PCs and well over half use Ashton-Tate products. We feel it is imperative that we have a highly technical resource available if we need it," said Kathy McKinney, manager of technical support for end-user computer services at Nynex. In addition, Nynex is a heavy user of Ashton-Tate products on local-area networks, which are support intensive. "We recognize that support is a real cost," she said.

For another user support is worth the cost. "We have not taken advantage of it yet, but we are going to since $4,000 is peanuts. Whether we'll sign up in multiples, I don't know," said Karl Kendall, manager of micro support, Metropolitan Life, New York, referring to Ashton-Tate's most extensive support offering.

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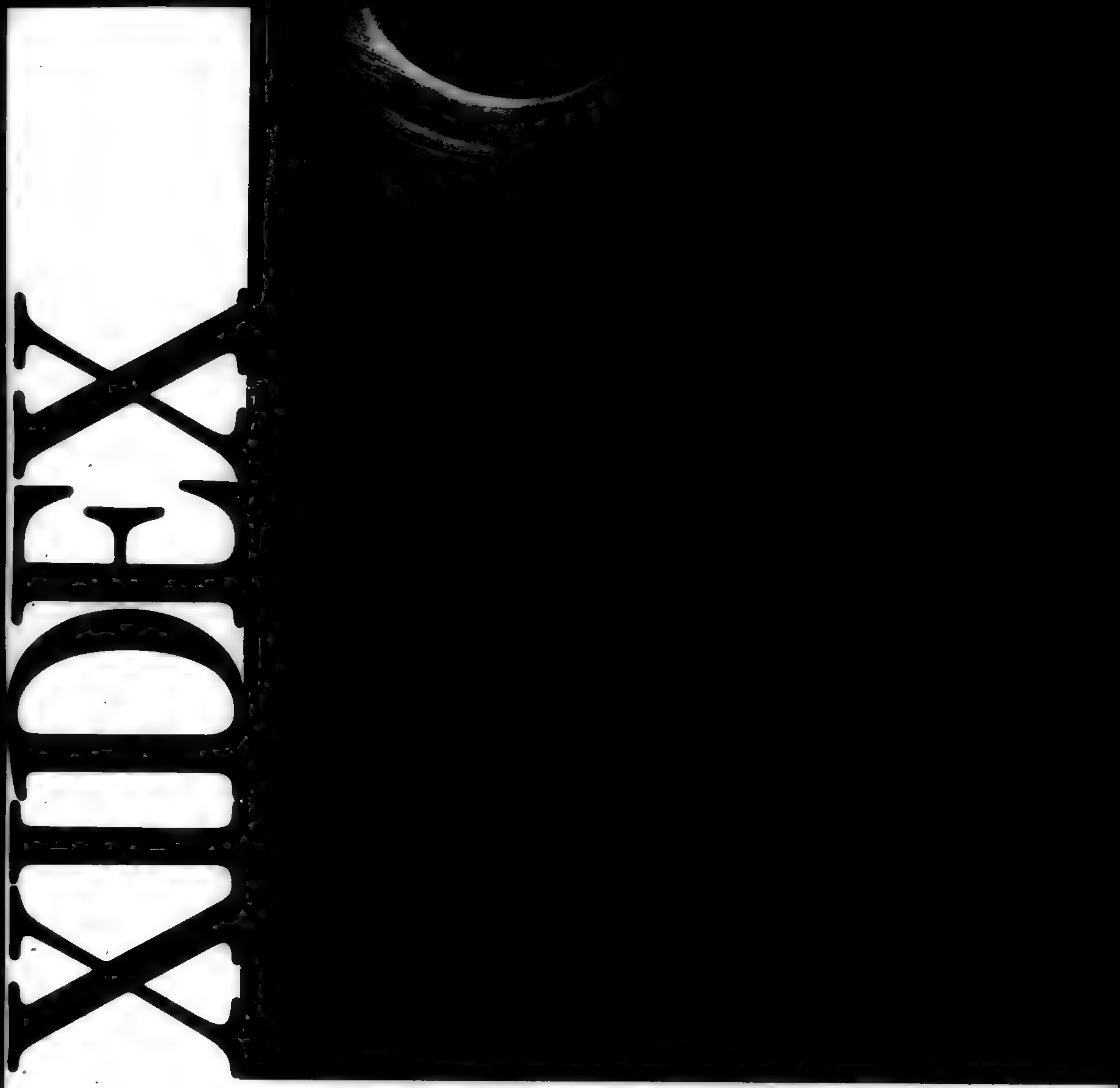

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INTERFACE '87 CONFERENCE

INTERFACE PLENARIES

Users are growing increasingly apprehensive as vendors merge and purge, organize and reorganize, while there is increasing necessity to integrate their information resources and systems

IPL-1 KEYNOTE
Information Resources Integration
Survival Strategy for the 1980s

IPL-2 EARLY JAVA I
Mergers, Acquisitions, Alliances
Does the Large-Scale User Benefit?

IPL-3 EARLY JAVA II
AT&T and IBM Reorganizations:
What to Expect

IPL-4 LOCKNOTE
Venture Capital's Impact on User Progress

BACKBONE NETWORKS

Critical issues include the design of such networks, the balancing of cost against traffic volumes, and interconnection from the backbone net to on-site premises

BBS-1 Net Designing with Wideband in Mind
BBS-2 Balancing Cost and Performance in Voice/Data Networks
BBS-3 Interconnection Issues

REGULATORY/LEGAL UPDATE FOR '87

Deregulatory activity didn't all come to an end with Judge Greene's decision on AT&T divestiture The FCC and state public utility commissions have weighed in with their own contributions.

RLU-1 On the Docket in '87: User Concerns
RLU-2 Local Access Cost/Service Forum
RLU-3 Computer Inquiry III: What's Left for Users?

BASICS AND TUTORIALS

Newcomers to INTERFACE will appreciate these "grounding" sessions in fundamental subjects such as voice, datacomm, network design, SNA, T-1, Packet-Switching and ISDN Treatment of these subjects, while introductory, is also authoritative.

BAT-1 Basics I: The Voice Network
BAT-2 Basics II: DataComm Theory, Concepts and Components
BAT-3 Basics III: Network Topologies
BAT-4 T-1 Fundamentals
BAT-5 ISDN Overview
BAT-6 SNA Building Blocks
BAT-7 Packet-Switching Nets

APPLICATIONS ENVIRONMENT UPDATES

Business communications in the next decade will be dominated by the need to link desktops with mainframes, by the requirement for cost-effective mail (and "voice-mail") systems, by "workplace automation," by "image communications centers" and by a series of standardized protocols for precise management of industrial processes

AEU-1 Communicating with Departmental Computers
AEU-2 Mail-Message Systems that Optimize the X.400 Standard
AEU-3 Workplace Automation: New Framework for Integration
AEU-4 Image Commonications Centers: Where They Fit
AEU-5 A Better MAP/TOP for the Factory Floor

NETWORK ENVIRONMENT ISSUES

It turns out that information networks proliferate, merge, consolidate and agglomerate almost as frequently as the organizations they serve! INTERFACE '87 examines nine aspects of this phenomenon ranging from the choice of network architecture to the hiring (and keeping) of qualified network professionals.

NET-1 Choosing a Network Architecture for the Decade of the 90s
NET-2 Net-to-Net Connectivity Advances
NET-3 What's COS Doing for OSI and Other Proposed Standards?
NET-4 Software-Defined Networks Who's Really in Control?
NET-5 Improving Your Private Network's P&L
NET-6 Preparing for ISDN Implementations
NET-7 Network Optimization with AI and Other Modeling Tools
NET-8 Network Security Cost-Benefit Tradeoffs
NET-9 Hiring (and Keeping) Network Professionals

SOFTWARE THAT COMMUNICATES

While the annual bill for telecommunications hardware soars, there is an equally important rise in the cost of essential software "Artificial intelligence" is increasingly important in network control, while users of desktop computers demand better access to mainframes

SFC-1 Net Control Software Adds AI
SFC-2 Voice Net Monitors and Optimizers
SFC-3 Micro/Mainframe Links to Access Mainframe Software
SFC-4 Micro Operating Systems in the Mainframe World

INTEGRATING DATA BASES

Desktop users can now have local mass storage of as much as 70–100 megabytes The integration of these data bases with a mainframe data base is a priority for systems professionals and MIS directors

IDB-1 Integrating Micro and Mainframe Data Bases
IDB-2 Data Base Architectures for Application-Driven Networks
IDB-3 Data Base Packages for Remote Workstations

LAN ADVANCES FOR USERS

Is this finally "the year of the LAN?" Perhaps so, as vendors and carriers wheel into position the building blocks, hardware and software, to make LANs both economically feasible and operationally desirable

LFU-1 LAN Utilization Survey
LFU-2 LAN Concepts and Architectures
LFU-3 Local Data Transport More Options for Users
LFU-4 On-Premises Cabling (Workshop)
LFU-5 What's Coming in LAN Software, Servers and Gateways

APPLICATIONS SHOWCASE

Nobody knows the terrain better than the chap who's actually been there! That's the underlying premise for INTERFACE's annual survey of significant applications—as users themselves report on perils, pitfalls and payoffs!

APP-1 T-1 at Its Best
APP-2 The High Speed LAN
APP-3 Network for Science: Progress at NSF
APP-4 Fiber Optic Throughput SPRINT Ahead

TECHNOLOGY HORIZONS

INTERFACE experts will survey network related technologies such as digitized voice, data compression, multi-processor architectures, CD-ROM and the network roles for 386-based desktops

TEH-1 Multi-Processor Architectures for Information Networks
TEH-2 Network Roles for 80386 Systems
TEH-3 Let's Hear It for Digitized Voice!
TEH-4 Data Compression Tips and Trends
TEH-5 Where CD-ROM Can Fit in the Net Environment

COMMUNICATIONS PRODUCTS HIGHLIGHTS

Whether your immediate concern is the analysis of monthly telecommunications bills, or selection of MODEMs and MUXs, you're sure to find sessions in this group guaranteed to make you a more sophisticated purchaser

CPH-1 Switch Architectures for the 1990s
CPH-2 What More to Expect from Centrex
CPH-3 Telephone Management Systems Update for Users
CPH-4 Portable Terminals for Data Entry On-the-Go
CPH-5 The MODEM-MUX Price/Performance Spectrum
CPH-6 Fiber Optics What's New

INTERNATIONAL COMMUNICATIONS OUTLOOK

Unrestricted trans-border data flow is all too often more a goal than a reality Multi-nationals will profit here from sessions on cost-saving trends worldwide telecomm deregulation and services available from overseas carriers

ICO-1 Cost-Saving Trends in Global Communications
ICO-2 Deregulation Worldwide Where Users Can Benefit
ICO-3 Feature-Full Services from International Carriers

IMAGE COMMUNICATIONS ADVANCES

Time was when "data" was communicated, now it's information itself, digitized for easier processing and transmission. Frequently, this information is in the form of a video signal or a graphics image, yet, it's just more data for your systems to handle

ICA-1 Business Videotex Systems Viewing the Potential
ICA-2 Off-the-Shelf Videotex Systems
ICA-3 Wideband Teleconferencing Roundtable
ICA-4 Teleconferencing Alternatives
ICA-5 High Speed/High Res Communication of Text and Graphics

BUILDING BLOCKS FOR BYPASS

With local access costs skyrocketing, users seek to bypass the ministrations of the BOCs and their independent counterparts Sessions here will include a user-vendor roundtable, with spontaneous discussion sure to provoke both controversy and attention!

BBB-1 Bypass vs Local TELCO Roundtable
BBB-2 A Plethora of Products for Metro Bypass
BBB-3 Bypassing Bottlenecks with V-SAT Networks

THE EXECUTIVE BRIEFING: THE STRATEGIC APPLICATION OF INFORMATION RESOURCES

Under the direction of network theoretician and consultant Dr Howard Frank, this year's Information Executive Briefing has been designed to offer a full panapoly of strategic perspectives in one day, with even a bit of time left over to walk the exhibit floor! **(Special Registration required)**

TEB-1 Information-Driven Organizations The Strategic Perspective
TEB-2 Leveraging the Payoff from Technology Advances
TEB-3 Planning the Application of Integrated Information Resources
TEB-4 Capital Investment Strategies for Major Information System Purchases
TEB-5 Network-Based Information for Executive Decision-Making
TEB-6 Positioning Your Organization for Open Systems Interconnect (OSI)

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- **TK** Network Systems Analysis
- **T5** MIS DP Management
- **T7** MIS DP Staff
- **TA** Software Development Programming
- **TC** Operations Manufacturing Management VP Director Manager
- **T8** Engineering R & D Management VP Director Manager
- **TE** Sales VP Director Manager
- **TG** Marketing VP Director Manager
- **TL** Advertising PR
- **TN** Purchasing
- **R** Consulting

USAGE

- **UE** End User
- **UQ** End User Buying in OEM Quantities
- **UM** OEM Systems Integrator
- **UR** VAR Retailer

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- **JA** Under 100 employees
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- **JC** 500–999
- **JD** 1000–4999
- **JE** Over 5000

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Comments ____________

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In Depth

How interruptible is your computer system?

Buying UPS is actually an insurance, not a technical, decision. MIS must determine not only whether to provide UPS, but how much protection is enough.

By ALAN RADDING

If a blackout were to throw the entire U.S. into chaos, only about 10% of the country's mainframes would still be up and running. These mainframes belong to those organizations that were farsighted enough — or scared enough — to install uninterruptible power supply (UPS) systems as protection for their computers and corporate data.

Most organizations do not start looking at UPS until after they have suffered a critical loss because of a sudden power outage. "Most people can't justify it until the last crash," says Murray Lazar, senior vice-president of K/W Control Systems, Inc. in Middletown, N.Y., a major vendor of UPS systems.

The reason so few computer systems are protected by a UPS is not a technical issue but a complex management issue. The decision to spend thousands, or in some cases millions, of dollars on a UPS system requires that management determine the hour-by-hour or even minute-by-minute value of the organization's operations. Recovery time as well as actual downtime must be considered, and the potential cost of possible hardware damage must be calculated.

Purchasing a UPS is an insurance decision, and like in every insurance decision, managers must take a calculated gamble. They must decide not only whether to install a UPS but also how much is enough.

They must decide if two minutes for an orderly shutdown is sufficient and weigh the risk to their system of, say, three days without power after a storm.

Other questions must be considered. What does the work force do when the computer is down? What is the effect on an organization's customers? What happens to communications within the organization and with the outside world? Are governmental or public safety mandates involved?

Fact of life

The reason for installing a UPS is based on a fact of life in the computer industry — that the machines require a steady source of the proper level of power. As recently as 10 years ago, computers would crash if power were interrupted for as little as one-quarter of a cycle, says Norm Woolard, a power and environmental specialist at Prime Computer, Inc.

Today's computers have better ride-through capability — or the length of time a computer can tolerate a loss of power — and can return to operation without problems after a loss of power for as long as 4 cycles, which is still only a fraction of a second.

For every kilovolt-ampere of power, Woolard notes, there is much more at stake. While these machines may be more tolerant of power fluctuations, they are also performing many more operations and handling much more data than computers of a decade ago.

Jan Cates, manager of operations control at Duke Power Co. in Charlotte, N.C., had to wrestle with this inverted logic as he planned the utility's own UPS system. His

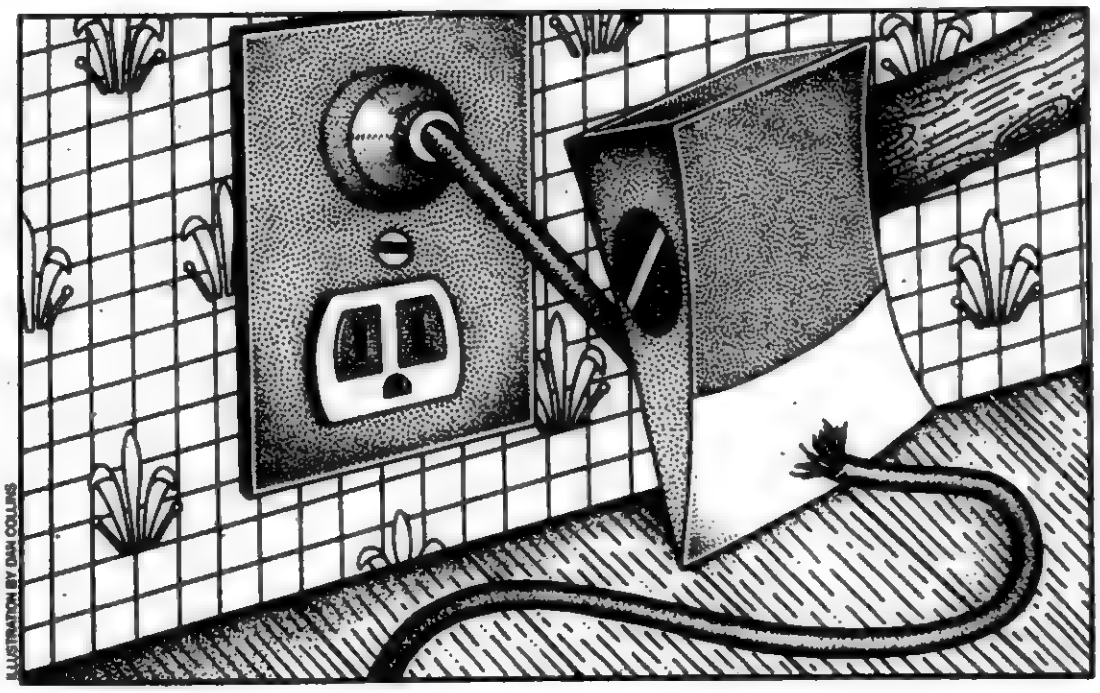


ILLUSTRATION BY DAN COLLINS

About the author
Radding is a Boston-based author specializing in business and technology.

> ”
>
> ***Figuring the cost of a power outage is not a straightforward calculation. There is the cost of the actual outage — hardware damage or data lost in a computer crash or through disk drive damage. Determining the cost of recovery — for both hardware and data — could take much longer.***

computers were requiring less power to perform more computing, but, he explains, "the power was becoming much more concentrated. We were looking at a much higher wattage per square foot."

Figuring the cost of a power outage is not a straightforward calculation. There is the cost of the actual outage — hardware damage or data lost in a computer crash or through disk drive damage.

Determining the cost of recovery — for both hardware and data — could take much longer. And there is the potential cost of hardware problems from the sudden power drop and return surge.

Finally, there are intangible costs, such as the effects of telling customers their data has been lost, losing business that goes somewhere else when you stop taking transactions or sending employees home.

The technology for UPS is readily available: More than 175 vendors are selling what each considers to be UPS equipment, one UPS salesman complains.

Out of the woodwork

At least several dozen of these are well-known, highly regarded electronics manufacturers.

A major power outage brings these UPS salesmen out of the woodwork.

In the aftermath of a major power loss, "As soon as the power came back on, I started getting calls from dozens of UPS companies," says the engineer for a small, completely automated broadcasting facility located in downtown Boston, which was already equipped with 45 minutes of UPS battery backup.

Fidelity Systems Co. in Boston was the victim of a major power loss late in March 1983, when a midday explosion and fire in an electric company manhole cut off all the power to blocks of office buildings that were located in the city's financial district.

"The power was out for five days," recalls Michael Simmons, president of Fidelity Systems, the division of the Fidelity Investments money-market funds organization that is responsible for computer operations.

Fidelity's computer systems went down, and thousands of financial transactions totaling millions of dollars stopped.

The computers remained out of service for 22 hours until the company could bring in rented diesel generators mounted on large flatbed trucks and patch them into the building's electric power distribution system, bypassing the Boston Edison Co. system entirely.

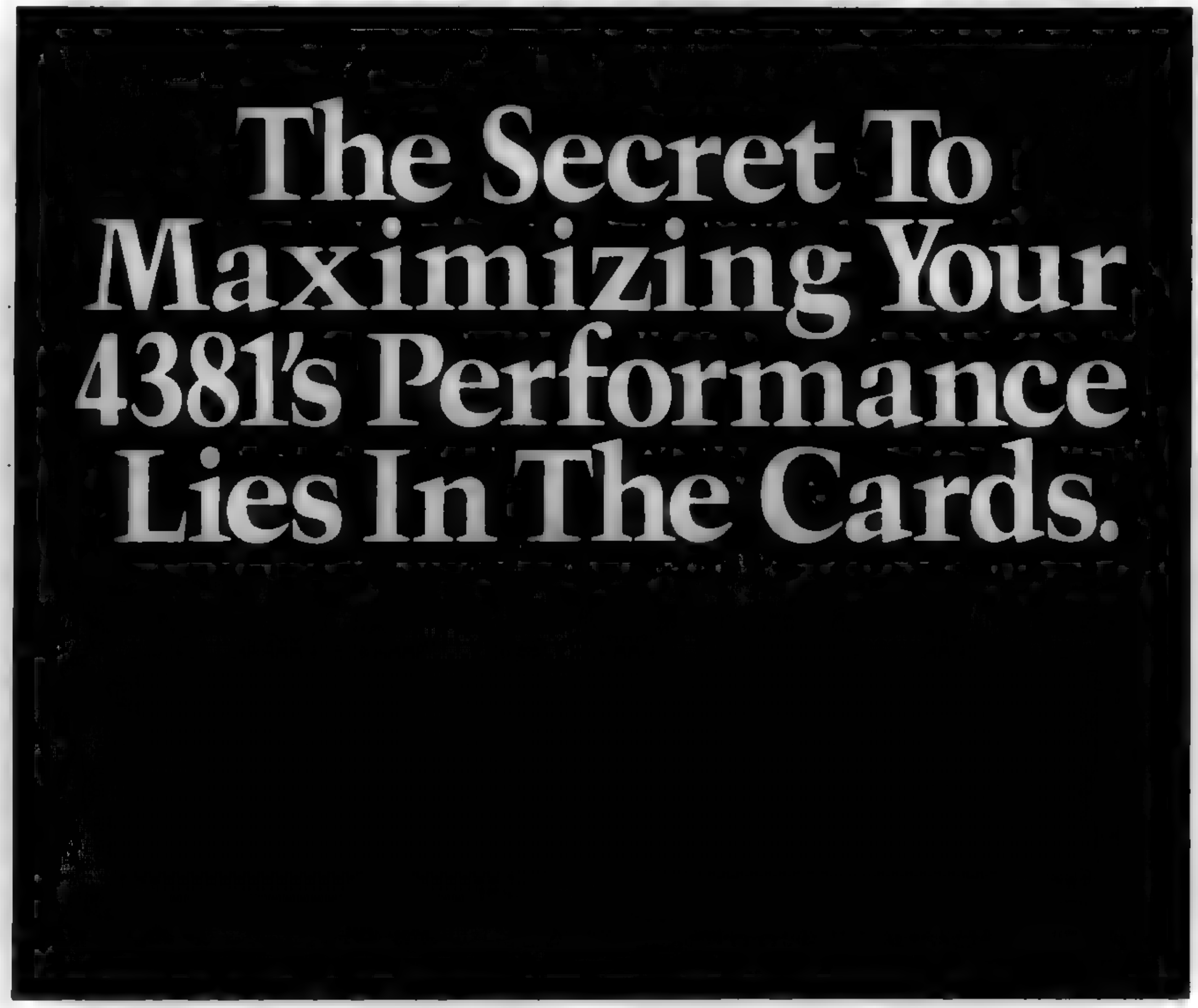
Today, if a major power blackout were to occur, "nothing would happen" at Fidelity, Simmons says. "We wouldn't care, and most people probably wouldn't even notice."

In the aftermath of the March 1983 blackout, the company installed an extensive UPS.

Fidelity's decision to spend a couple of million dollars was a clear-cut one. After learning the lesson of March 1983, the company realized that when its computers went down, it was out of business.

A smaller but still severe power outage that occurred later, in October, confirmed the company's decision to install a complete UPS system. The cost of the UPS system "if figured over time, is not as much as an insurance policy," Simmons says.

The company did more than just install a UPS system: It developed an entire plan to continue its essential operations on a restricted power basis and built



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ITT rushes aid to fleet

A California shipping agent, who used to worry about keeping in touch with a worldwide fleet of container ships by telex, called his operation "shipshape" today.

Bill Lowe, a manager for Los Angeles-based Merit Steamship Agency, Inc., added that ITT Worldcom experts had made it "much, much easier" to transmit cargo schedules.

Merit, a nationwide shipping agency, is one of the few agencies to represent a number of steamship companies in worldwide cargo transport, Mr. Lowe explained.

"We dispatch over 40,000 telex messages a month," he said. "So we really needed a first-rate communications network to keep our customers on top of their imports and exports."

BACK IN TOUCH—Shipping agent Bill Lowe after rescue.

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into its UPS requirements enough capacity to take care of those needs. Keeping only the computers running would preserve data and prevent possible hardware problems but would not in itself keep the company operating.

If the power problem were to last longer than a few minutes, Fidelity's department managers, following a predetermined plan, would start switching off power selectively. Only a minimum level of operation would be maintained, keeping elevator service, lights, phones and necessary accessories running to accompany the computers.

Today, Fidelity uses a total of 196 Exide Electronics Corp. batteries, which provide its computers with up to 15 minutes of power to cover brief disturbances in the public power supply. Long before this first source gives out, twin 820-kVA diesel generators kick on. As soon as these diesels are running, responsibility for generating power is automatically transferred to them. The diesels can run nonstop for 72 hours before they need to be refueled and can be relied upon almost indefinitely.

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> ***UPS covers a broad range of devices and capabilities, ranging from a few batteries built into a surge protector to large battery racks coupled with backup diesel generators.***

Who uses UPS and why?

The term "uninterruptible power supply" covers a broad range of devices and capabilities, ranging from a few batteries built into a surge protector, which provide two minutes for a graceful shutdown of the computer, to large battery racks coupled with backup diesel generators to provide a true UPS for a long duration.

Technically, a UPS system is a group of devices that sits between the electronic equipment and the public power supply to ensure a constant, stable supply of power.

A fully configured UPS system typically involves batteries, rectifier, inverter and transfer switching.

The system senses when the power supply is fluctuating and compensates for it. An alternative power source, such as a diesel generator, is often the final component of a UPS system.

In the past, UPS was considered appropriate only for large businesses that relied heavily on mainframes, particularly financial companies. Increasingly, though, UPS manufacturers have seen growing interest from small companies.

"Mom and Pop operations that are dependent on their small computer need UPS, too," says Ken Bates, a sales engineer at Bates and Associates in Abington, Mass., an Exide Electronics value-added reseller.

Large systems, defined by Bates as those requiring 15 kW/3-phase power or more, need extensive UPS systems; about 35% of those UPS installations ultimately provide for some kind of alternative power such as diesel generators.

For systems requiring 15 kW or less, computer operators tend to rely on a battery-based UPS that provides from two to 15 minutes of power for an orderly shutdown, "and then they just wait out the power failure," Bates says.

UPS systems fall into two basic categories: on-line and off-line. Simplified, an on-line system runs public power through the batteries, a process in which the batteries are constantly being charged.

If the public power fails, the batteries are already operating and able to compensate instantly for the power loss.

The batteries will carry the system for a limited amount of time until it can be shut down in a safe, orderly fashion or until an alternative power source can be brought into service.

In an off-line system, the batteries sit fully charged but idle until the load is transferred to them during a power fluctuation.

Improvements in the speed of electronic switching (typically six milliseconds) have made off-line systems, which are considerably less expensive than on-line systems, much more reliable, especially in smaller systems, notes Bill Niemann, Boston district sales manager for Topaz Electronics, a San Diego-based UPS manufacturer.

Who's buying; who's not

"A computer is production machinery for a bank," says George DiNardo, executive vice-president of Mellon Bank N.A. in Pittsburgh. When the computer is down, production stops, he explains, noting the electrical supply system is the Achilles' heel of that machinery.

Mellon Bank provides computer services for 500 banks in 30 states and is subject to a ruling by the federal comptroller of the currency that requires it to have backup power, according to DiNardo. In addition, he says, "the board of directors are on your back if the computers are down."

But it was a natural disaster, not a federal regulator or the board of directors, that pushed the bank into a decision to proceed with a UPS system 12 years ago. After ice jammed the rivers around Pittsburgh in spring 1974 and water came within

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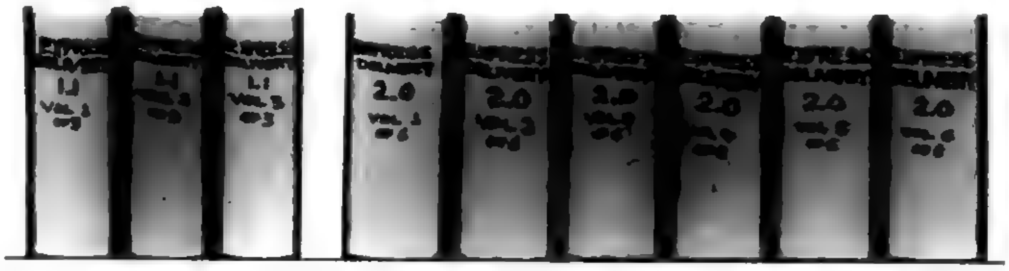

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one foot of the power generating station that supplied the bank, work began on a UPS system.

"We were frightened and moved as fast as possible," DiNardo says. Now the bank maintains battery capacity equal to two World War II submarines — which ran on batteries when submerged — has two 12,000-horsepower diesel turbines and is installing a third.

When the John C. Lincoln Hospital and Health Center in Phoenix converted to a full on-line system in 1984, the hospital, which already maintained one UPS system for its life-support equipment, made the decision to add a full UPS system, including diesel power backup.

"When we were just handling admitting or payroll, we could get by without UPS," says John Eric Thomas, the hospital's director of information systems and services. But when the system started to handle all aspects of the hospital's work, eventually including medical testing, a UPS system became important.

Not every organization comes to the same conclusion. Russell Stevenson, senior systems analyst at Campbell Soup Co. in New Jersey, reports that the company considered a UPS system for the computers used in manufacturing processing but ultimately decided against it for budgetary reasons.

The company has never experienced a critical crash due to power failure. "The computer recovers itself. It closes its files. We'd only lose what's in flight," Stevenson says.

Foodarama Supermarkets, Inc., based in Freehold, N.J., has looked at UPS systems for its point-of-sale terminals but decided against installing one, mainly because the benefits do not outweigh the expense, says Ken Warner, manager of operations.

"We've never had a crisis where we've had to recreate files," he explains. His computer manages to ride through small glitches in the power supply.

Chubb Life America does not use a UPS system either, although the company is just starting to look into the situation, says Marty Wagner, Chubb's director of computer operations.

The company has never experienced a catastrophic power failure, although periodic outages have brought the computer to a halt. "So far, it isn't something that justifies the cost, considering the downtime that we've experienced," she says.

Beyond utilities' control

The power companies are not much help when it comes to providing reliable power. Most utilities perform to specifications, but those specifications are inadequate for reliable computer operations. Utilities deliver the stated voltage with a variance of ±10%, "but they are often talking about a one-minute time frame," which is unacceptable for a computer, Prime's Woolard says.

Boston Edison admits as much. "Voltage variations or electrical disturbances may occur at any time and are beyond the control of Boston Edison," the company states in a pamphlet entitled "Minimizing the Effect of Power Variations on Sensitive Electronic Equipment."

"It is physically and economically impossible to offer 100% reliable power," a Boston Edison spokeswoman explains, saying there are

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> ***Once it has been determined that a UPS system is required, the organization must decide exactly how extensive a system is desired and whether the system is to be part of an overall emergency operating procedure.***

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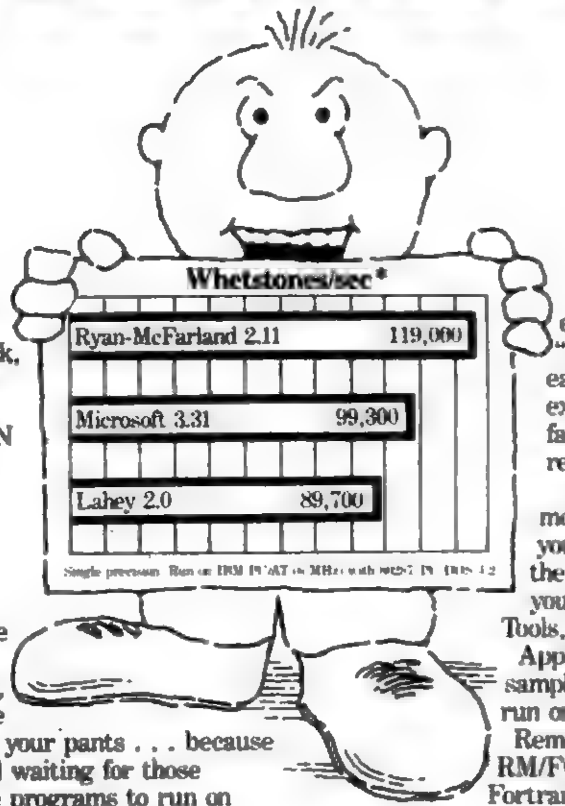

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Choosing the best test plan

By GEORGE DANBURY

Acceptance test plans for data center power systems are offered in varying levels of complexity and flexibility, depending on the equipment involved and the level of performance verification desired by the customer. Vendors offer three different test plans.

Basic test plan. The basic test plan is designed for the customer who desires an acceptance test for a single uninterruptible power supply (UPS) module.

This plan consists of a series of four tests designed to verify the most critical performance parameters of a UPS module. These include the following:

- Documented functional test.
- Voltage regulation test.
- Transient response test.
- Battery rundown test.

Standard test plan. The standard test plan is designed for customers whose acceptance requirements are more comprehensive than those covered by the basic plan.

The standard plan consists of a series of tests designed to verify a majority of the manufacturer's performance specifications. It may cover virtually all of the equipment in the total power system, including 60- and 415Hz UPS modules, 60- and 415Hz frequency converters, 60Hz power stabilizers, battery systems, paralleling systems, power distribution systems, monitoring and management systems and associated switch gear.

The tests include the following:

- Documented functional test.
- Voltage regulation test.
- Transient response test.
- Battery rundown test.
- Efficiency test.
- Total harmonic distortion test.
- Thermal scan.

Additional tests may be specified by the customer to meet specific site requirements.

Comprehensive test plan. This plan is designed to measure virtually all of the manufacturer's performance criteria for all components of the total power system as well as site-specific conditions affecting the total power system. This test plan can include the following:

- Documented functional test.
- Voltage regulation test.
- Battery rundown test.
- Efficiency test.
- Total harmonic distortion test.
- Overload test.
- Unbalanced load test.
- Frequency regulation test.
- Dynamic signal analysis.
- Internal redundancy test.
- Signature analysis.
- Infrared (video) record.

Additional tests may be added to this plan to meet specific customer and site requirements.

Documented results of on-site acceptance tests performed in accordance with the above-mentioned test plans are recorded in the field on portable computers and are later incorporated into a final, computerized acceptance test report. ■

Danbury is vice-president of K/W Control Systems, Inc., Middletown, N.Y., a UPS vendor.

simply too many mechanical elements that are subject to breakdown. In general, utilities are vulnerable to storms, fires and other natural disasters.

For sensitive electronic equipment, Boston Edison recommends the use of dedicated circuits, in-house transformers and the specification of low-impedance equipment.

In addition, the power company suggests the use of surge suppressors, regulators, motor generators equipped with heavy flywheel and, finally, a UPS system.

The first determination an organization must make is whether it needs a UPS system at all. According to K/W Control's Lazar, "the cure could be worse than the disease." After a company totals up the costs of the UPS system, installation, additional space requirements, special considerations or municipal permits to accommodate the system and maintenance, not to mention the additional energy costs, and compares all that with the cost of a power outage including downtime, recovery time, damaged data, hardware damage and customer and employee relations, a UPS system may not be the right solution.

Do you need a UPS?

Not every power problem and computer crash requires a UPS solution. A properly planned and prepared site will eliminate many power problems. For instance, poor grounding of the existing power distribution system, resulting in power-line noise, is a major source of crashes that appear to be the result of momentary power failures, Woolard says.

Of the problems he is called upon to solve, he adds, 20% can be corrected simply through proper rewiring. Before an organization invests in UPS to compensate for suspected momentary disruptions in power, experts suggest investing in a site study and power monitoring.

Once it has been determined that a UPS system is required, the organization must decide exactly how extensive a system is desired and whether the system is to be part of an overall emergency operating procedure. The choices vary. Comprehensive on-line systems like Fidelity's are part of a total plan that allows a reduced but acceptable level of operation to continue uninterrupted through the power outage.

Small, off-line UPS systems are available that use a few maintenance-free sealed batteries to provide only several minutes of emergency power, enough for what is euphemistically called a graceful shutdown. A graceful shutdown, "if you can call coming to a sudden screeching halt graceful," one MIS manager observes, allows a company to preserve all data, properly close all files and prevent hardware problems, but it does not allow the computer to continue operating during the outage. It saves the time-consuming and costly job of reconstructing files once power is resumed.

Since the majority of power outages take the form of momentary interruptions that might destroy data and damage hardware but would not otherwise put a computer operation out of commission for hours or days, this type of system is ideal for many smaller organizations, Bates notes.

Columbia Savings and Loan Association in Fair Lawn, N.J., installed its UPS system with alternative diesel power five years ago when it moved to its current location. At its old site, Columbia had nothing. Power problems never destroyed data files, but they wreaked havoc with the programming, reports Margaret Kaneftke, manager of computer operations. "We would have to go back and start from the beginning," she says.

The power outages also damaged the hardware. Comparing that experience with her system now, she concludes, "If you can't have a full system with a generator, at least have some kind of battery backup."

Implementation considerations

If you decide to keep the computer running through a shutdown, how much more equipment do you need to keep powered? You probably will want storage devices and some terminals, but do you need printers? You need some lights. Air conditioning is necessary for some computers, and, in the case of water-cooled machines, pumps must be kept running as well.

Finally, you must project your needs three or five years ahead. "Not only do people have to think about their immediate needs, but their future needs, at least the near future," Topaz's Niemann says.

The problem of bringing UPS into a company is half managerial and half technical, says Robert Bicknell, vice-president of data center operations at First National Bank of Cincinnati, which put an extensive UPS system into its new computer center. Management must decide the insurance question, but the technical staff must implement the actual system.

The first task of implementation is determining the load. K/W Control's Lazar suggests two possible methods. One is to add up the stated power consumption figures for each piece of equipment for which UPS will be provided and reduce the total by 30%. An alternative method is to calculate power consumption by figuring 50 watts per square foot of computer room.

Once a company has determined its current power needs, it should consider its future needs. For instance, Brockway, Inc. Airline Division, which recently expanded its computer center to six processors, is planning a UPS installation now, but it is planning its system to support eight processors. Because of where the size breaks come with diesel generators, however, a unit large enough to support eight processors will actually support 10 or 12, which

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> ***Nobody likes to buy insurance of any kind. It is an expense that, under ordinary circumstances, can be done without. When circumstances are not ordinary, however, insurance suddenly appears to be a smart buy.***

allows the company room to expand at a later date, notes Robert D'Orazio, Brockway's manager of data processing.

Environmental considerations must be heeded as well. UPS systems require space for racks of batteries, switching equipment, alternative generators and fuel. Ventilation provisions must be considered, and various municipal permits, such as for fuel storage, may be required. "When we built this facility, we thought our needs through and got everything approved for the UPS when we obtained the building permits," D'Orazio says.

Finally, access must be provided. The UPS system does not have to be adjacent to the computer room, but the farther away the UPS system is, the more power will be lost on the way to the computer.

Nonlinearity

The biggest technical problem encountered with UPS systems is the problem of supplying enough power to support a nonlinear load. Ideally, computers prefer a clean 60Hz sine wave, but because the load in a computer room is nonlinear, distortion — most often visible as wavy lines on the CRT — is introduced. Similarly, Lazar warns, diesel generators can introduce distortion when the full load of the computer system hits them. A key test for any UPS system is how well it handles these nonlinear loads.

To avoid or solve these problems, "coordination between the UPS vendor and the user is mandatory," Lazar says.

None of the UPS system users contacted about their systems reported any problems with nonlinear loads or inaccurate specifications.

Careful specification of the system and detailed screening of vendors eliminate many of these problems. "More consultants are specifying the equipment, and the DP managers are much more sophisticated. They are specifying UPS systems as carefully as they specify disk drives," Lazar notes.

Pricing a system

The cost of UPS systems varies as widely as the computer systems being protected. As a rule of thumb, Niemann suggests that one dollar per watt for the new off-line systems is a good estimate. Bates estimates that on-line UPS systems for mainframe machines will start in the tens of thousands of dollars and run into hundreds of thousands of dollars.

Smaller systems can cost $5,000 to $25,000, or an estimated $500 to $1,000 per kilovolt-ampere. A UPS system that is part of an overall emergency operating system like Fidelity's can cost several million dollars.

UPS systems are not installed overnight. A complete on-line system with diesel generators takes six to eight months to install, while small systems can be installed in a few weeks. Major installations, such as the UPS system installed in the New York Stock Exchange, are installed in phases over a period of months or years. An optimal time to install a UPS system is when a new computer facility is being built or an existing facility is being expanded.

The final step in implementation is the ongoing system testing and maintenance. A UPS system is supposed to eliminate technical problems, but, if it is not regularly maintained and tested, it can become just another piece of equipment prone to failure. Because the system is not in daily use, potential problems are less likely to be discovered casually at the most inappropriate time — before a critical failure.

A typical testing routine is to turn on the diesel generators weekly, check out the system under load quarterly and extensively test the entire system under full load at least twice each year.

When UPS is a smart buy

Nobody likes to buy insurance of any kind. It is an expense that, under ordinary circumstances, can be done without. When circumstances are not ordinary, however, insurance suddenly appears to be a smart buy.

Eventually, anyone with an integral computer operation is going to have to confront the question of UPS. Nobody is predicting what will happen in coming years, and many forecasters are suggesting that the situation will get worse because few new modern power plants are coming on-line. To protect themselves, computer managers will insist on more control over the power supply.

Since Fidelity installed its UPS system, about 20 unplanned instances have occurred when the UPS has switched on, Simmons estimates. While none of the subsequent power outages have been as dramatic as the March 1983 fire, each would have shut down the computer system.

From Simmons' perspective, the millions the company spent on the UPS system keeps looking more like a bargain. ■

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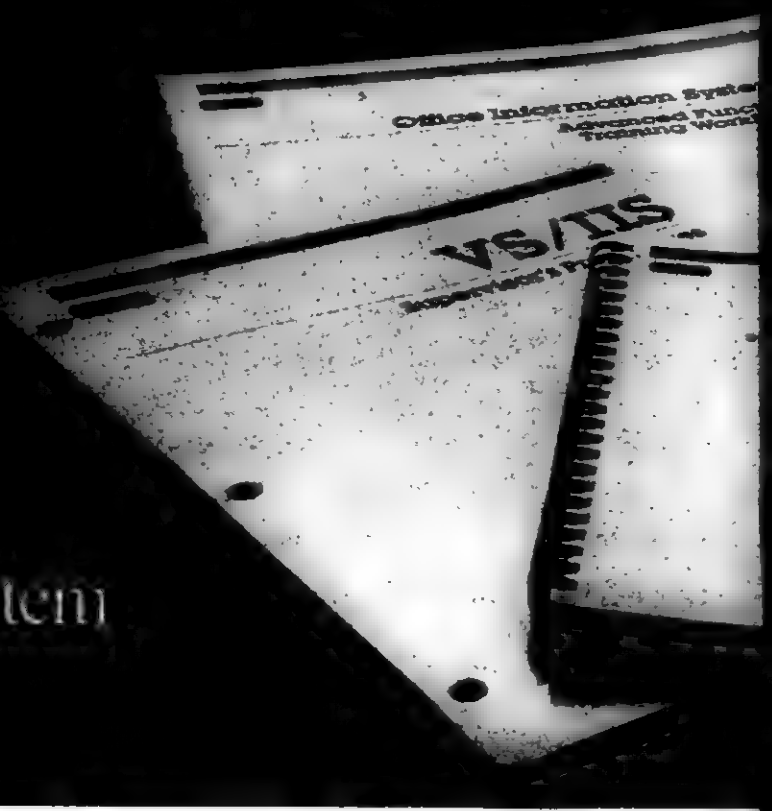

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MANAGEMENT

TAKING CHARGE
James L. Young

Your style as manager

Years ago, Gerald Weinberg published a book entitled *The Psychology of Computer Programming*. It was a landmark statement focusing attention on a new dimension of a new profession that had been seen as a largely technical practice. It was also an important step because it emphasized not just personnel management issues but also environmental needs, such as group dynamics and work habits, that were seen as unique or at least highly individualized.

That same analysis needs to be applied to data processing management. Unlike Weinberg, it is doubtful we would find a single distinctive profile but rather a diverse assortment of attributes, motivations and behaviors with one thing in common: the management of the discipline of data processing.

In our effort to master the art of managing the data processing resource, we frequently overlook fundamental elements of our job. We look at the technical side, the management practices and techniques and we try to be diligent about the financial component of our responsibilities, but we ignore that component that is our own makeup. All too frequently, it is the most important component. *Our management style and personality frequently determine the fit with a particular job and contribute to our success and enjoyment or become barriers to achieving them.*

As one example, an extremely dedicated data processing manager worked hard to become part of the top manage-

See **YOUR** page 54

Young is a principal of Worcester, Mass.-based Arthur Young.

Taking care of business

DEC's MIS manager takes aim at inventory and sales

By David A. Ludlum

With his employer riding a business boom driven largely by its supple technology, the director of Digital Equipment Corp.'s information systems might be expected to champion the use of the latest gadgetry.

But Belford E. Cross, who holds the title of corporate manager of Digital Information Systems, is a former manufacturing executive given to describing his work in terms of inventory turns rather than instructions per second.

DEC's Cross

Just as DEC lately has worked to tailor its sophisticated technology to the dictates of the market, the company has shifted the focus of its corporate information systems function to business concerns.

Nearly three years ago, Cross — then a group manufacturing manager for Ethernet who had begun his career at DEC as an engineer and later started up a plant in Maine — was asked to interview for the top information systems job.

"There was a belief that there was an excellent architecture, excellent products and a forward-leaning technical strategy but a lack of integration with buiness requirements," says Cross, a trim, soft-spoken skiing enthusiast and father of two.

DEC sought someone who understood its business — the culture and the way decisions are made — with experience in getting things done, such as building plants and delivering products, and with credibility among line functions. "Someone who wouldn't be perceived as a techie but as someone who understood the factory floor," according to Cross.

DEC also needed someone with a reasonable technical background and credibility within the information systems department. The job calls for challenging the information systems staff to work on the most significant business problems rather than on the most appealing technology, Cross says.

A year earlier, DEC had shifted corporate information systems' reporting relationship, moving the function from finance to operations, a change aimed at making better use of the technology, observes Cross, who reports to Winston Hindle Jr., who holds the position of senior

See **TAKING** page 56

INSTANT ANALYSIS

"Senior management must take responsibility for the planning, funding, implementation, testing and certification of an alternate processing strategy."

— **Irene E. Isaac, from the "Guide on Selecting ADP Backup Processing Alternatives," issued by the National Bureau of Standards of the U.S. Department of Commerce**

Fire enlightens Boston users

By Donna Raimondi

BOSTON — A fire that recently struck a 42-story building here in the financial district has shed some light on the question of how much disaster protection is enough. While the fire did not destroy data centers, it gave victims food for thought.

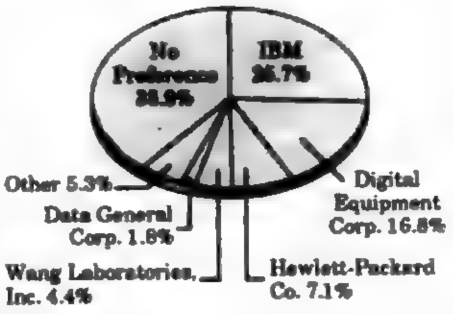
One Post Office Square was rocked by explosions at 5:45 p.m. Dec. 9 as its electrical switches blew, injuring nine occupants, two seriously. For the next week the build-

See **BOSTON** page 56

•DATA VIEW

Open market

Preferred departmental system vendors



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MANAGEMENT MEMO

Typical senior exec changed focus, now earns $215,000

The typical senior executive at a Fortune 1,000 company made his major career breakthrough at age 34 and attributes it to being in the right place at the right time and to having moved from one functional area to another, according to a survey.

The executive, now 51 years old, was earning $100,000 a year by the time he was 35, as a vice-president, and currently pulls down compensation of $215,000 a year.

However, he said he defines success as enjoying work and effecting change; money is a secondary consideration. Public recognition is not particularly important.

These are among the facets of the typical Fortune 1,000 manager at or near the level of vice-president that emerged from a survey by Los Angeles-based executive search firm Korn/Ferry International.

Self-portraits

The survey, based on more than 1,300 responses, reflects the executives' views of themselves. Korn/Ferry conducted the survey in 1985 and recently released a full report, including a profile of the typical respondent.

That typical executive said he believes concern for results and an urge for responsibility are necessary for success in business and that he does not place much emphasis on likability, appearance or formal business training, although general education can have a significant impact.

The executive credited his rank to hard work tempered by ambition and luck and named integrity as the most important ingredient of a successful business career.

Younger execs more mobile

He said he has worked for only two companies and has been with his present firm for 17 years, although younger respondents showed more mobility.

His ambition is to become chief executive officer of his company — not to own his own business. He said that if he were financially independent, he would continue to work at his present position.

The executive is in general management, after starting his career in finance or accounting.

Fast track

However, he said he believes sales and marketing is currently the fastest route to the top in his organization and will remain so in 10 years.

The executive's average workweek is 56 hours. He said he spends about 49 days a year traveling on business and takes 14 vacation days a year. He fully intends to retire at or before age 65.

He said he feels the biggest threat to his career is a corporate reorganization.

At 3 a.m. on November
declared at our cor

Denny's Inc. corporate data center:

- processes over $20,000 in food and beverage sales weekly for each of our 1,200 restaurants.
- electronically captures payroll, cash and menu mix information from each of our 1,200 Denny's restaurants weekly.
- processes over 70,000 deposit transactions daily
- handles payroll and benefit transactions weekly for over 50,000 employees nationwide.

Richard [illegible]
Vice President,
Information Services
Denny's Inc.

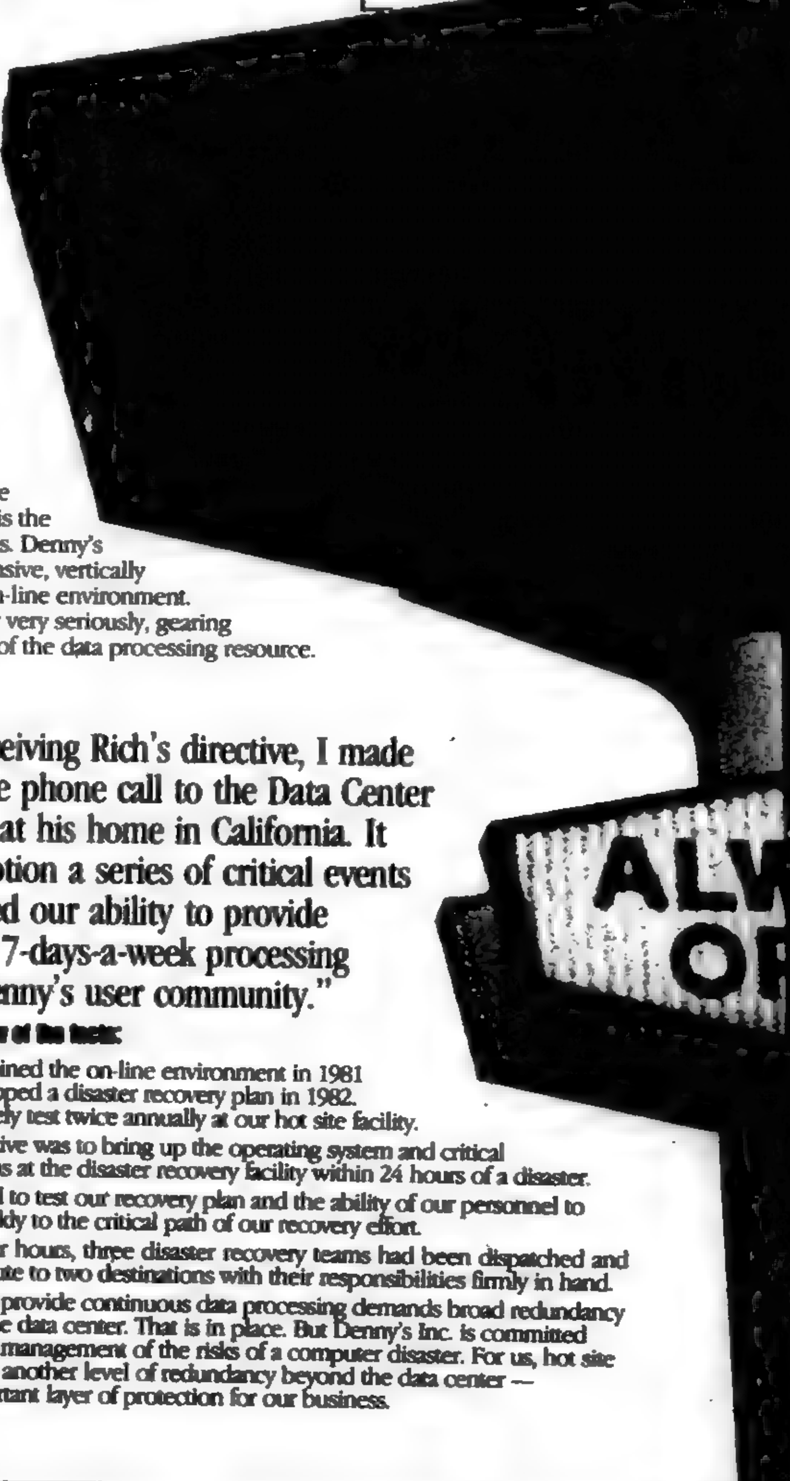
• • • • • • • •

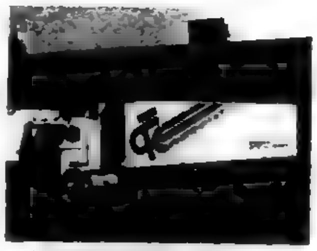
"I declared a full-scale mock disaster in our Denny's Inc. data center to ensure our ability to provide the highest level of protection for vital assets and uninterrupted service to our guests."

Here are a few of the facts:

- To ensure the seriousness and realism of the recovery activity, there was no preannouncement of the "disaster."
- Beyond our concerns with shelf life and food preparation, Denny's is a perishable business in the sense that a missed meal is a lost sale. There are no next-day chances to recoup it.
- Rapid inventory turnover demands that our supply lines remain clear at all times. These supply lines are critically dependent on on-line order entry processing.
- Denny's is an enterprise that deals with high volumes and moderate prices.
- Denny's operates on a weekly basis. In addition to daily polling of each restaurant to collect financial data, we issue weekly paychecks to 50,000 employees, and each of our 1,200 restaurant managers receives a weekly profit/loss statement.
- To protect our operating capabilities, Denny's Inc. management is committed to total redundancy in our data processing operations.

With over 1.3 Billion in total sales, our 1,200 Denny's restaurants play a major role in the success of the corporation. My primary concern is the success of the company's management objectives. Denny's restaurant operation is time-sensitive, labor-intensive, vertically integrated and exceptionally committed to an on-line environment. As a result, we take the issue of disaster recovery very seriously, gearing ourselves, from the top down, to the protection of the data processing resource.





Every week, trucks from the Denny's Inc. subsidiary, Proficient Food Company, deliver average food orders of over $5,000 to each of 1,200 Denny's Restaurants nationwide. All ordering and distribution is processed on-line through Denny's corporate data facility.

• • • • • • • •

Evan [illegible]
Director,
Systems Development
Denny's Inc.

"After receiving Rich's directive, I made a surprise phone call to the Data Center Manager at his home in California. It set in motion a series of critical events that tested our ability to provide 24-hour, 7-days-a-week processing to the Denny's user community."

Here are a few of the facts:

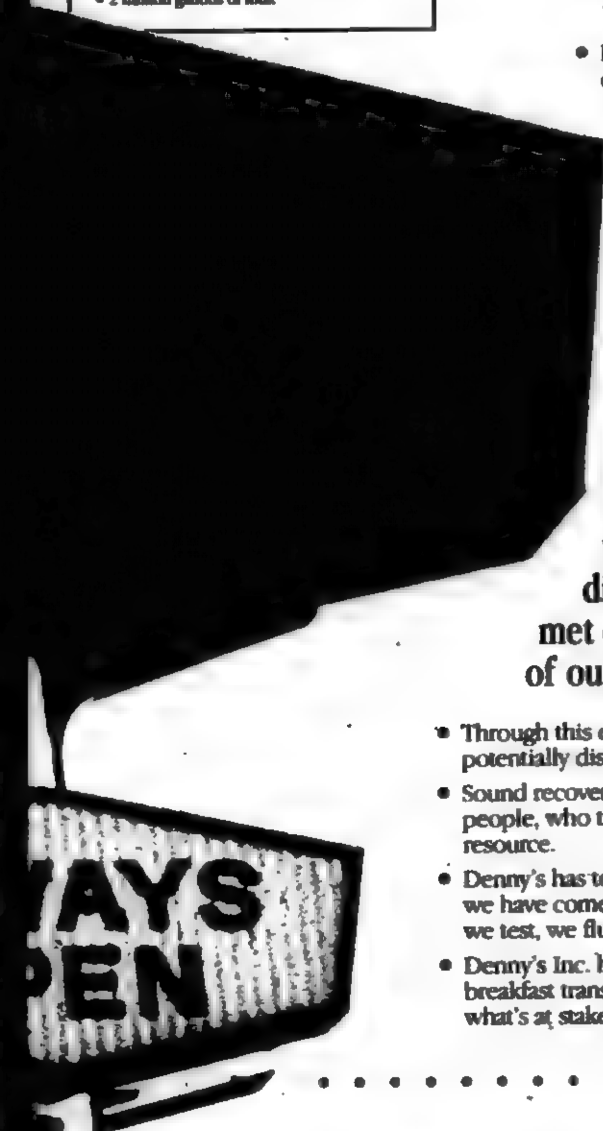
- Denny's joined the on-line environment in 1981 and developed a disaster recovery plan in 1982. We routinely test twice annually at our hot site facility.
- Our objective was to bring up the operating system and critical applications at the disaster recovery facility within 24 hours of a disaster.
- We wanted to test our recovery plan and the ability of our personnel to move quickly to the critical path of our recovery effort.
- Within four hours, three disaster recovery teams had been dispatched and were enroute to two destinations with their responsibilities firmly in hand.

Our ability to provide continuous data processing demands broad redundancy throughout the data center. That is in place. But Denny's Inc. is committed to *maximum* management of the risks of a computer disaster. For us, hot site backup is just another level of redundancy beyond the data center — another important layer of protection for our business.

19, 1985, a disaster was porate data center.

In one year, Denny's 1,200 restaurants serve more than 90 million breakfasts to the American public. That requires ordering, procurement, delivery and preparation of approximately:

- 7.5 million lbs. of coffee
- 264 million eggs
- 7 million loaves of bread
- 21 million lbs. of bacon and sausage
- 10 million lbs. of pancake mix
- 2 million gallons of milk



Shepard James
Data Center Manager
Denny's Inc.

"When I received Evan's call at 3 a.m., I first picked myself up off the floor. Then I immediately put in action our disaster recovery plan."

Here are a few of the facts:

- We had planned, strategized and tested. Now it was time to find out how effective we could be in the face of an unexpected shutdown.
- It was my responsibility to alert and dispatch our personnel with specific directives that would allow us to bring up the operating system and critical applications at the Recovery Center within 24 hours of the "disaster."
- Reestablishing user access was critical, since 1,200 restaurants were depending on us to keep them functioning.
- Along with general operating concerns, we were specifically interested in our ability to back up our communications network at the Recovery Center.

Once we had established the critical path and our teams had arrived at the Recovery Center, we were able to bring up the MVS operating system, run diagnostics on our communications equipment, and begin processing critical applications according to schedule. We knew we were well prepared, but nothing validated our ability to respond as well as the real-world dynamics of this experience.

• •

"Within 22 hours of declaring the "disaster," our operating system was up and running, thanks to proper planning and a capable disaster recovery resource like CDRS. We met our objectives and honed the capability of our seasoned disaster recovery team."

Richard Kalowski
Vice President,
Information Services
Denny's Inc.

- Through this experience, we reaffirmed our ability to conduct business under potentially disastrous circumstances.
- Sound recovery procedures are especially important to our division operating people, who truly recognize the importance of protecting the data processing resource.
- Denny's has tested its plan six times in the past three years. As a result of that, we have come to believe that testing is as important as planning. Every time we test, we flush out a new wrinkle.
- Denny's Inc. has committed the resources to ensure that we don't lose a single breakfast transaction. That may appear simplistic, but when you consider what's at stake, disaster recovery simply makes good business sense.

• •

Denny's Inc. is one of the more than 625 corporations for whom Comdisco Disaster Recovery Services, Inc. provides disaster recovery services. Their experience and concern is similar to that of many companies seeking bottom-line assurance through a dependable contingency resource. CDRS is pleased to be able to share their story.

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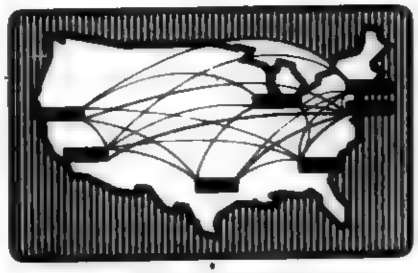

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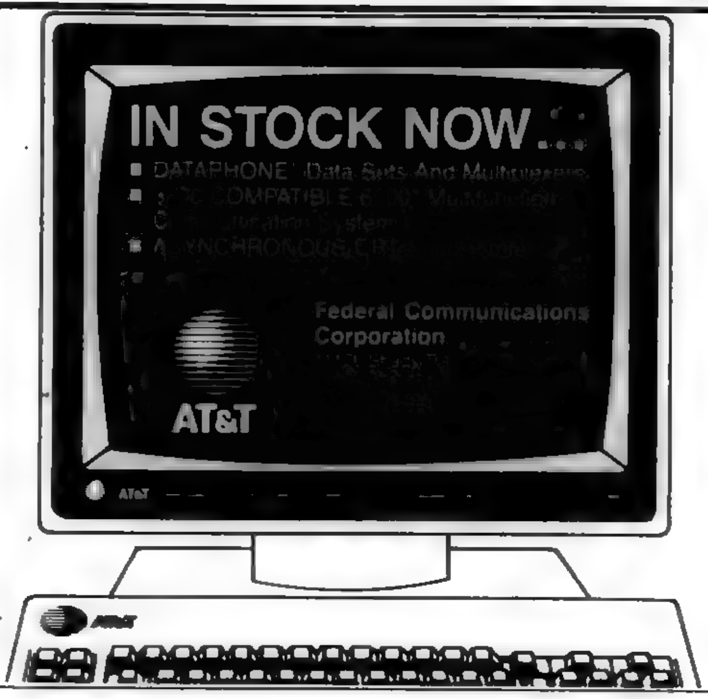
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Your style as manager

From page 51

ment team, trusting his management proficiency and hard work would promote his success. Unfortunately, he never saw that his style was contrary to the relaxed, sociable attitude of top management. Key discussions often took place over long lunches and decisions were made on the golf course or while socializing. Though the data processing manager was a peer on the organizational chart, he did not belong to the team responsible for running the company, largely due to a difference in style.

It should be noted, however, that when two opposite types can coexist the complementary strength can be great. Traditional examples are the thinker and the doer, word people and numbers people, people-oriented individuals and task-oriented ones. In a hiring situation, while we may be drawn to people like ourselves, it may be someone very different who would make for the best working team by complementing our abilities.

Personality and style affect not only our ability to get along with others but the very ability to perform certain tasks. This is seen best in the context of changing job needs. Several large data processing shops owe their success to managers who charted the shops' growth and inspired people to implement a vision.

When their companies' fortunes changed, however, and the task became one of caretaking, the drive to alter and improve was not consistent with the new need to control and fine-tune. The introduction of distributed processing and personal computers has had the same impact on control-oriented managers. Some who could not tolerate a more cooperative style appeared to be technically obsolete when, in fact, the problem was really an inflexible personality trait.

Understanding yourself

With so many ways in which your style can work for or against you, it is important that you understand yourself. You can gain insight by asking yourself which tasks you like and do well and which you do not. Is there a pattern to your successes and disappointments? What people do you like and get along with and why?

The most dramatic use of personal skill assessment is when it leads to the need for staff changes. You may conclude that a subordinate just cannot work with you or that you cannot work for a certain company. However, that should be rare. Remember, all differences in personality are not bad — only those that lead to conflict and inefficiency.

For example, if a manager recognizes that a particular task requires a creative orientation that is not his strength, he may choose to delegate the task to someone with that trait or at least work with such a person.

In supervising others, a data processing manager may be concerned about subordinates who spend much of their day socializing. However, it may be that this is not only important to the employees but to how they get work done. If this is only in conflict with the manager's ideas about proper work, perhaps an objective yardstick can be established to ensure that the important things are getting done.

However, if the behavior is contrary to the beliefs of top management, co-workers, customers or others, then no yardstick will be able to measure the potential disruption. Clearly, the only remedy is action such as closer supervision, environmental change or job reassignment.

The essential thing to remember is that data processing and personality are not contradictory terms. Computer management and personal style are not mutually exclusive. Even though we work in a world noted for precision and scientific method, it is ultimately people who make it work. Therefore people are the most important thing to understand — beginning with ourselves.

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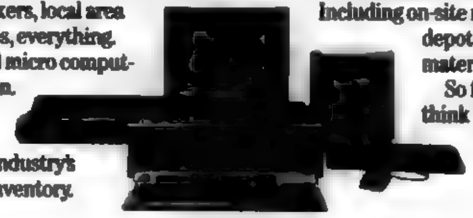

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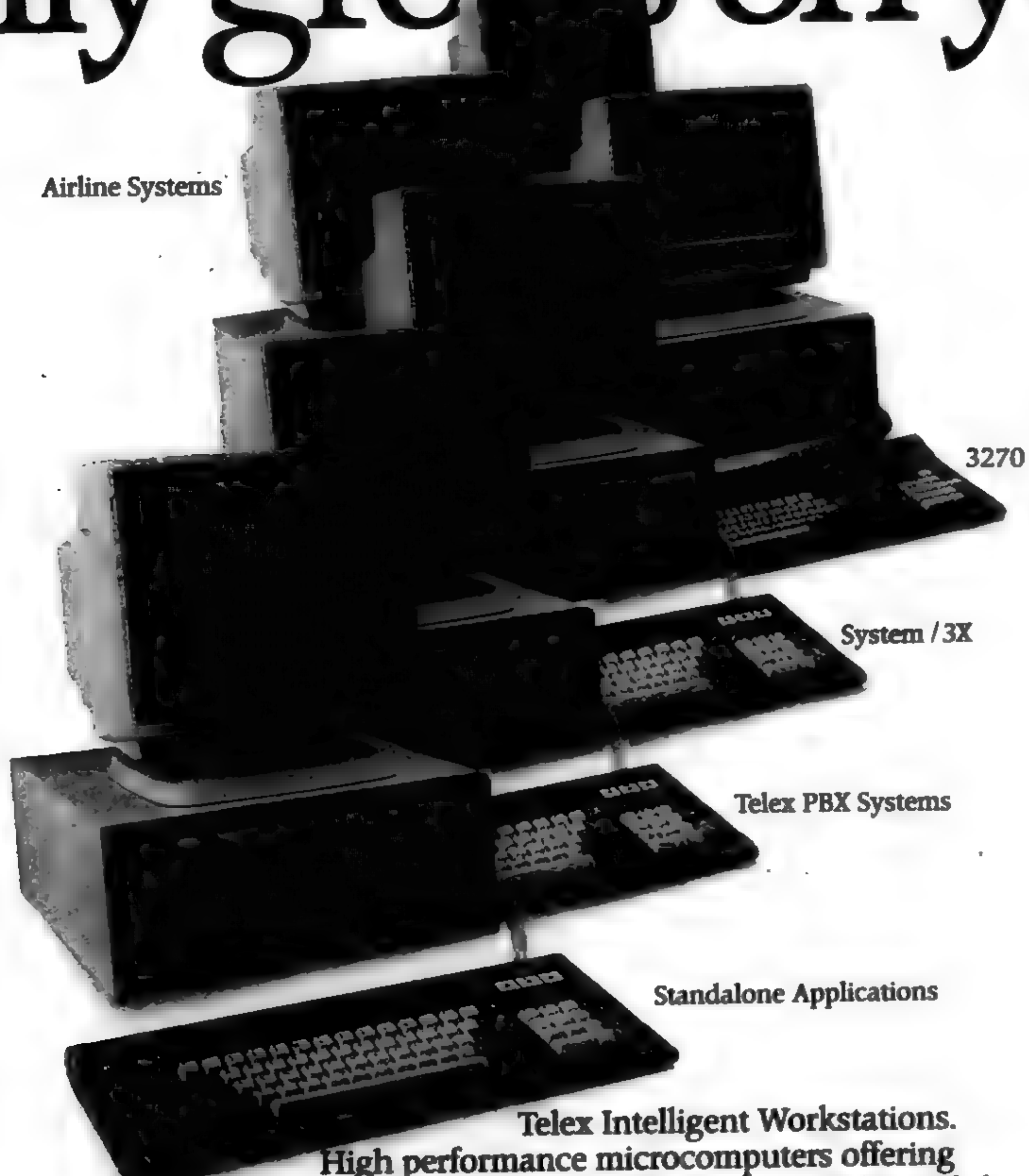

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Taking care of business

From page 51

vice-president for corporate operations.

Cross's responsibilities range from telecommunications to decision-support systems, with the major resource being a 12,000-node network that links nearly 60,000 employees through electronic mail and various applications.

He also chairs a corporate information systems management committee made up of information systems subordinates, local information systems site managers and senior executives from various geographical and functional areas.

The committee directs corporate information systems planning and budgeting while trying to maintain what Cross calls strong reporting relationships within the operating units.

Cross speaks of accomplishments in his current role strictly in terms of benefits to DEC's manufacturing and marketing activities. Improvements in managing materials increased the number of times inventory is turned over per year from 1.8 to more than three. Enhancements in managing orders cut the time between placement and confirmation by more than half.

Using artificial intelligence to configure complex orders reduced the number that are changed, which cut costs and enhanced customer satisfaction.

Cross says he believes his move from line management to corporate information systems — with its responsibility across the entire corporation — enhances his career prospects at DEC.

"I get a very cross-organizational perspective about how the business works," he says. "Some of the metrics we use to measure ourselves are what's happening with inventory turns, what's happening with accounts receivable, what's happening with the company's overall asset management."

Cross recommends that other line managers work in information systems to broaden their perspectives and that information systems managers likewise work in line positions, even moving from one function to another, which he says is increasingly possible with the decentralization of processing.

Cross also suggests that information system managers trying to acquire general business knowledge take courses in areas such as management and finance. "It's appropriate to get some good old-fashioned education to any extent that's possible," he says.

Boston users enlightened

From page 51

ing was closed, although workers were allowed to retrieve items they needed.

While most businesses had to operate out of other branches or share facilities with beneficent companies, one firm, Putnam Cos., a pension and mutual fund manager, moved to a prearranged disaster-recovery hot site.

Putnam Investor Services, Inc. — a subsidiary of the $34 billion Putnam Cos. — protected its securities trading by retrieving up-to-date backup data from an off-site vault and rushing it to a Sungard Data Systems, Inc. hot site in Philadelphia. For the next week, Putnam ran its IBM 4381 operations at the hot site through its Quincy, Mass., branch.

Putnam had grown big enough five years ago for its managers to provide for disaster recovery for the home office, but no such safeguards had been arranged for some smaller offices in the building, prompting managers there to consider the risks they face.

On the five floors of offices of the accounting and consulting firm Coopers & Lybrand, there was smoke damage but no loss of equipment or data, according to Barry Davis, microcomput-

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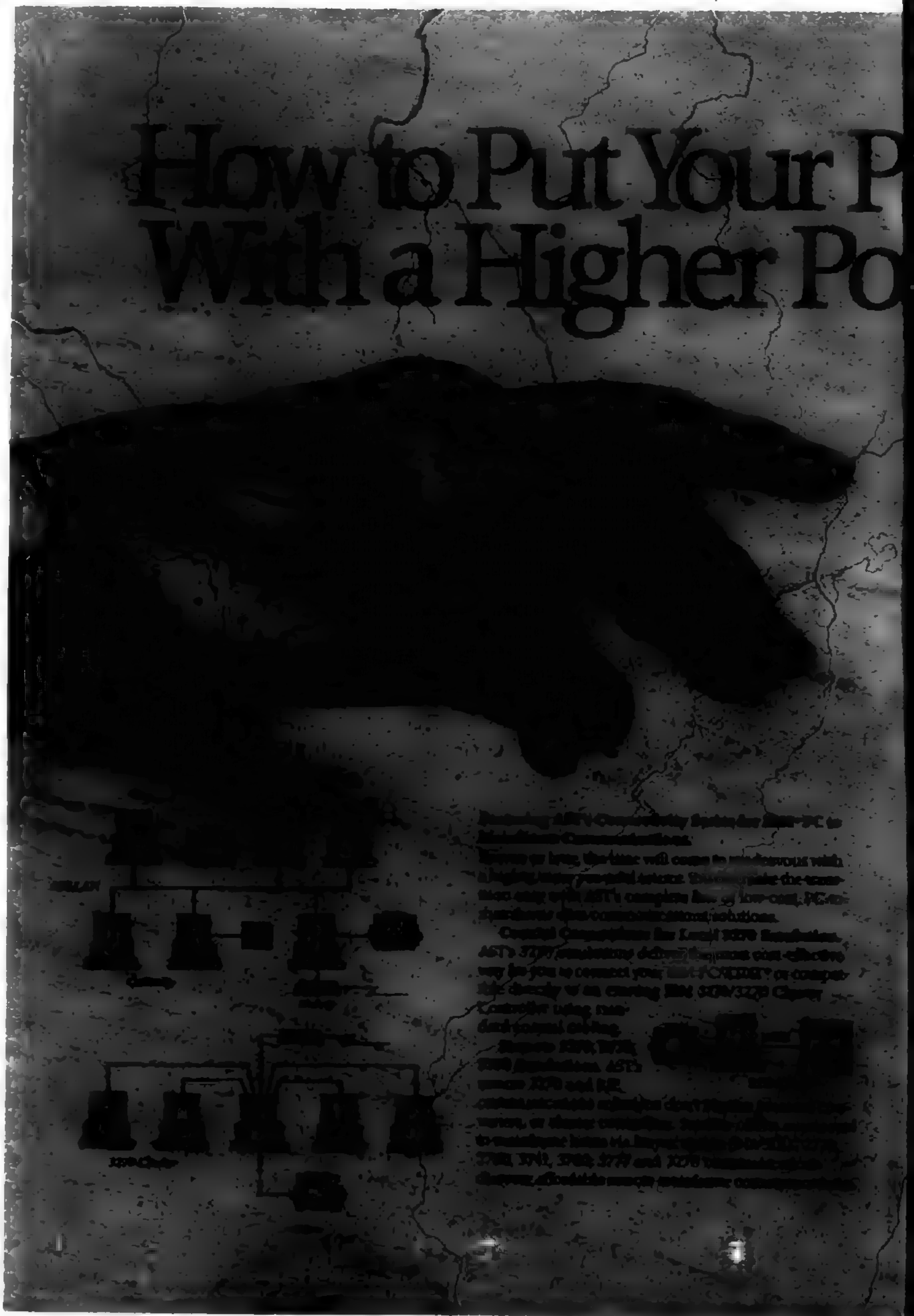


ing facilities coordinator. But had the fire actually entered the offices, the firm would have lost all the disks for roughly 65 microcomputers, which are used primarily for client work — audits, analysis of audits and spreadsheet applications.

Coopers & Lybrand stores hard copy and tapes from its Digital Equipment Corp. VAX minicomputer off-site but does not have remote storage for backup diskettes, Davis says. The firm has insurance for the equipment and could reorder the software, but any data on disks would have been lost.

Backup advice

"If you can store diskettes, store them in cases and cabinets so the sprinklers won't ruin them, at the very least," Davis advises. "You should have them backed up off-site, but it's one thing to say that and quite another to get it done."

Davis says he finds that even getting PC users to make a duplicate copy is difficult. "If somebody spends two to three days working up something on Lotus Development Corp. 1-2-3 and the disk goes, it is their responsibility," he says.

At Craig & Mac Cauley Professional Corp., a law firm on One Post Office Square's 22nd floor, occasional shutoffs of electricity at the building had made Pauline Hanson wary. As the assistant administrator of a Wang Laboratories, Inc. VS15 word processing installation, Hanson had decided on the Sunday before the fire to keep everything backed up in an on-site vault.

After the fire, workers were able to retrieve stored backup from their offices and continue working at another law firm with a bigger Wang system. "If we weren't allowed back into the building, there would have been nothing we could possibly do," Hanson says.

She has made a disaster recovery plan a priority for the near future. Her firm is moving to another building and, as soon as it is settled, she hopes to convince executives to cover themselves against loss. "We use the Wang to do briefs, litigation, wills and trusts. If they were destroyed, we would be in serious trouble," Hanson adds.

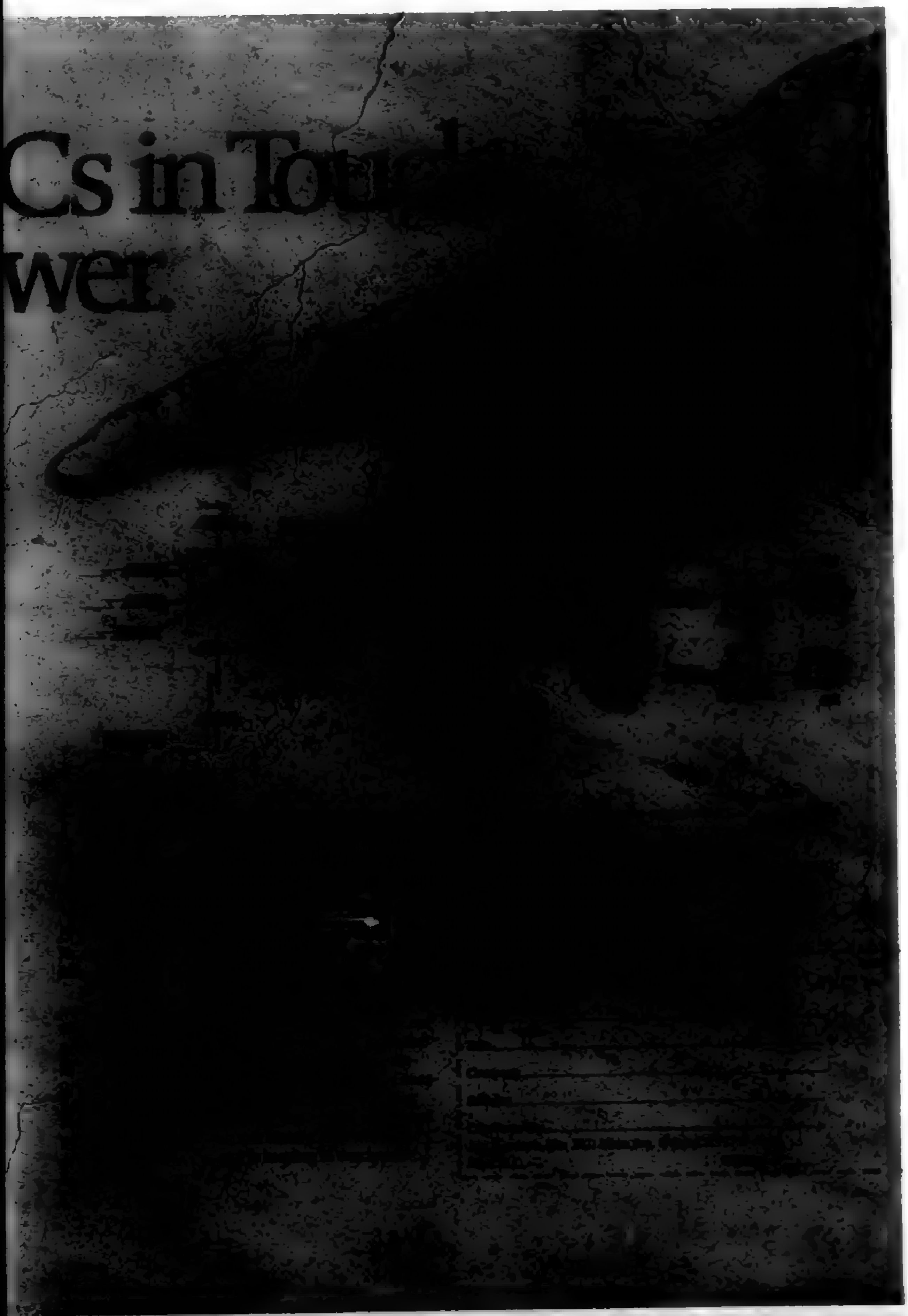
Disaster planning should be senior management's charge, according to a recent report by the National Bureau of Standards. "Senior management must take responsiblity for the planning, funding, implementation, testing and certification of an alternate processing strategy," the report says.

Assigning responsibility

Top executives should assign management responsiblities for developing alternate processing strategies, demonstrate a dedication to developing and supporting the plan, commit the necessary resources, monitor development and require and verify periodic testing of the strategy, the report adds.

Alternative strategies can range from enrollment in dedicated disaster recovery centers or shared contingeny centers at the top end to a reversion to manual processing as the last resort. An individual company's risk assessment efforts will show what level of coverage is necessary.

Reverting to manual processing is not a likely alternative for any large or medium-size company, Hoey notes. "In most cases, the people who know how to do that are retired or dead. The company wouldn't have a mainframe if it were possible to do it manually."



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NEW PRODUCTS

PC network tool compatible with Netbios

Server Technology, Inc. in Sunnyvale, Calif., has announced Easylan Version 3.0, an IBM Netbios-compatible version of its personal computer network software.

Easylan 3.0 is said to allow personal computer users to run application programs written to IBM's network interface standard over RS-232C serial communications links and to develop Netbios-compatible local-area network (LAN) applications.

According to a company spokesman, Easylan 3.0 interconnects up to 20 IBM Personal Computers, PC XTs, ATs or compatibles.

The Netbios interface defines four basic network functions — send, receive, connect and disconnect. Because Server Technology has implemented Netbios through software and the PC's RS-232C serial communications ports, a network program coded to use the Netbios 5C interrupt will operate with IBM's PC Network, the IBM Token-Ring network and other LANs that support the Netbios interface, the spokesman added.

Easylan Version 3.0 also incorporates four new network commands in addition to the DOS-like EZDIR, EZCOPY, EZTYPE, EZDELETE and EZRENAME. The commands are EZCLOCK, for setting the network time from one date and time board; EZBEEP, for signaling other users through the PC's speaker when a file is about to be transferred or when a file transfer is complete; and EZMD and EZRD, allowing one user to make or delete subdirectories on another interconnected PC.

Easylan Version 3.0 supports commonly used single-user programs such as Lotus Development Corp.'s 1-2-3 and Ashton-Tate's Dbase products.

The single-copy price is $99.95. A two-PC kit is priced at $219.95. Additional single-user add-ons cost $119.95. Existing users of previous versions can upgrade to Version 3.0 for $25, the vendor said.

Screen painting facility debuts

Designs and manages CICS screens on micros

Micromain Software, Inc. in Duxbury, Mass., has announced an IBM CICS screen painting and design facility for the IBM Personal Computer.

Called Micromain Painter, the software has the ability to build maps and create IBM's Basic Mapping Support (BMS) code on the PC for use in mainframe CICS applications, according to the vendor.

Micromain Painter is said to be a fully operational, menu-driven mainframe-style utility for designing and managing screens.

Multiple utilities

The product incorporates utilities for handling, listing and testing files that contain screen designs and generated BMS code.

According to the vendor, the product features the ability to design CICS mainframe screens on IBM PCs or compatibles. It is also said to be able to store, modify, save design and generate the BMS code for use in the mainframe applications.

Extended attributes

The BMS code includes extended attributes, color and multiple-map mapsets. The BMS source code is uploaded for a PC file for use in the CICS application, the vendor said.

Micromain Painter also features an import facility to accept screen designs from other sources such as word processing systems and an export facility to include screen images in documentation.

Micromain Painter costs $495, the vendor said.

INSIDE

Software & Services/61
Microcomputing/61
Networking/61
Systems & Peripherals/62
Price Reductions/62

Technical publisher upgrade handles complex documents

Interleaf, Inc. in Cambridge, Mass., has announced the first customer shipments of its Technical Publishing Software (TPS) Release 3.0.

According to a company spokesman, TPS used to be primarily an office automation product. On the other hand, the spokesman continued, Release 3.0 focuses on productivity enhancements for users who create long, complex documents such as technical manuals, directories and books.

Features of Release 3.0 include editing and formatting control of text within graphics; revision tracking; an equation package; and a book facility for long-document assembly, including automatic numbering and cross-referencing.

This numbering and cross-referencing feature also has the ability to automatically generate an index and a table of contents, according to the vendor.

Other features of Release 3.0 are said to include additional computer-aided design interfaces, isometric and freehand drawing, additional graphics input options including line-art scanner and tracing tablet, enhanced software for editing images and new typefaces.

Can be bundled with workstations

TPS Release 3.0 is available bundled with 32-bit workstations manufactured by Apollo Computer, Inc., Digital Equipment Corp. and Sun Microsystems, Inc., according to the vendor.

An entry-level configuration including Apollo, DEC or Sun workstation, standard TPS software license and an Interleaf laser printer is priced at $29,900.

Unbundled TPS costs $15,000 per license, the vendor said.

Server ups Unix users' speed

Informix Software, Inc., based in Menlo Park, Calif., has announced the release of Informix-Turbo, a specialized data base server said to increase transaction processing speed and provide fault tolerance.

According to a company spokesman, Informix-Turbo was designed to provide Unix-based system users with the ability to handle heavy on-line transaction processing without increasing the risk of information loss.

Informix-Turbo is an optional data base server that uses AT&T Unix System V shared memory, query optimization techniques and raw I/O capability to manage data and speed access for users. A system administrator can use expert-system technology to modify parameters that affect the performance of the system for a particular application environment.

To implement fault tolerance, Informix-Turbo bypasses Unix to insert, read and update data directly on the disk rather than buffering the information in internal memory and writing it onto the disk later. The server keeps transaction logs of the writes so that if there is a system failure, it can use its logs to restore the data base to the last transaction processed. The logs also enable Informix-Turbo to maintain data consistency across multiple tables.

Informix-Turbo is priced from $1,200. It requires Unix System V shared memory and, because it is a data base server, must be used with another Informix product or application as a front end.

According to the company, all current applications written with Informix-4GL, Informix-SQL and other Informix products can be used with Informix-Turbo.

Informix-Turbo will be available in March.

Prime unveils Common LISP

Language integrates with system software

Prime Computer, Inc. of Natick, Mass., has announced the availability of the company's proprietary implementation of the industry standard Common LISP programming language for Prime general-purpose superminicomputers.

Called Prime Common LISP, the programming language is said to be fully integrated with Prime system software. According to the vendor, users can develop and execute artificial intelligence and symbolic computing applications on 50 series systems, such as portfolio management, environmental quality control, mining and exploration strategies, numerical control tooling and flexible manufacturing systems.

In the stand-alone development environment, Prime Common LISP users can develop, compile and debug LISP programs interactively. With the runtime system, users can execute applications independently of the development environment.

Prime Common LISP interfaces to Prime languages, the Primos operating system and other Prime system utilities. Users can exchange data between application programs and incorporate existing data bases into their LISP programs.

Prime Common LISP is user installable. It requires Revision 20.0 of Primos. For Prime office systems, the development environment costs $8,400; for $10,500, it comes packaged with the Emacs full-screen text editor. For computer-room systems, the development environment is priced at $12,000 and at $16,000 with Emacs. The Prime Common LISP runtime system costs $4,000 for all Prime systems.

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NEW PRODUCTS/SOFTWARE & SERVICES

SOFTWARE & SERVICES

Systems software

Cambridge Systems Group has introduced **ACF2/VM Release 3.0**, an enhanced version of its data security software for VM users.

Release 3.0 is said to provide enhanced security for the CP DIAL command, allowing a virtual machine to be secure from unauthorized DIAL access. Under Release 3.0, the installation has the option to validate logons of FORCEID users and write individual rule sets for each DIAGNOSE instruction controlled by ACF2/VM.

ACF2/VM Release 3.0 does not require source code modification for VM Control Program modules.

ACF2/VM Release 3.0 costs $24,000. Current users may upgrade for free.

Cambridge Systems Group, 1333 Lawrence Expwy., Santa Clara, Calif. 95051.

Applications packages

SCS, Inc. has announced an IBM Manufacturing, Accounting and Production Information Control System-interfaced **quote-estimating system**.

The system allows users to determine final price estimates using any cost variables specific to their business and to print quotes that can be sent to customers and maintain a quote history. It also provides a Help text for on-line documentation.

The quote-estimating system costs $3,200.

SCS, Suite 300, 201 S. Main St., N. Syracuse, N.Y. 13212.

Software languages

Celerity Computing has announced the availability of the **LISP** artificial intelligence programming language for its Unix-based 32-bit computer systems.

The Franz LISP dialect offered allows multiple users to run large-scale AI applications, such as the Department of Energy MACSYMA. Celerity's LISP has been optimized to take advantage of the University of California at Berkeley Unix version operating system.

Celerity's Lisp costs $7,000.

Celerity Computing, 9692 Via Excelencia, San Diego, Calif. 92126.

MICROCOMPUTING

Software enhancements

Kartech Data Services, Inc. has announced **Release 1.8** of its **PC-Proto**, a systems prototyping tool.

PC-Proto allows users to create a working model of a system on an IBM Personal Computer, PC XT, AT or compatible. It also provides access to files and data bases and features include enhanced cross-reference reports and an enhanced file converter.

PC-Proto costs $249.

Kartech Data Services, 165 Pinewood Ave., Toronto, Ont., Canada M6C 2V6.

Communications

Consumers Software, Inc. has announced an entry-level version of its **Network Courier** electronic-mail program for personal computer local-area networks.

The program was designed for networks with up to six personal computers. It provides the same functionality of the standard version and the ability to share files without exiting application programs.

The entry-level version of Network Courier is priced at $295.

Consumers Software, Suite A, 8315 Monterey St., Gilroy, Calif. 95020.

Data storage

CMS, Inc. has announced the **K-Kit 60**, a 60M-byte hard disk drive subsystem for the IBM Personal Computer XT.

The drive features an average access time of 28 ms., a transfer rate of 5M bit/sec. and required operating power of 29 watts.

The subsystem comes formatted for installation and includes controller card, cables and mounting hardware.

The K-Kit 60 costs $1,595.

CMS, 3080 Airway Ave., Costa Mesa, Calif. 92626.

NETWORKING

Protocol converters

Datagraf, Inc. has announced the **Honeywell VIP 7700 and VIP 7800 protocol converters**.

The protocol conversion packages are said to convert terminal protocols of other manufacturers, such as IBM, Burroughs Corp. and Sperry Corp. , to emulations of the Honeywell, Inc. terminal protocols. It is said to allow for communications with Honeywell mainframes as well as associated front-end processors.

The Honeywell conversion packages are available in Series II and Bump protocol converter configurations. Prices start at $3,300.

Datagraf, 8305 Highway 71 W., Austin, Texas 78735.

Software

Communications Research Group has announced **Blast Host**, a software product designed to allow mini or personal computers to connect to mainframes.

Blast Host runs under IBM's VM/CMS and MVS/TSO operating systems using any asynchronous pathways found in the mainframe environment, such as protocol converters and CCITT X.25 pads. It operates as an application program to connect

Continued on page 62

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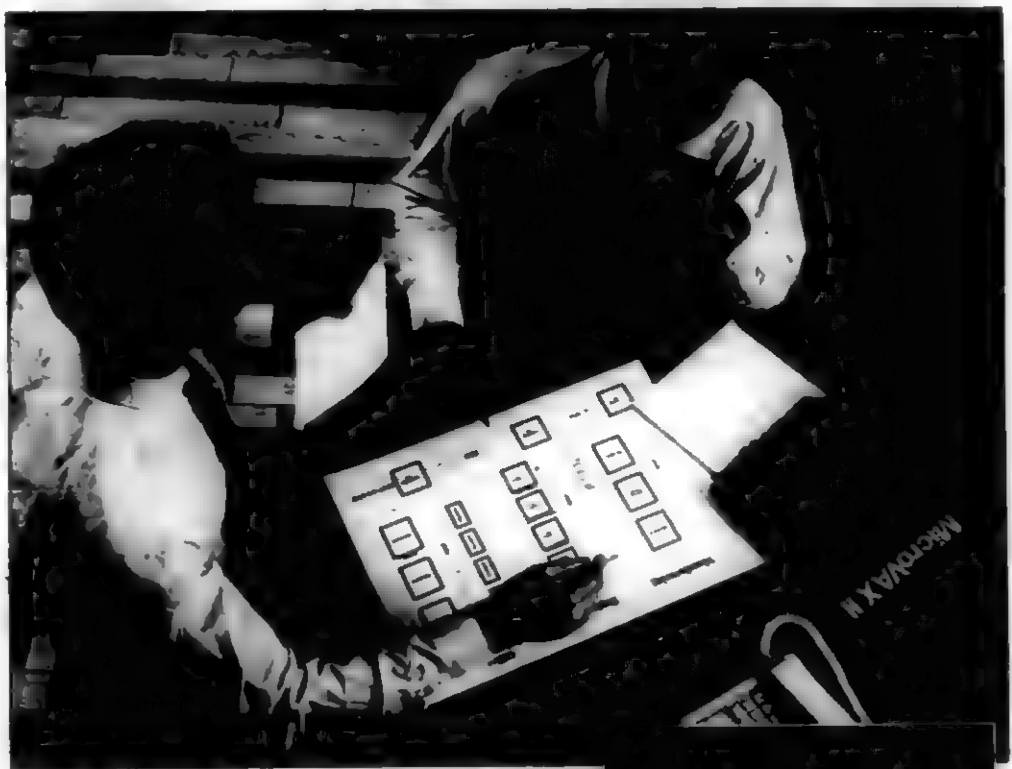

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Continued from page 61

PCs or minis to a remote host and transfer files between systems.

Features include IBM 3270 terminal emulation, asynchronous connectivity and automatic connection to host mainframes or minis dialing public-network pads.

Blast Host is priced at $5,500.

Communications Research Group, Third Floor, 5615 Corporate Blvd., Baton Rouge, La. 70808.

Multiplexers/Modems

Franklin Telecom has introduced the **FM-2400E** and the **Bright modems**.

Both are said to be Hayes Microcomputer Products, Inc.-compatible. The FM-2400E operates at 24K bit/sec. It offers asynchronous or synchronous transmission.

The Bright modem is a full-function modem that fits into the short slots of the IBM Personal Computer and compatibles. It operates at 12K bit/sec. and has auto-answer, pulse or touch tone auto-dial, automatic speed selection and switch-selectable settings for COM1/COM2 ports.

The FM-2400E costs $460. The Bright modem costs $149.

Franklin Telecom, 31320 Via Colinas #113, Westlake Village, Calif. 91362.

SYSTEMS & PERIPHERALS

Turnkey systems

General Computer Corp. has introduced the **Script Manager II**, a stand-alone system designed for use in pharmacies.

The Script Manager II features computer assistance in filling and refilling prescriptions; third-party billing through the vendor's central billing service or through roster billing; monitoring for allergic reactions as well as for conditions against the medications being dispensed; patient profiles; itemized formulary; reordering; and reporting tools, according to the vendor.

The Script Manager II is available for lease for $259 for 60 months or $299 for 48 months.

General Computer, 2045 Midway Drive, Twinsburg, Ohio 44087.

Processors

Imaging Technology, Inc. has added the **HF-150 Histogram/Feature Extractor** to its Series 150 and 151 product lines.

The HF-150 is a Motorola, Inc. VMEbus-compatible, dual-function board said to perform both histogramming and feature extraction at real-time video rates. Features include the ability to accelerate the execution of image processing functions.

The coordinates of up to 16 features can be recorded simultaneously. The output buffer can hold up to 16,000 distinct features.

Histograms are performed on 10-bit image data.

The HF-150 with one output buffer costs $2,395; with two it costs $2,895.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801.

Terminals

Informer Computer Terminals has announced its **207-102** portable workstation.

The 207-102 is said to connect a Digital Equipment Corp. communications network to an IBM communications network through a protocol converter. It is said to be functionally equivalent to DEC's VT102 display terminal. It features direct RS-232C connection or an optional dial-up connection to the mainframe.

The unit features a 9-in. display with a flip-down keyboard; switching between 80 and 132 columns; and an external asychronous ASCII printer port.

The basic Informer 207-102 costs $1,390.

Informer Computer Terminals, 12781 Pala Drive, Garden Grove, Calif. 92641.

Printers/Plotters

Wespercorp, Inc.'s Western Peripherals Group has introduced the **DLP-3000** printer protocol converter said to support Hewlett-Packard Co. HP300 minicomputers.

According to the vendor, the DLP-3000 provides a standard RS-232 serial connection on the printer side while returning emulation of the HP 2631B or 2930 series printers to the host.

The device's HP emulation also supports the HP 3000 MPE spooler for remote-spool printing. It also works with parallel-to-serial converters.

Other attributes of the printer protocol converter include built-in diagnostics and error detection and correction of print files.

The DLP-3000 is priced at $900.

Wespercorp, 1821 E. Dyer Road, Santa Ana, Calif. 92705.

PRICE REDUCTIONS

Ampex Corp. has reduced the price of its **Ampex 220** video display terminal.

The Ampex 220 is an American National Standards Institute terminal said to be compatible with Digital Equipment Corp. VT220, VT102, VT100 and VT52 protocols. It features 400 bytes of nonvolatile programmable function-key memory, a programmable user line, function key loading, VT220-compatible keyboard, downloadable character sets, block mode and a Compose character key.

The Ampex 220 is now priced at $529.

Ampex, 401 Broadway, Redwood City, Calif. 94063.

WALKER HELPS KEEP THE PEACE AT PENNSYLVANIA GAS AND WATER

"While many packages satisfy user requirements, Walker also satisfies data processing objectives. Eliminating conversions each time our computer environment changes gives us a competitive advantage."

David A. Miller
Director of Data Processing
Pennsylvania Gas and Water (PG&W)

Data Processing Director David Miller maintains a peaceful coexistence between users and data processing personnel at Pennsylvania's $230 million utility by training both groups in Walker's financial application packages.

"We solved two distinct sets of requirements, without making tradeoffs," says Miller.

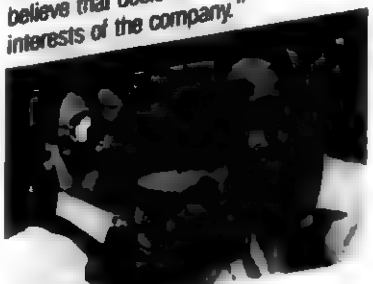
USER NEEDS: "It was important that users begin to control the systems supporting their business activities," explains Miller. "With Walker products, users work with high level tools to interactively tailor screens and reports to match PG&W's business requirements. Once the application is installed, users control the majority of the application's processing," says Miller.

DP NEEDS: Experience told Miller that hardware and software changes were inevitable: "In the '70s we experienced numerous changes in the company's operating environment," he says. "We were determined to minimize the future effects of such changes by making prudent hardware decisions and by isolating application software."

Miller achieved his goals. Because Walker products run independently of operating, data base management, and telecommunications systems. Notes Miller: "We no longer perform costly conversions for our Walker-based products each time components in our operating environment change."

During the selection process, Miller looked beyond current package pricing. "We factored into product cost the expense associated with the total conversions expected over its useful life," says Miller. "We believe this type of evaluation presents a more valid view of an application's cost."

"Every time we review our decision to purchase Walker products, we still believe that decision was in the best interests of the company."



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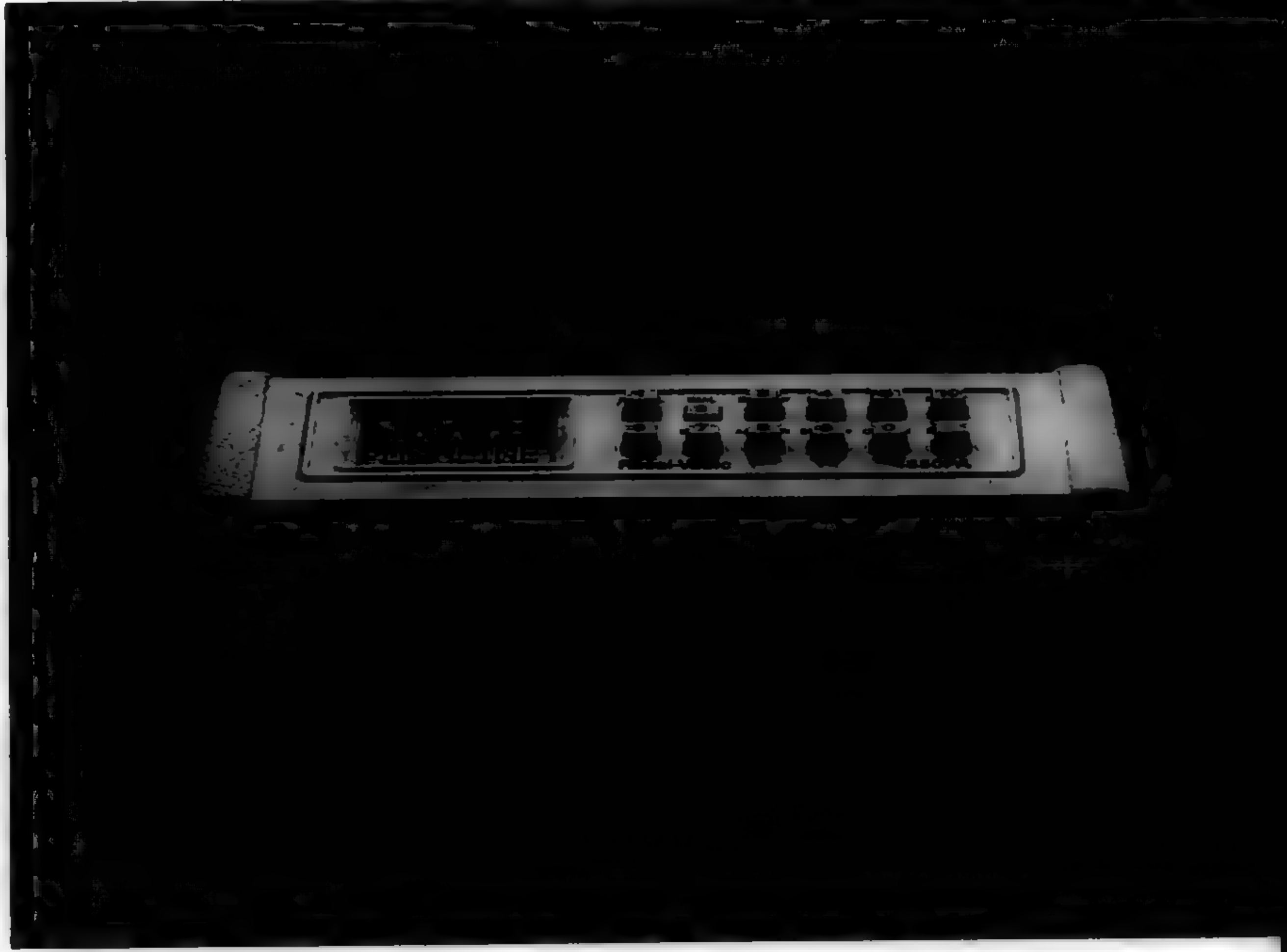

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The 4850PA is extremely compact, fully automatic and packed with useful features. The front-panel keyboard comes with an LCD display, and lets you program up to 28 options, including storage for 15 phone numbers.

And since it's a sync modem, the 4850PA is the ideal companion for every kind of remote device, including RJEs and PCs in micro-to-mainframe applications. You can even use it to lynk up your minis.

So get *all* your remote sites in sync with your mainframe. Dial up Racal-Vadic today at **800-482-3427** and ask for more information about the 4850PA.

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by resting on what's behind.

Somewhere along the way, a leader has to break away from the pack. And go it alone. That's what leadership is all about. Standing up, bearing down, and moving ahead.

Breaking Away.

Novell broke out of the local area networking (LAN) pack four years ago with the introduction of the file server. We called it a LAN milestone. Others scoffed. Three years later, when IBM announced that its LAN systems would be file server-based, the rest of the pack finally headed for that first milestone.

But Novell was already milestones ahead. By porting the NetWare® LAN Operating System to over 30 major LAN hardware systems and offering nearly 4,000 NetWare-compatible multiuser applications, Novell had established a de facto LAN standard. A standard now supported by more than 400,000 NetWare users worldwide.

And with the introduction of System Fault Tolerant (SFT™) NetWare, Novell passed another LAN milestone: affordable fault tolerance for nearly all LAN systems.

Moving Ahead.

Today, Novell isn't resting. On past achievements or anything else. While other companies are struggling to reach Novell's LAN milestones, Novell is forging an even bigger lead with new milestones like the Universal Network Architecture (UNA) strategy and the opening of NetWare Centers worldwide. A lead so big that many major LAN competitors are buying Novell technology just to stay in the race.

Being a leader is hard work. But Novell is in front to stay. Because nothing compares to the view from the front. Especially when you look forward to the milestones ahead.

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COMPUTERWORLD

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COMPUTER INDUSTRY

Section begins on page 94

Third-party micro software support gains corporate attention

By James A. Martin

Just 18 months ago, third-party microcomputer software support companies were virtually nonexistent. Their numbers remain small, but analysts predict that will soon change and a new industry will emerge from several key developments in corporate computing habits.

As micros began to proliferate, the ranks of end users using sophisticated spreadsheet and accounting packages grew. The level of software support from vendors and corporate MIS departments, however, did not always keep up, and the promises of increased end-user productivity did not always materialize.

Last year, one major software vendor, Ashton-Tate, began charging fees for customer support after the initial warranty period, which some say is giving this fledgling industry a strong boost.

"I always thought this was an up-and-coming industry, and the fact that some software companies are now charging a fee for support has guaranteed it," says Amy D. Wohl, president of Wohl Associates, a consulting firm in Bala-Cynwyd, Pa.

Micro Support Resource Corp. (MSR) is one of the few companies now offering third-party software support nationwide for PC end users. After opening its Atlanta headquarters in September 1985, MSR has grown from seven employees in one office to 35 employees supporting some 6,000 end users. Revenue is expected to reach $1 million in 1986.

Other companies are beginning to show interest in third-party software support as well. Businessland, Inc. rolled out a nationwide program last June to offer a variety of third-party hardware and software support packages. Analysts believe it is only a matter of time before a large micro software vendor offers support of other vendor's products — just as hardware vendors such as Honeywell, Inc. and NCR Corp. have entered third-party hardware maintenance.

MSR's Fain

"We do for users what maintenance companies do for hardware — we keep them operational," MSR President Deborah Fain says. "Most companies tend to forget that the user, in terms of dollars, is more expensive than the hardware."

Last August, Ashton-Tate announced that its Systems, Service and Information Division sector would begin providing a range of support services from $50 to $150 per year per user for each software package supported. Other software vendors, seeing the profit potential, are expected to follow suit.

"By charging these fees, the software industry has opened a Pandora's box," Wohl says. Most software vendors do not have a good reputation for support, she says, and, as a result, customers are hesitant to pay for vendor support. "This gives folks like MSR a good chance, and I think there's room in this business for a lot of their type," Wohl adds.

On the other hand, some analysts see third-party companies facing an uphill battle in trying to support other companies' products.

"Third-party companies have to compete with the original provider for service," says D. R. MacNaughton, president of Business Development International, Inc., a consulting firm in Franklin Lakes, N.J. "They can compete on price, probably, but there is the assumption with a lot of people that the guys who wrote Lotus 1-2-3, for example, will be better at maintaining it than someone who didn't."

MSR says it can meet that challenge. Founded by Fain and three colleagues with whom she had worked in support and education at Samna Corp. and Lanier Business Products, Inc., the firm counts Coca-Cola Co. and Greyhound Lines, Inc., a subsidiary of Greyhound Corp., among its customers. MSR offers full telephone support for $150 per user per package for 20 calls on most major PC word processing, spreadsheet and data base software packages.

"There had to be a multivendor system in large numbers in the workplace for our kind of service to be viable," Fain explains. "Before, with office automation products, end users were used to getting all their components and support from one company, like Wang Laboratories, Inc. In the microcomputer environment, these components come from a variety of places."

"The days of manufacturers selling hardware at 35% off and giving free support are gone," according to Miles Walsh, director of Businessland's toll-free Solution Line telephone support service.

It is expected that at least one major player in the micro software industry will enter the market, maybe as early as middle or late 1987.

However, MSR is not worried. "If another company started today, it would take them at least two years to duplicate our data base, and in that time frame we think we can secure enough of the market share to maintain an edge," Fain contends. "If we do a good job, their entrance won't affect us dramatically."

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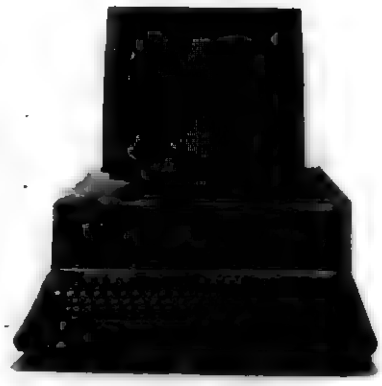

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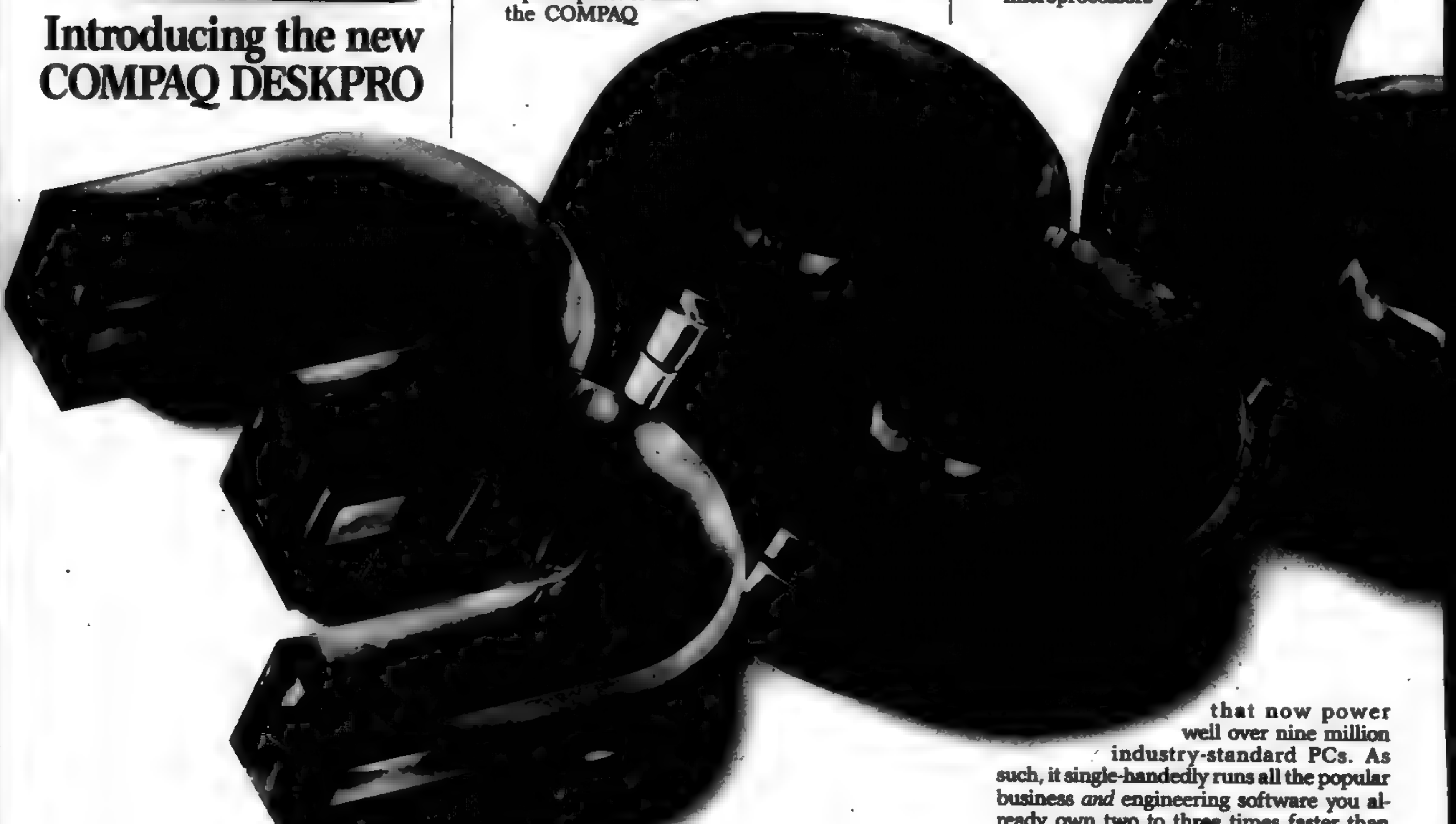

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advanced-technology computers

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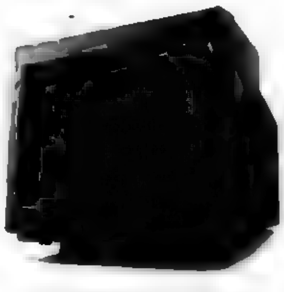

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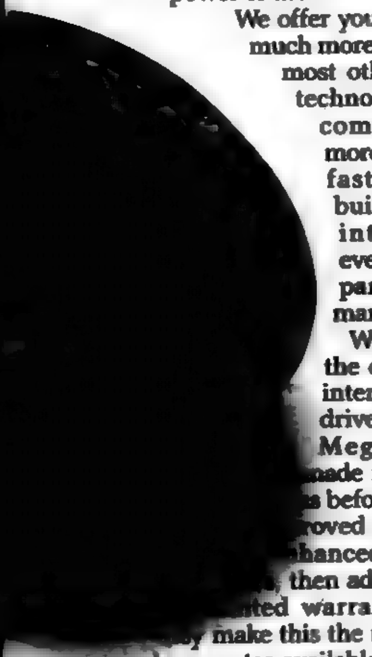

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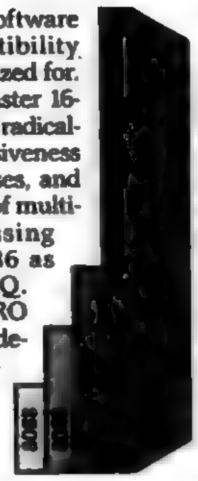

The Intel 80386 microprocessor is faster and more powerful than its predecessors.

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Datapoint's future questioned as CEO leaves firm at crucial point

By James A. Martin

SAN ANTONIO — After several years of financial and management setbacks, the most recent being the sudden resignation of its president and chief executive officer, the future of Datapoint Corp. appears to be at its most uncertain.

The office automation and network vendor lost market share in recent years to mini and microcomputer vendors and reported operating losses in both fiscal 1985 and 1986. Before that, the company suffered lawsuits alleging the firm misrepresented financial results to its shareholders between 1980 and 1982.

In 1985, Asher B. Edelman, a Wall Street financier infamous for buying troubled companies and selling them off in pieces, gained control of Datapoint in a highly publicized corporate takeover.

'Dangerous point'

"Datapoint is at a dangerous point right now," according to Linda O'Keeffe, a director of market research at Dataquest, Inc. in San Jose, Calif. "Users have been nervous since the 1982 scandal and even more nervous since Asher Edelman stepped in. There must be a concerted sales and marketing effort and a unified product positioning strategy to energize sales if they are to survive."

Datapoint recently suffered a further blow with the unexpected resignation of 13-year executive and CEO Edward P. Gistaro [CW, Jan. 19]. Although Gistaro refused to comment on his departure and did not reveal to Datapoint his reasons for leaving, analysts and observers speculated that Gistaro often disagreed with Edelman's vision for the company.

Edelman referred press inquiries regarding Gistaro's departure to a Datapoint spokesman, who said that to his knowledge the two had a good relationship.

Several Datapoint users contacted by *Computerworld* said the company's recent problems have not necessarily translated to their own DP shops.

"Product-wise, the company is in the best shape ever," said David Prybys, director of MIS for Cadillac Gage Co. in Warren, Mich. "The question is, Have too many people been scared away?"

Dana Commercial Credit Corp. in Troy, Mich., however, is phasing out its seven Datapoint 8800 minicomputers in favor of an IBM 4381 mainframe.

"The growth of our company is why we're migrating to a mainframe," said James P. Jones, Dana's director of information services. "At the time we decided to upgrade, I didn't feel Datapoint had kept up with the technology curve. Over the last year, they've come out with significant technological improvements over what they had, but for us it was a day late and a dollar short."

Technological expertise will not be as important as marketing savvy in the search for Gistaro's replacement, according to Dataquest's O'Keeffe. "The new CEO had better be the world's best marketing executive, otherwise the company is going to continue to face tough times," O'Keeffe said.

In December 1986, Edelman appointed Clark R. Mandigo as president and chief executive officer of Intelogic Trace, Inc., the third-party computer maintenance concern spun-off from Datapoint by Edelman. With no experience in computer maintenance, Mandigo was chosen for his management skills [CW, Dec. 8].

If the company does not make headway in marketing and sales, the possibility is strong that Datapoint will "have to be merged, acquired or form a strategic alliance with another vendor just to survive," according to Andrea Rossi, analyst with Rossi Consultants in Marblehead, Mass.

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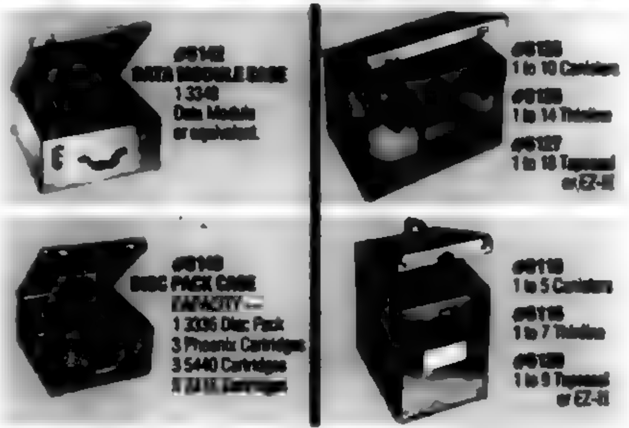

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Apple, Microsoft, Tandy report rise in sales, earnings

Stratus, Tandem gain while NCR growth stalls

By Alan Alper
and Clinton Wilder

Demonstrating that the worldwide microcomputer industry remains robust, Apple Computer, Inc., Microsoft Corp. and Tandy Corp. last week reported solid growth in sales and earnings in the quarter ended Dec. 31.

Three larger systems vendors targeting the transaction processing market, however, posted contrasting quarterly results. While Stratus Computer, Inc. and Tandem Computers, Inc. continued their recent success, NCR Corp.'s profit growth stalled on a 12% rise in revenue.

Microsoft. Spurred by healthy growth across all product areas, Microsoft registered second-quarter profits of $19.7 million, or 71 cents a share, up 80% from the corresponding period last year. Sales were up 52% to $49.9 million.

President Jon Shirley attributed the favorable results to strong sales through retail channels. He cited, in particular, strong demand for software products for Apple's Macintosh, such as Microsoft Works.

"Microsoft's systems products fell to below 50% of total revenue, which means that their applications products are contributing more," said Thomas Galvin, an analyst with Shearson Lehman Brothers, Inc. in New York.

Apple. Apple's traditionally strong December quarter, which in 1986 included a much higher percentage of Macintosh sales, boosted revenue 24% to $662.3 million. But profits grew by only 3%, reflecting the gross margin pressure that Chairman John Sculley has said will probably result in a year-to-year earnings decline in the current quarter.

First-fiscal-quarter earnings were $58.5 million, up from $56.9 million a year earlier. Per-share earnings remained flat at 91 cents.

Tandy. Buoyed by strong acceptance of its new line of low-cost IBM Personal Computer-compatible microcomputers, Tandy posted a 19% second-quarter revenue gain to $1.19 billion. Net income for the period also rose 19% to $103.8 million, or $1.16 a share.

"We sold more computers in the fourth calendar quarter of 1986 than in the prior three quarters combined," a spokesman for the Fort Worth, Texas, firm noted. He cited exceptionally strong demand for the new computers introduced last July, the Tandy 1000 Models SX and EX.

Earnings for the quarter were lowered by $1.8 million because of the recapture of investment tax credits.

NCR. Tax reform negatively affected NCR's fourth-quarter results. Earnings edged up 1% for the period to $134 million, or $1.39 a share. Revenue rose 12% to $1.5 billion.

The effect of the repeal of the investment tax credit lowered fourth-quarter earnings, the firm said. Tax reform also increased NCR's tax rate by 1.7% to 45.7%.

For the full year, however, NCR achieved record results. Earnings reached $336.5 million, or $3.42 per share, up 7% from 1985, on a revenue increase of 13% to $4.8 billion.

NCR Chairman Charles Exley said the firm finished its fiscal year "in the strongest financial position in the company's modern history." But, he added, "The slump in the U.S. computer market, with its associated pressure on profit margins, remains a major concern. We see no signs as yet of material improvement in domestic business conditions in our industry. However, order strength and profit improvement in our international operations is very encouraging."

Tandem. New products brought out during the past year enabled the Cupertino, Calif., maker of fault-tolerant transaction processors to report a profit increase of 133% to $27 million, or 58 cents a share, for its first quarter.

Revenue was up 40% from the comparable period last year to $238 million.

Tandem Chief Executive Officer James G. Treybig attributed the strong performance to continued international growth and improved domestic order rates. "For example, Texaco Oil AB Sweden chose Tandem systems to implement a point-of-sale application for Sweden, Norway and Denmark," he noted.

"They're growing like gangbusters," said Louis Gilio, a market researcher for Bear, Stearns & Co. in New York.

Stratus. The Marlboro, Mass.-based fault-tolerant vendor capped another impressive growth year with a fourth-quarter profit rise of 52% on a 40% sales increase. Stratus earned $3.7 million, or 19 cents per share, on revenue of $35.3 million.

For the year, sales reached $124.5 million, up 55% from $80.1 million in 1985. Profits grew 57% to $13.6 million, or 70 cents per share.

Stratus was particularly successful overseas selling transaction processors to the newly deregulated brokerage industry in the UK. President William E. Foster also cited several new U.S. accounts in 1986, including American Express Co., the Citibank N.A. unit of Citicorp, the American and New York stock exchanges and Mack Trucks, Inc.

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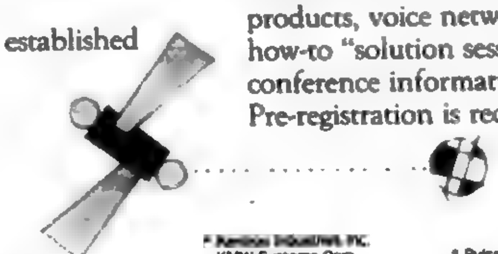

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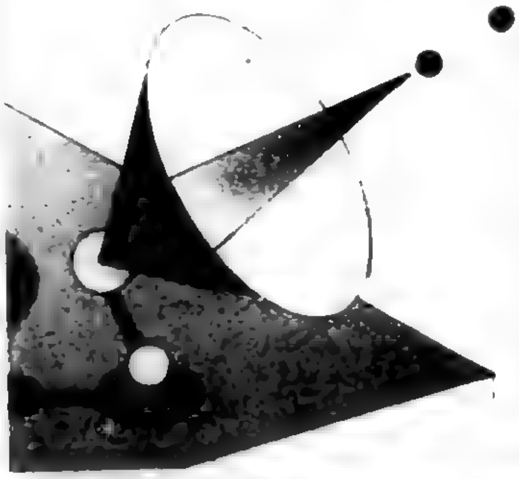

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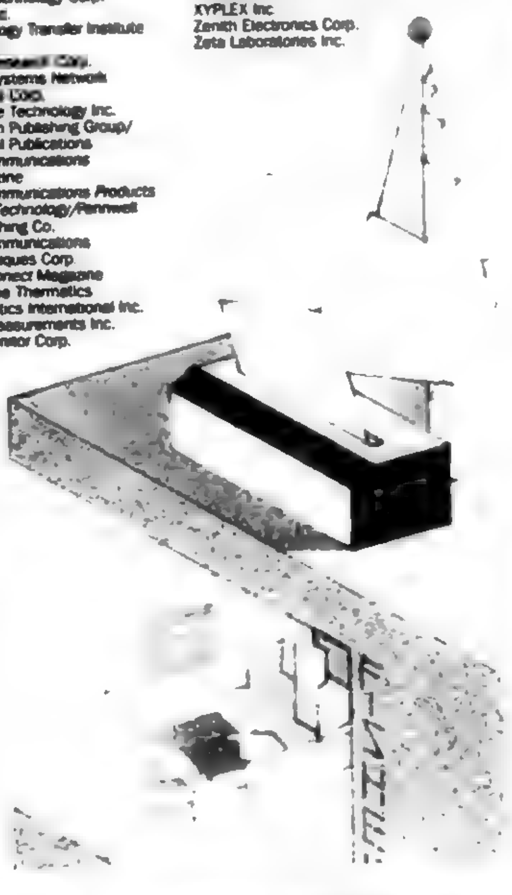

Sytek broadens spectrum, will support Ethernet, TCP/IP

By Peggy Watt

MOUNTAIN VIEW, Calif. — Broadband local-area network developer Sytek, Inc. will broaden its scope to support Ethernet, Transmission Control Protocol/Internet Protocol (TCP/IP) and new transmission media in an effort to shake the stigma of being two years in IBM's shadow.

Sytek will boost their development of twisted-pair and baseband media, said Roger Ferguson, executive vice-president of Sytek. The company already offers fiber-optic connections in a joint marketing effort with fiber-optic developer Codenoll Technology Corp. in Yonkers, N.Y.

Sytek's broader market will pit it against two other Mountain View-based network companies, Ungermann-Bass, Inc. and Bridge Communications, Inc. Ferguson said Sytek is better suited to face the competition after two years of experience as the developer and supplier of IBM's PC Network, which was all but abandoned with IBM's announcement of its Token-Ring network a year ago.

Network industry analyst Harvey Freeman, vice-president of Architecture Technologies Corp. in Minneapolis, said he is optimistic about Sytek's survival and prosperity in its post-IBM era.

"They're going to become a formidable force," he said. While Sytek has to lose its image as IBM's shadow, Freeman said the company is also well positioned because of that exposure. The income from IBM, while temporary, yielded valuable research dollars for Sytek's later products, he said.

"The IBM deal," Ferguson agreed, "was both a blessing and a curse. We learned how to really define and test a product and develop a quality, defect-free product. We've translated that philosophy to our existing products."

Slightly more than half of Sytek's revenue came from IBM, and that income dropped when the contract did. The resulting losses delayed Sytek's plan for a public stock offering in 1987 at least a year, Ferguson added.

IBM still owns 15% of Sytek through convertible bonds.

Ferguson said Sytek will offer "clear migration from existing Sytek systems to TCP/IP and other emerging standard protocols." TCP/IP tops Sytek's list because of the great interest in that standard by the military and government, markets that constitute more than half of Sytek's current business.

Sytek is also eyeing General Motors Corp. Manufacturing Automation Protocol/Technical Office Protocol (MAP/TOP) standards. "We are committing to supporting MAP/TOP in the future," Ferguson said. No MAP products will come out of Sytek until MAP 3.0 is released, he added.

"Within 10 days we had the names of the best distributors in three foreign countries."

For nearly two decades, Land Grant has been involved with high tech in a variety of capacities. He is president of Land Grant & Company — a business devoted to export consulting and profitable concepts in global trade for high technology producers.

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In fact, selected international market information is so scarce, Land is currently writing a guide entitled the *High-Tech Exporter's Sourcebook.* And he plans to continue relying on CW International Marketing Services for distributor contacts. He explains, *"The real added value of CW is its people and expertise in-place around the world."* He adds, *"Because CW Communications is a network of international offices, CW International Marketing Services has worldwide contacts and marketing information unavailable elsewhere."*

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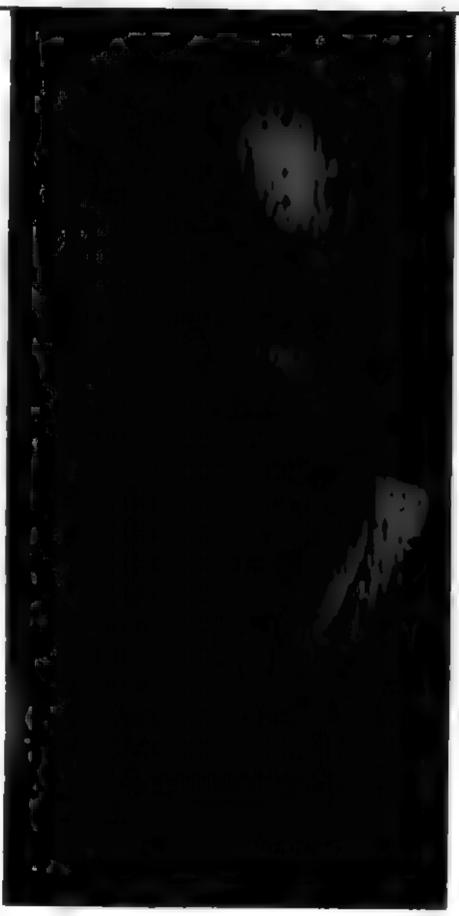

Land Grant
President
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DEC takes slice of Big Blue pie

From page 94

changed appreciably.

IBM's market share losses in the high-end of the intermediate systems market were especially noticeable. DEC's share of the $4.3 billion intermediate systems' annual shipment value at list for systems of $100,000 and up was 49%, nearly three times higher than IBM's 17.5%.

In terms of the "if sold" value of the U.S. installed base at list for such high-end systems, DEC's share of the U.S. market went from 28% to 32% in just six months. IBM's market share, meanwhile, dropped from 35% to 32% in the same time frame.

For the whole U.S. mid-range market, estimated at $5.6 billion, DEC outdistanced IBM by a 1.4-to-1 margin, despite some 12,000 low-priced System/36s that IBM shipped during the same period.

Cash vs. unit shipments

The System/36s were the reason IBM appeared to be doing well in annual unit shipments, with a 61% market share, compared with DEC's 17%. Unfortunately for IBM, bankers and investors look for cash, not unit shipments, before passing judgment on how a company is doing.

Within IBM's intermediate systems, the System/36 is IBM's largest revenue contributor with $872 million of "if sold" value in the U.S. The 4381 shipments have dropped significantly in the first half of 1986 to $510 million, down 40% from their 1985 level of $853 million.

Such a decrease could lead to the conclusion that at times of weak demand, a high level of competition and disparate IBM product lines, the marketplace is no longer so elastic as to react favorably to IBM's aggressive price/performance actions, such as the 4381 announcement IBM made last February.

Of course, one could reasonably argue that such a conclusion may be premature — that there had not been enough time for the marketplace to fully react to IBM's price/performance move. But the figures indicate that one can at least make a strong suggestion that the intermediate systems market was not as price-elastic as IBM had hoped in the first half of 1986.

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"Too many terminals just don't measure up," says Susan. "I've seen machines with questionable ergonomics . . . keyboards that flex in the middle when you type . . . even cheap little diodes that could drop off.

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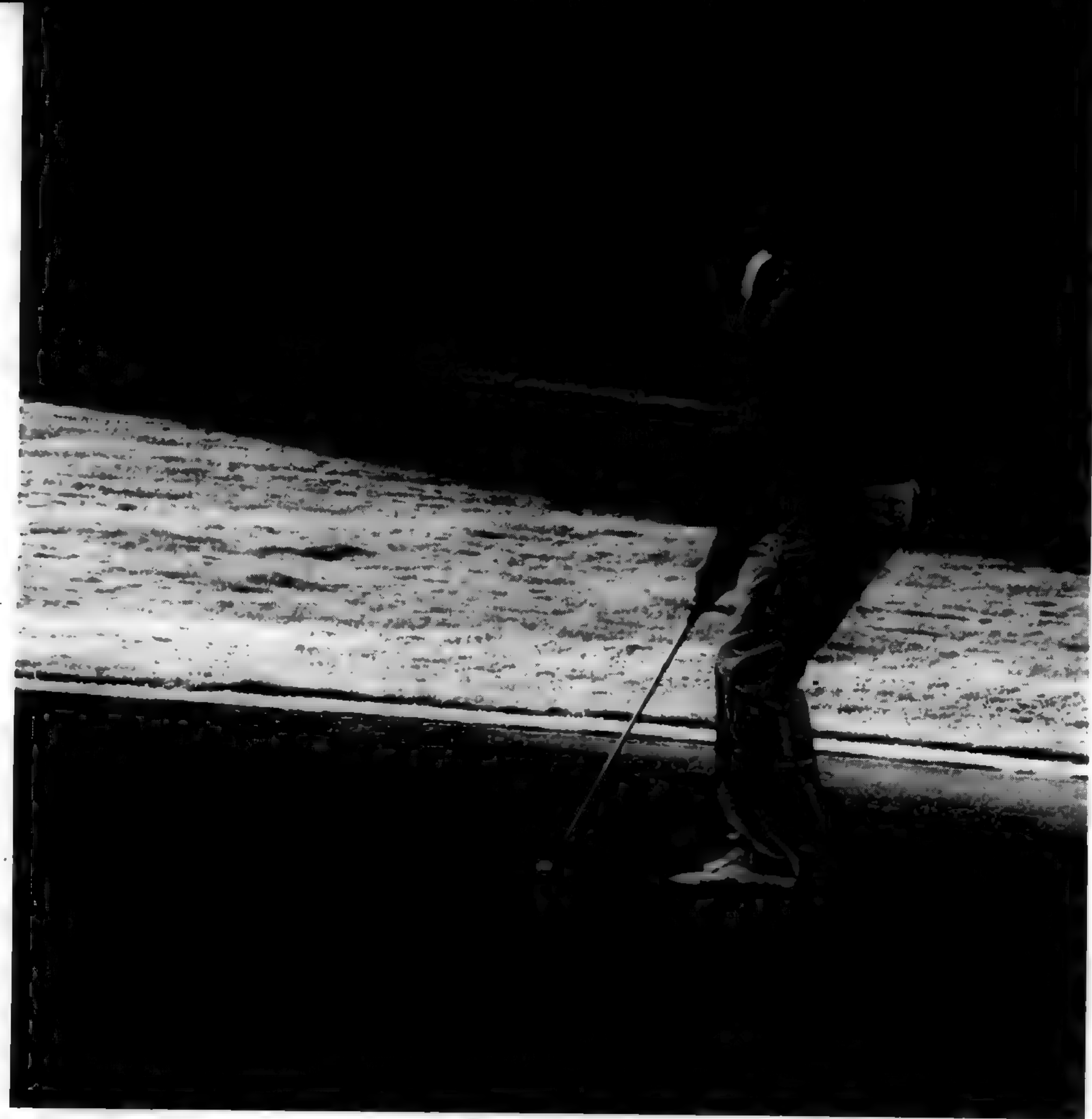

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Information Technologies Division
McKesson Corporation
Age: 44
Budget: $65 million
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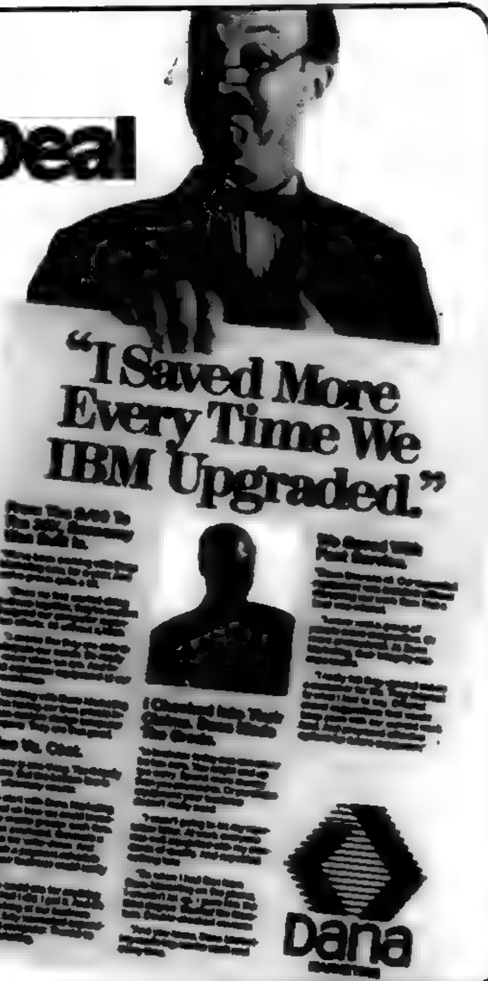
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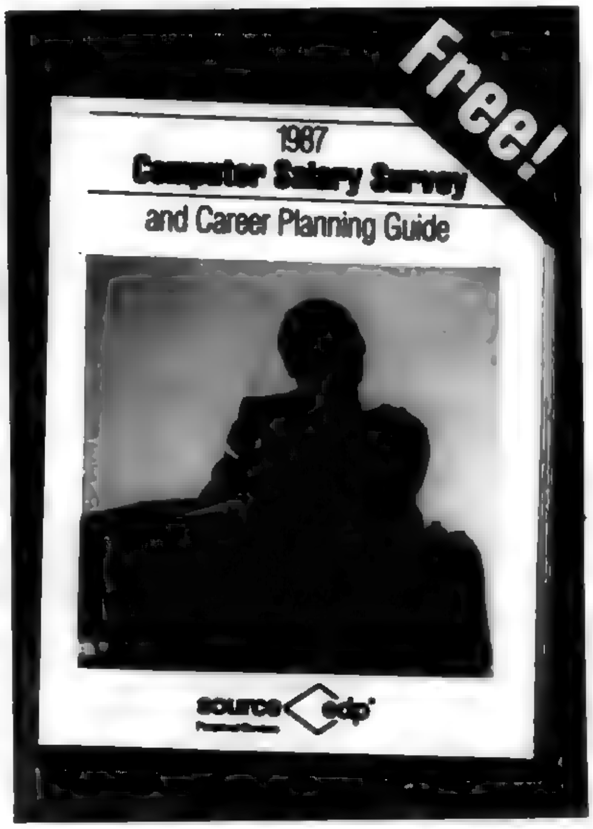

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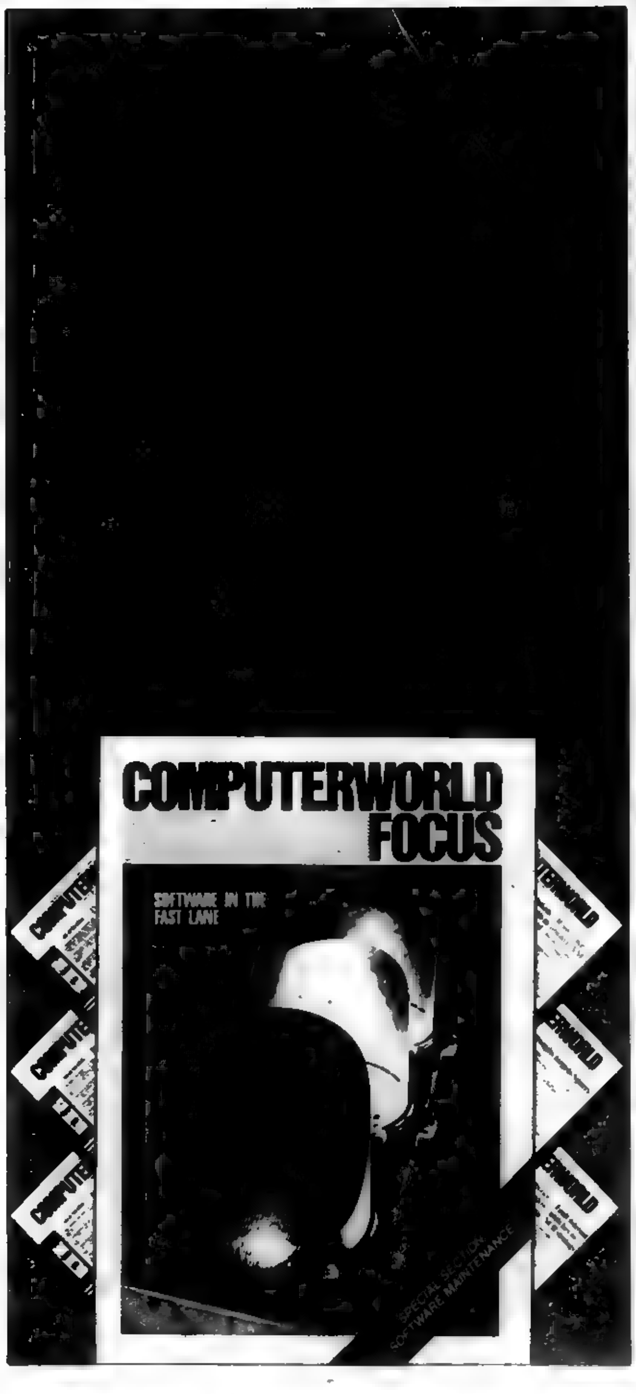
40 hrs. weekly, 9:00 A.M. to 5:00 P.M. $27,000.00 yearly. 1) Write and debug word processing file translation software for IBM PC-XT, Microvax II and Onyx Computers and various types of word processors. 2) Maintain Engineering Change Request (ECR) and maintenance list for all products. 3) Port product source code and adapt source code to various mini and microcomputer operating systems and hardware environments using C and assembler programming languages and Unix, VMS and MSDOS operating systems. 4) Evaluate word processing systems with respect to document structure normalization. Bachelor of Science degree in Engineering required. Must be able to use C and Assembler programming languages and Unix, VMS and MSDOS operating systems. Must be versed in the operation of stand alone and PC-based word processors. Send resumes to: ILLINOIS JOB SERVICE, 910 South Michigan Avenue - Room 333, Chicago, Illinois 60605. Att: [illegible]. Ref#[illegible]. AN EMPLOYER PAID AD.

PROGRAMMER ANALYST

-Responsible for analysis, design, implementation and documentation of new systems or changes to existing systems on batch and online environment, using IBM assembler, COBOL, (Common Business Oriented Language), CIS (Customer Information Control System) language under large IBM mainframe. May assign projects to others and monitor progress, provides estimates, detailed specifications and recommendations regarding installation of new systems. High School Graduate, 4 yrs college, Bachelor Degree Computer Science. 4 mos experience in job offered; 2 yrs exper as Programmer. The 4 mos experience must include implementation and use of University Computer company super MICR II (magnetic ink) processing operating systems. Salary $28,800 per/yr., basic 40 hr. wk. (9-5:30 pm). Send resume: MESC, 7310 Woodward, Rm. 415, Detroit, MI 48202. Ref. No. 78688. Employer Paid Ad.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CAPACITY PLANNING ANALYST This position requires a strong background in capacity planning and performance. Minimum 3-5 years experience required. Familiarity with SAS, BEST/1, and CRYSTAL a plus.

SYSTEMS PROGRAMMER This person should have a heavy background in MVS/XA, and JES2 performance and tuning. VTAM background a plus. Minimum 3-5 years experience required.

STORAGE CONTROL MANAGER The best candidate for this position will be familiar with the "DASD pooling" concept, and have strong managerial skills. Previous experience implementing pooling a plus.

STORAGE CONTROL ANALYST Candidates should have experience using DMS/OS for DASD management. This position works closely with users coordinating volume backup, restores, overall allocation, and assist in user problem determination.

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TAPE LIBRARIAN This job requires an in-depth knowledge of and actual experience using the UCC1/TMS software product. Qualified candidates must be able to interact with TCC's extensive customer base and able to manage a large library of tapes. Additional project management experience is very desirable. Experience with VM/CMS, BACKUPC, and TAPELIBC would be a plus.

OPERATIONS SHIFT SUPERVISOR Qualified applicants must have experience in managing the shift operations of a large data center with multiple IBM CPUs. Must also have the ability to provide utmost in service to data center customers. Project management experience is a definite requirement. Participatory experience with data center relocation, disaster recovery, and physical planning is very desirable. Shift rotations must not be a problem.

Interested candidates should mail their resumes and salary history (indicating position being applied for) to:

Vice President, Processing Services Division
The Continuum Company
3429 Executive Center Drive, Austin, TX 78731

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Provides support to Applications staff in maintaining a large and complex IMS environment. A minimum 2 years' data base administration experience in an IMS/DB/DC environment working with all IMS support activities, including IMS logical data base structures and data base performance considerations, is necessary. Working knowledge of VSAM, plus IMS support facilities, such as BTSII, SMUII and MFS is important. DBRC experience is also desirable.

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Responsible for the operational support of data storage and retrieval. A minimum 1 year system programming or data base analysis experience in an IBM mainframe environment is required. Prior programming in an on-line, data base environment, plus knowledge of data access methods, such as VSAM, QSAM and Assembler language, are necessary. An understanding of backup and recovery, reorganization, data access, problem determination and resolution, security and data integrity is important. This position will include learning to tune the IMS environment.

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One of the leading Savings & Loan Associations in the Southeast, located on Florida's West Coast, has an opportunity for an individual with 1-3 years HOGAN deposits or loans programming experience. Send resume with salary requirements to:

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P.O. Box 1509
St. Petersburg, FL 33731
Attn: Sandra Griffin

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The Miami Valley Regional Transit Authority (RTA) of Dayton, Ohio has an immediate opening for a Systems Software Engineer.

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Rogue Valley Medical Center, a regional medical center serving southern Oregon and northern California, seeks RPG II Programmer/Analyst with minimum two years experience for growing data processing department. Position requires knowledge of the IBM S/36 and its operating system. Some supervisory experience and BS in Computer Science preferred.

Contact Personnel
Rogue Valley Medical Center
2825 Barnett Road
Medford, Oregon 97504
(503) 773-[illegible] EOE

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Performs self-assigned tasks including but not limited to, development of overall systems design specifications, design and code key modules and sub-systems, monitor system performance, develop quality assurance procedures and testing facilities, evaluate and recommend software tools, work with project leaders and other technical staff to assure cross system capability.

Requires thorough knowledge of the following: OS/JCL, OS/MVS, CMS. Knowledge of the following preferred: Cullinet Tools, PL/I, VSAM. Knowledge of the following helpful: Assembler, IMS/VS DB, CICS, MARKIV.

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The candidate for this position will be required to analyse financial statements as necessary, to evaluate the impact of budgets on Group Company Balance Sheets, to follow-up and analyse financial market trends and to perform loan administration functions.
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Responsible for performing accounting duties relating to ADNOC's Cash Management. Co-ordinate and monitor the flow of funds through the company's bank accounts. Evaluates and analyse the company fund utilisation activities and financial institutions holding ADNOC's funds.
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THE HUMAN RESOURCES DIVISION MANAGER
PERSONNEL DIRECTORATE
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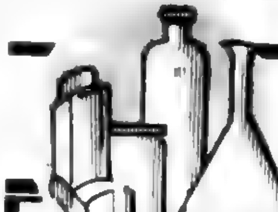

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Denmark: Preben Engell, Computerworld Danmark A/S, Torvegade 52, 1400 Copenhagen K, Denmark. Phone: (011) 45 1955 695. Telex: (855) 31566.

France: Jean-Louis Rendon, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, France. Phone: (011) 33 14 747 1272. Telex: (842) 613234 F.

Hungary: Dezso Futasz, Computerworld Informatika Co., Ltd. H-1536 Budapest, Pf. 386, Hungary. Phone: (011) 36 1 228 458. Telex: (861) 22 6307 (KSHP H).

Italy: Dr. Bruno Fazzini, Computer Publishing Group S.R.L., Via Vida 7, 20127 Milano, Italy. Phone: (011) 39 02 2613432. Telex: (843) 335318.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (011) 81 3 551 3882. Telex: (781) 252-4217 (Computerworld Japan only).

Steven Yamada, Tokyo Representative Corp., Sanshin Kogyo Jimbocho 3F, Chiyoda-ku, Tokyo 101, Japan. Phone: (011) 81 3 230-4117/4118. Telex: (781) J26880 (reps for all CWCI publications except Computerworld Japan).

Mexico: Henry Morales, Computer Mexico S.A. de C.V., Oaxaca 21-2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Phone: (905) 514-4218 or 6309. Telex: (383) 177 1300 (ACHAME).

The Netherlands: Wout Berends, CW Communications B.V., van Eeghenstraat 84, 1071 GK Amsterdam, The Netherlands. Phone: (011) 31 20 646426. Telex: (844) 18242 (CWCOM NL).

New Zealand: Reg Birchfield, CW Communications Ltd., 13 Maidstone St., Grey Inn, Auckland 1, New Zealand. Phone: (011) 64 9 768 993. Fax: (011) 64 9 780 244.

Norway: Morten Hansen, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Toyen, 0608 Oslo 6, Norway. Phone: (011) 472 647725. Telex: (856) 78476 (CW NOR N).

People's Republic of China: Chen Minglun, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Phone: (011) 47 814 6174. Telex: (716) 222214 (CCW CN).

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Switzerland: Gebhard Osterwalder, CW Publikationen AG, Witikonerstrasse no. 15, Postfach 253, CH - 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (845) 816 710.

Taiwan: Leona Wang, ACE Media Agency Co. Ltd., P.O. Box 26-578 Taipei, Taiwan, R.O.C. Phone: (011) 02 751 3636. Telex: (785) 14142 (ACE GROUP). (Representative for all CWCI publications).

London: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WC1 8UT, United Kingdom. Phone: (011) 44 1 831 9252. Telex: (851) 262346.

United Kingdom: Euan Rose, Beere Hobson & Associates, 34 Warwick Road, Kenilworth, Warwickshire, CV8 1HE, United Kingdom. Phone: (011) 09 26 512424. Telex: (851) 311951 (BEEHOB). (Representative for all CWCI publications).

Venezuela: Kalman von Vajna Nagy, CW Comunicaciones, C.R.L. Torre Maracaibo, Piso 13, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 58 2 72 76 30.

West Germany: Eckhard Utpadel, CW Publikationen Verlagsgesellschaft mbH, Rheinstrasse 26/28, Postfach 40 0429, 8000 Munchen 40, West Germany. Phone: (011) 49 89 360880. Telex: (841) 5215350. (COMW D).

ADVERTISERS INDEX

ADR 3
Aluminum Case Company 71
Artificial Intelligence 15
AST Research 56-57
Ausdata 13

BASF 60
Bendata 29

Cambex 13
Canaan Computer 14
Chen & Associates 25
Codex Corp. 22
Comdisco 52-53
Communication Networks '87 73
Compaq 68-69
Compuscan 45
Computer Management Research 35
Cullinet 19
CW Corporate 78
CW Circulation 66
CW DIAL INQ Reader Service 90
CWIMS Denmark 67
CWIMS LandGrant 74
CWIMS Switzerland 67

Data Design Associates 36
Datalex 8
Dataware 57
DBMS Inc. 46

Electronics Forms Systems 24-25
EMC Corp. 42

Federal Communications 54

Group Operations 10

Hewlett-Packard 76-77
H&M Systems 96
Honeywell 48-49

IBM 28-29

Innovation Data Processing 7
ITT 43

JCA Software 44

Leasametric 54
Local Data 18
Lotus Development Corp. 30-31

McCormack & Dodge 97
Michaels,Ross & Cole Ltd 56
Micom/Interlan 38,47
MTI Systems 61

Novell 64-65

On-Line Software International 32
Oracle 9,27,37

Peat Marwick 39

Racal-Vadic 63
Radio Shack 71
Realia,Inc. 72
Relational Technology 26
Ryan-McFarland 45

SAS Institute 20-21,23
Software Technology & Research (STAR) 10
Sorbus 58
Syncsort 5
Systems Software Associates 34

Tandem 40
Teknowledge 11
Technologic Software Concepts 12
Televideo 75
Telex 55
Travtech 38
Tymnet 50

Walker Interactive 62
Wyse 70

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Ansa, Lotus ink Paradox pact; TAC gains support

By Douglas Barney

BELMONT, Calif. — Ansa Software and Microrim, Inc. both recently announced support for Lotus Development Corp.'s The Application Connection (TAC), a software product aimed at the micro-to-mainframe market.

"We have a very extensive micro-to-mainframe strategy. The first component of that strategy is the relationship with Lotus under which Paradox and TAC will work together," said Ron Posner, president and CEO of Ansa.

Ansa also reached a joint marketing relationship with Cambridge, Mass.-based Lotus involving Paradox, Ansa's data base software. According to Posner, the joint marketing relationship involves both current and future products.

"The joint marketing relationship will go on into the future for other products that each of us will come out with that will work together," Posner said. "Our salespeople will jointly try to sell TAC with Paradox and vice versa."

Data base access

TAC allows microcomputer users to access data on mainframe-based data base programs and fourth-generation languages, while using a personal computer-type user interface.

Ansa is looking to develop or license additional technology that will allow Paradox to communicate with a variety of systems. The local-area network version of Paradox will be unveiled in a couple of months and will ship by the end of the second quarter, Posner said.

Redmond, Wash.-based Microrim earlier this month announced a direct interface from its R:Base System V data base software to TAC. Using R:Base System V's Filegateway utility, files from supported mainframe data bases are automatically converted to a format usable by R:Base. System V now also has the ability to export files in the same file format as Ashton-Tate's Dbase III.

In addition, Ansa announced an OEM program and signed its first OEM agreement with Wang Laboratories, Inc. under which Wang will market Paradox through its 1,250 direct field sales representatives.

In other news, Ansa is seeking a way to allow Paradox to take advantage of the untapped power of Intel Corp. 80286- and 80386-based microcomputers and may not wait for Microsoft Corp. to pave the way with its next version of MS-DOS.

"As soon as we can find a way to break through the 640K-byte memory barrier on the 286 and the 386, we will immediately take advantage of the memory with the current product without it being rewritten," Posner said.

"If we can figure out a way to do that without Advanced DOS [the anticipated next version of DOS from Microsoft], we will do it and have the product in very short order. We have to find a way through the 640K-byte memory barrier," he added.

Posner, however, is uncertain whether this approach is technologically possible.

IBM rebound hampered

From page 1

tinue. It is a fundamental change in the nature of demand, indicating IBM's problems are deeper than people are willing to recognize."

IBM's well-publicized mid-range systems shortcomings were apparently acknowledged by Chairman John F. Akers, who cited "unsatisfactory levels of demand for parts of our product line" as one reason for Big Blue's 1986 performance.

But IBM must also move quickly to stem a mass exodus of potential 3090 buyers into the used 3080 market.

A recently completed International Data Corp. survey of 500 IBM user sites indicated intentions to purchase only 202 3090 CPUs in the first half of this year, compared with roughly 1,020 such purchases in the first half of 1986.

However, the same buyers intend to purchase 786 3080 processors, up from 675 in 1986, the survey showed.

"IBM's big battle is to drag as many of those as possible back into the 3090 column," IDC analyst Frank Gens said. "They have got to improve the price/performance of the 3090 to get that revenue."

'VAX killer'

All indications are that the 9370, dubbed the "VAX killer" in reference to Digital Equipment Corp.'s highly successful mid-range computers, could be IBM's make-or-break product this year.

"Since sales of PCs were flat and Sierra sales were up, the problem was obviously in the mid-range," said Michael Geran of E. F. Hutton & Co.

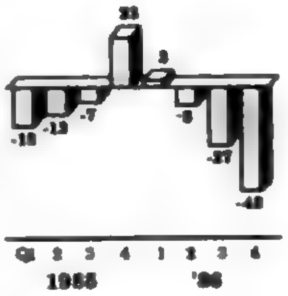
Salomon Brothers, Inc. analyst Marc Schulman estimated that IBM has received 30,000 orders in the U.S. and 15,000 orders overseas for the 9370.

He predicted that IBM will ramp up volume 9370 production in the second quarter, producing significant revenue just as Big Blue sees the positive benefits of last year's work force reductions and plant closings.

"By mid-year, all the people coming off the payroll will be off, costs will be down and shipments will be up," Schulman said. "And as the use of IBM's connectivity software and DB2 proliferates, that will consume considerable machine cycles. I expect a recovery, but by no means a return to the glory days of 1983 and 1984."

IBM Earnings

Percentage gain/decline compared with year earlier



CW CHART

Schulman predicted that IBM will gear up a new product cycle this year with a 15% price/performance enhancement of the 3090, a low-end "clone killer" Personal Computer, a new Intel Corp. 80286-based micro, a six-way 3090 processor and an 80386-based microcomputer.

Rooney, however, suggested that 9370 sales may cut into demand for the processing power of IBM's high-margin mainframes.

"The 9370 accelerates what DEC is doing to IBM," he said.

"You've got to sell an awful lot of $100,000 and $200,000 boxes to make up for the lost multimillion dollar mainframes. The company is not positioned, from a cost standpoint, to sell a lot of smaller systems," he added.

Consolidation efforts

IBM took several steps to reduce its work force and consolidate operations during the year, resulting in a fourth-quarter charge of an estimated $425 million.

Fourth-quarter profits of $1.39 billion resulted in a full year decline in profits of 27%, from $6.55 billion to $4.79 billion — their lowest level since 1982. Per-share profits fell from $10.67 in 1985 to $7.81.

Rental income dropped by 35% during the year, while revenue from services increased 24%.

IBM's pretax profit margins dropped significantly from 23.2% in 1985 to 16.4%. Net profit margins fell from 13.1% to 9.3%.

Saved by currency

The decline in the U.S. dollar's value between 1985 and 1986 prevented IBM's disappointing year from being a major disaster.

IBM estimated that the favorable currency valuation added $4.35 billion to its revenue and $645 million to its bottom line.

A company statement said IBM's first-quarter 1987 earnings will be less than its profits in the first quarter of 1985, in which profits fell 18% from 1984 levels to less than $1 billion.

3Com to buy Centram, developer of Tops distributed networking system

By Douglas Barney and Patricia Keefe

SANTA CLARA, Calif. — In a move strengthening its position in the Apple Computer, Inc. networking market, 3Com Corp. last week signed a letter of intent to acquire Centram Systems West, Inc., developer of Tops, a distributed networking software package.

The deal is expected to be finalized by the end of the month and calls for a stock exchange and a pooling of interests.

The Centram purchase is the first step under a vision that involves building a federation of software companies at 3Com to provide a host of products that plug and play, said Robert Bressler, vice-president and general manager of 3Com's Software Division.

"The next step is to look around and find software companies that will help bolster our leadership position in the local-area network market," Bressler said, adding, "Centram does that." 3Com will either purchase those companies or form strategic alliances.

Right now, 3Com will concentrate on building Tops compatibility into its Macintosh product line. "We will quickly offer the 3Server3+ as a server for the Tops line," Bressler said.

Ethermac, 3Com's low-end solution linking IBM Personal Computers to Macintoshes, "will not be the focus of any new marketing efforts," although it will continue to be supported, Bressler said. Users prefer the Tops interface to Ethermac's, he added.

"Yes, we are backing away from Ethermac and putting our focus into integrating Tops into 3Com solutions," Bressler said. Those plans are expected to dilute the efforts of Orem, Utah-based local-area network rival Novell, Inc., which is hard at work developing Macintosh compatibility with its own networking software, Advanced Netware. Novell is expected to show prototypes in the near future.

Novell and 3Com are already battling it out for market share in the IBM PC and compatible networking arena. The Centram purchase allows 3Com to fill gaps in its product line, both vendors said, and eliminates some overlap between the two product lines and dealer agreements.

For example, while 3Com provides gateways in the electronic mail area and print spooling, Tops provides Unix interconnection and Adobe Systems, Inc. Postscript conversion.

3Com will position Centram as an entry-level system providing a soon-to-be-built upgrade path to 3Com's 3+ networking software.

Users believe the 3Com acquisition might expand the product's market. With 3Com owning Tops, his company might take a closer look at Tops, said Chuck Miller, member and former president of Gateway Microcomputer Managers Association in St. Louis.

This acquisition of Centram Systems by 3Com might also serve to make Tops more attractive to Pratt & Whitney Aircraft. "It moves it from 10th priority to eighth priority," said Ron Goldfarb, manager of office automation at Pratt & Whitney's administration section in Hartford, Conn.

Tops has been installed on 15,000 workstations in its first five months on the market. It allows Macintosh computers to transparently share files with Unix-based machines and Microsoft Corp.'s MS-DOS.

The buyout is not expected to encounter the difficulties faced by 3Com in its failed attempt last spring to merge with Convergent Technologies, Inc. Bcause Centram is a private company, the buyout is subject to different rules and easier to pull off, 3Com's Bressler said.

Senior writer David Bright contributed to this report.

HP founder Hewlett to retire

By Clinton Wilder

PALO ALTO, Calif. — Hewlett-Packard Co. Vice-Chairman William R. Hewlett, one of the modern computer industry's founding fathers, announced last week that he will retire from the HP board Feb. 24.

Hewlett, 73, founded the minicomputer and scientific instruments firm in 1939 with partner David Packard and has served on the board since HP was incorporated in 1947. Packard will remain chairman of the board.

Shoso Yokogawa, president of Yokogawa Electric Corp., will also retire from the HP board. The new directors expected to be approved at the Feb. 24 annual meeting are Hewlett's son, Walter B. Hewlett, Packard's son, David Woodley Packard, and Ford Motor Co. Chairman Donald E. Petersen.

In other major executive changes within the industry last week, Norman Block resigned as chief financial officer of Ashton-Tate, Gabriel Fusco resigned as chief executive officer of Iomega Corp. and former U.S. Rep. Ed Zschau returned to the chairmanship of Systems Industries, Inc.

Unisys shareholders' profits, expectations on the upswing

ACTIVE ISSUES
Kathy Porteus

Even if investors were not thrilled by the company name chosen for the Burroughs Corp.-Sperry Corp. merger, few shareholders of Unisys Corp. (UIS — 94⅛) would complain about the stock's performance in recent months. Since mid-September, when the merger was completed, Unisys shares have soared 42%. Nevertheless, some analysts still consider the stock a good value.

"If Mr. Blumenthal continues the excellent job he has done over the past six months, the stock should work its way considerably higher," says Stephen Dube of Shearson Lehman Brothers, Inc. in reference to Unisys Chairman W. Michael Blumenthal. Such kudos come Blumenthal's way because restructuring the merged company and sales of certain assets are yielding greater than expected results.

For example, by the end of 1986, Unisys had sold $1.8 billion worth of assets, including Sperry's aerospace group and portions of Memorex Corp., Burroughs' former computer-storage unit. Blumenthal had originally targeted receipt of $1.5 billion from asset sales by 1988. In addition, the firm now indicates that its annual rate of cost savings from consolidating operations totals $3 million, which is double Blumenthal's original estimate.

Asset sales, which result in lower interest charges, and vigorous cost-cutting should greatly benefit Unisys's earnings this year, according to Don Young of Sanford C. Bernstein & Co. Young was one of the few analysts on Wall Street to have favored the Burroughs-Sperry merger from the start.

"With these factors, you have more confidence in earnings estimates, particularly when demand for computer systems remains weak," Young says. He says Unisys will earn $9 per share this year.

According to Young, new product cycles, such as that of Sperry's mid-range 1100 Model 400 processor, further support the argument for Unisys. "Even if we experience a recession in commercial systems," he says, "Unisys, with so much of its business from service, defense and government, should still hold up better than most."

Although Shearson Lehman's Dube aggressively recommends NCR Corp., he still likes Unisys, which he says should continue rewarding shareholders. Dube estimates Unisys will earn at least $7 per share this year. But citing uncertain growth expectations for the computer industry this year, Dube says, "We are obviously dealing with moving targets when it comes to the earnings of Unisys and others."

Although many analysts base their recommendations of Unisys on this year's earnings, at least one — Martin Simpson of Martin Simpson & Co. — says he prefers concentrating on longer term issues, causing him to be wary of the stock.

"The big write-offs Unisys took in the fourth quarter of 1986 mean clear sailing for at least a while," Simpson says. "But the real questions facing Unisys and its shareholders concern the number of customers Unisys prevents from migrating to other equipment manufacturers and whether Unisys can meld its two disparate organizations enough so a consistent product line and marketing strategy emerges that enables the company to grow, rather than just defensively hang on to its customer base."

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Enmasse pulls operations plug

From page 94

masse had lagged behind its product development schedule, and development costs exceeded expectations, he said.

"The original business plan called for a product to market in one year at a cost of less than $10 million," Gardner explained. "Instead, it took 2¼ years and $18 million, and it was going to take another $5 million to reach profitability. The investors felt this was far in excess of their expectation."

The company's group of investors was led by venture capital firm Oak Partners in Westport, Conn. Gardner said he requested an additional $5 million at a board meeting on Jan. 17 but that the investors declined the request.

Only six employees remain at Enmasse, which once employed 72, and the firm's goal is solely to sell the remainder of the company to interested parties, according to Gardner. "We believe we will locate a purchaser of our technology very soon," he said. A likely buyer is Toltec Computers, Inc. in Scottsdale, Ariz., which may acquire Enmasse's ECS family as the basis of its Pick-based systems.

Enmasse developed, manufactured and marketed the ECS family of Unix-based multiprocessor systems, designed for general-purpose business applications. Last Tuesday, it was scheduled to introduce the ECS 2000 line of products, which could handle, in various configurations, from eight to 2,880 simultaneous users and deliver as many as 200 million instructions per second in processing power [CW, Jan. 19].

Four-month-old Toltec had planned for Enmasse computers to be its flagship hardware line, integrating the Pick operating system and Unix on Enmasse and other hardware to sell through a dealer network. As part of its OEM agreement with Enmasse, Toltec gained the right to manufacture and market Enmasse hardware should Enmasse cease operations, according to Toltec President Alfred DeiMaggi.

If Toltec completes the purchase, Enmasse research and development could continue under the Toltec name, remaining in Massachusetts, he added. DeiMaggi said Toltec had received seed capital from Enmasse's investors but that the additional financing to buy Enmasse's assets will not come from that group.

Gardner said Enmasse has not declared bankruptcy and "remains open to sell off its technology and to meet its obligations to banks and customers."

Enmasse had lined up nine resellers of its computers and installed 20 systems at an average price of $75,000 each, according to Gardner.

Gardner is the third Enmasse president in as many years, having succeeded Chester Fennell in spring 1986. Fennell had taken over from Enmasse Founder Robert Downs in fall 1985.

Wang, Unysis post losses

From page 94

traordinary tax credit — on revenue of $336.7 million. A year earlier, Amdahl earned $13.7 million, or 29 cents per share, on sales of $257.2 million.

For the year, revenue was $966.3 million, compared with $862 million in 1985.

DG. Continuing its eclipse by the long shadow of Digital Equipment Corp., the Westboro, Mass., minicomputer maker reported revenue of $313.3 million. Net income of $3.3 million, or 12 cents per share, included a $3 million tax credit.

Prime. The Natick, Mass., vendor said fourth-quarter profits declined to $14.1 million even though revenue increased 10% over the year-earlier quarter to $230.9 million. For the year, revenue increased 12% to $860.2 million, while profits dropped 19% to $46.9 million.

Harris. Harris reported second-quarter profits of $20.1 million, or 49 cents per share, compared with $14.5 million, or 36 cents per share, a year ago. Revenue, however, dropped slightly to $525.2 million.

Sun. Chief Executive Officer Scott McNealy said a production ramp-up that exceeded expectations accounted partially for the workstation vendor's record second quarter. Revenue soared to $115.3 million from $42.2 million a year earlier, and profits jumped to $8.5 million from $1.7 million.

Software earnings climb

From page 94

though, they realized software was more important than hardware," Bloom said.

Recent increases in hardware spending have also helped the software industry, according to Kenneth J. Burke, software analyst for Alex Brown & Sons, Inc. in Baltimore.

Other leading vendors reporting financial results included:

ASK Computer Systems, Inc. The Los Altos, Calif., manufacturing applications vendor reported second-quarter revenue of $21.2 million, a gain of 11% from $13 million for second-quarter 1986. Net income was $2 million, or 15 cents per share, compared with $1.8 million, or 14 cents per share, a year earlier.

ASK stands to gain ground this year with the expected continuing success of the minicomputer market.

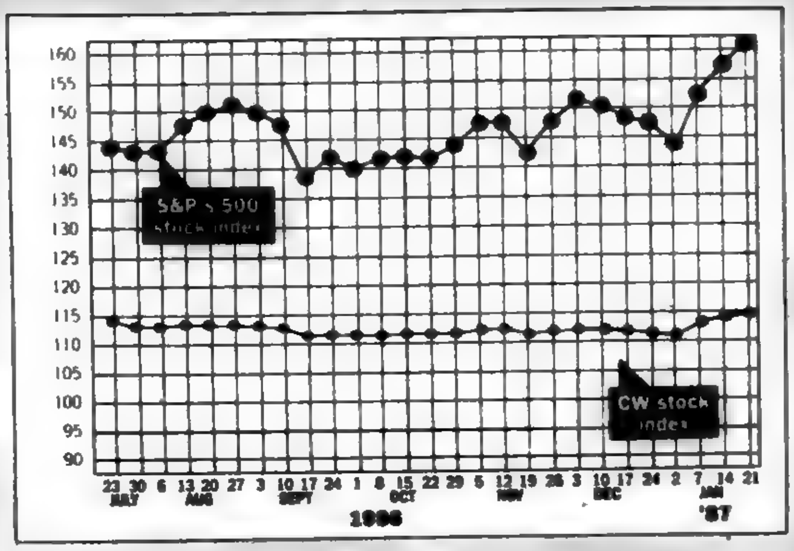
Computer Task Group, Inc. The Buffalo, N.Y., software consulting and programming analysis firm reported fiscal 1986 revenue of $143.4 million, up 24% from $115.8 million. Net income increased 26% to $5.1 million. Per-share earnings were flat at 68 cents, reflecting a greater number of shares outstanding.

Fourth-quarter revenue was up 21% to $38.7 million. Net income was flat at $1.3 million, or 17 cents per share, because of costs associated with a recent reorganization.

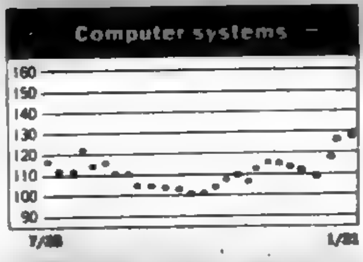
Software Publishing Corp. The Mountain View, Calif., microcomputer applications vendor said its first-quarter revenue for this year was $8.7 million, up 25% from $6.9 million. Net income doubled to $1.2 million, or 17 cents per share, from $617,000, or nine cents per share, in the year-earlier quarter.

MITCHELL / HAYES

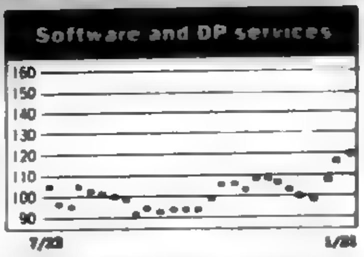
Computerworld stock trading index



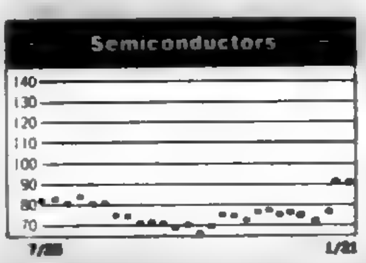
Computer systems



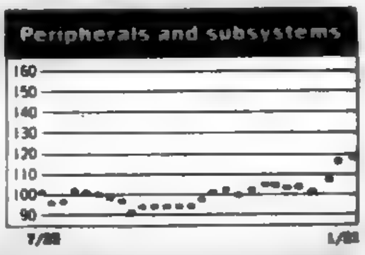
Software and DP services



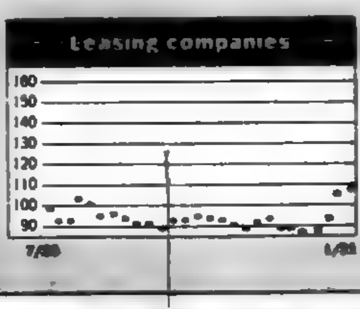
Semiconductors



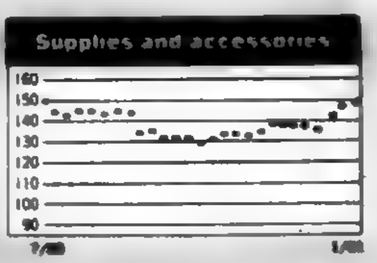
Peripherals and subsystems



Leasing companies



Supplies and accessories



All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	1/14/87	1/21/87
Computer systems	125.3	**127.5**
Software and DP services	114.5	**119.2**
Peripherals and subsystems	115.6	**117.0**
Supplies and accessories	146.8	**148.5**
Semiconductors	90.4	**90.4**
Leasing companies	104.5	**107.3**
CW stock index	114.5	**114.9**
Standard and Poor's 500 stock index	157.0	**160.2**

Computerworld stock trading index

CLOSING PRICES WEDNESDAY, JANUARY 21, 1987

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 21 1987	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS					
O	ALPHA MICROSYSTEMS	8	4	4.63	-0.1	-2.6
O	ALTOS COMPUTER SYS	19	10	14.00	+0.4	+2.8
A	AMDAHL CORP	32	14	28.00	+2.3	+8.7
O	APOLLO COMPUTER INC	21	9	19.38	+0.9	+4.7
O	APPLE COMPUTER INC	56	22	49.00	+0.9	+1.8
N	AT&T	28	21	28.75	+1.5	+5.9
O	C P T CORP	7	3	4.00	-0.3	-5.9
N	COMPAQ COMPUTER CORP	25	12	23.50	+0.0	+0.0
A	COMPUTER CONSOLES INC	12	6	9.63	+0.4	+4.1
O	CONCURRENT COMP CORP	25	1	14.25	-2.8	-16.2
N	CONTROL DATA CORP	29	19	27.50	+2.3	+8.9
O	CONVERGENT TECH	14	4	8.38	+0.1	+1.5
N	CRAY RESH INC	110	59	105.88	+9.9	+10.3
O	DAISY SYS CORP	25	8	9.38	-1.3	-11.8
N	DATA GEN CORP	48	25	38.25	+3.0	+8.5
N	DATAPOINT CORP	9	5	5.25	-0.5	-8.7
N	DIGITAL EQUIP CORP	145	72	140.00	+10.0	+7.7
N	FLOATING POINT SYS INC	46	11	12.25	-1.1	-8.4
N	GOULD INC	31	15	19.38	+0.1	+0.6
N	HARRIS CORP	37	26	35.00	+1.9	+5.7
N	HEWLETT PACKARD CO	54	38	52.38	+3.4	+6.9
N	HONEYWELL INC	84	58	63.50	+3.8	+6.3
M	IBM	162	116	122.75	+4.1	+3.5
O	IPL SYS INC	4	1	2.00	-0.3	-11.1
N	ITT CORP	60	36	57.75	+0.4	+0.7
N	M A COM INC	19	12	13.50	+0.1	+0.9
N	MATSUSHITA ELEC INDL LTD	138	62	126.75	+4.9	+4.0
O	MENTOR GRAPHICS CORP	24	11	22.50	+1.8	+8.4
N	NBI INC	14	8	10.38	+0.0	+0.0
N	NCR CORP	58	40	56.75	+3.4	+6.3
N	PRIME COMPUTER INC	28	16	21.13	+1.1	+5.6
O	STRATUS COMPUTER	34	17	29.75	+2.3	+8.2
O	SYMBOLICS INC	15	4	4.25	-0.6	-12.8
O	TANDEM COMPUTERS INC	53	21	49.25	+6.8	+15.9
N	TANDY CORP	49	31	47.00	-0.9	-1.8
N	TEXAS INSTRS INC	148	103	134.38	+0.4	+0.3
A	ULTIMATE CORP	36	13	23.88	+1.4	+6.1
N	UNISYS	97	58	95.88	+6.8	+7.6
A	WANG LABS INC	22	11	13.88	-0.1	-0.9
A	WANG LABS INC	22	11	13.88	+0.0	+0.0
N	XEROX CORP	72	40	67.00	+0.8	+1.1
	SUPPLIES & ACCESSORIES					
N	AMER BUSINESS PRODS	37	23	27.25	-0.1	-0.5
N	BARRY WRIGHT CORP	25	14	16.13	-0.4	-2.3
A	DUPLEX PRODS INC	23	18	19.00	+0.0	+0.0
N	ENNIS BUSINESS FORMS INC	31	22	30.25	+2.1	+7.6
N	3M CO	132	86	129.38	+9.3	+7.7
N	MOORE LTD	28	19	22.50	-0.4	-1.6
O	STANDARD REGISTER CO	50	32	39.50	+0.5	+1.3
N	WALLACE COMPUTER SVCS	50	37	46.00	-1.5	3.2

EXCH: N = NEW YORK, A = AMERICAN; P = PACIFIC; B = BOSTON:
L = NATIONAL, M = MIDWEST, O = OVER-THE-COUNTER; S = SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 21 1987	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & DP SERVICES					
O	ADVANCED COMP TECH	7	3	4.50	-0.5	10.0
N	ADVANCED SYS INC	20	12	18.63	+0.4	+2.1
N	AGS COMPUTERS INC	35	17	32.88	+0.5	+1.5
O	AMERICAN MGMT SYS INC	27	11	26.25	-0.5	1.9
O	AMERICAN SOFTWARE INC	20	9	19.38	+0.6	+3.3
N	ANACOMP INC	7	3	4.63	+0.6	+15.8
O	ANALYSTS INTL CORP	10	4	9.88	+0.4	+3.9
O	ASHTON TATE	30	10	27.38	+2.4	+9.5
O	ASK COMPUTER SYS INC	15	9	13.13	+0.1	+1.0
O	ASTRADYNE COMP IND	3	1	1.56	-0.1	5.7
N	AUTOMATIC DATA PROC	46	29	45.25	+2.9	+6.8
O	BOOLE & BABBAGE INC	8	4	8.00	+0.8	+10.3
O	COMPUTER ASSOC INTL INC	25	17	16.50	+0.0	+0.0
O	COMPUTER HORIZONS CORP	14	10	13.00	+0.1	+1.0
O	COMPUTER NETWORK TECH	10	4	4.56	+0.2	+4.3
N	COMPUTER SCIENCES CORP	52	30	50.50	+1.8	+3.6
O	COMPUTER TASK GROUP INC	19	11	12.75	-0.6	4.7
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	16	10	12.00	+0.3	+2.1
N	CULLINET SOFTWARE INC	18	6	8.38	-0.3	2.9
O	CYCARE SYS INC	17	7	9.75	-0.3	2.5
O	DUQUESNE SYS INC	33	15	38.50	+1.5	+4.1
N	GENERAL ELEC CO	99	67	97.13	+6.1	+6.7
N	GENERAL MTRS CORP	50	24	30.25	+1.6	+5.7
O	HOGAN SYS INC	15	7	14.50	+0.6	+4.5
O	INFORMATION SCIENCES INC	4	1	1.38	+0.1	+10.0
O	INFOTRON SYS CORP	19	7	8.00	-0.5	5.9
O	KEANE INC	16	5	6.00	-0.1	-2.0
N	LOGICON INC	38	22	28.25	-0.6	2.2
O	LOTUS DEV CORP	66	20	64.00	-6.8	+11.8
O	MANAGEMENT SCI AMER	18	11	16.63	-0.6	3.8
O	MCI COMM CORP	13	6	6.75	+0.0	+0.0
O	MICOM SYS INC	23	10	16.00	+1.3	+8.5
O	MICRO PRO INTL CORP	4	2	3.13	+0.4	+13.6
O	MICROSOFT CORP	70	28	67.75	+7.8	+12.9
O	NATIONAL DATA CORP	26	16	22.75	+0.0	+0.0
O	ON LINE SOFTWARE INT	19	10	18.75	+3.0	+19.0
O	ORACLE SYS CORP	30	13	28.00	+1.0	+3.7
N	PANSOPHIC SYS INC	36	25	35.75	+2.5	+7.5
O	POLICY MGMT SYS CORP	30	15	28.50	+1.8	+6.5
O	PROGRAMMING & SYS INC	11	8	9.38	+0.4	+4.2
O	REYNOLDS & REYNOLDS CO	42	25	32.75	1.0	3.0
O	SCIENTIFIC COMPUTERS INC	7	4	7.25	+1.3	+20.8
O	SEI CORP	28	18	22.00	+0.5	+2.3
O	SHARED MED SYS CORP	49	28	47.25	+2.0	+4.4
O	SOFTWARE AG SYSTEMS INC	22	10	13.13	1.5	10.3
O	SOFTWARE PUBG CORP	11	5	10.50	+2.1	+25.4
A	STERLING SOFTWARE INC	21	10	13.13	+0.8	+6.1
N	SUNGUARD DATA SYSTEMS	17	10	16.38	+1.1	+7.4
N	UCCEL CORP	33	15	30.25	+0.9	+3.0
N	URS CORP	18	11	17.88	+0.8	+4.4
O	VM SOFTWARE INC	32	12	29.50	+2.5	+9.3
	SEMICONDUCTORS					
N	ADVANCED MICRO DEV	34	13	17.50	-0.5	2.8
N	ANALOG DEVICES INC	25	14	18.38	1.3	6.4
O	ANALOGIC CORP	15	10	10.75	-0.3	-2.3
N	APPLIED MAGNETICS CORP	20	13	19.13	+0.8	+4.1
O	AVANTEK INC	23	14	16.75	+0.0	+0.0
O	NAOCO CORP	6	3	4.50	+0.0	+0.0
O	INTEL CORP	32	16	27.50	-0.4	1.3
O	MICRO MASK INC	7	2	4.63	+0.1	+2.8
N	MOTOROLA INC	50	34	43.75	+0.3	+0.6
N	NATIONAL SEMICONDUCTOR	16	8	13.63	+0.3	+1.9
N	TERADYNE INC	30	16	19.88	+0.8	+3.9

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 21 1987	WEEK NET CHNGE	WEEK PCT CHNGE
	PERIPHERALS & SUBSYSTEMS					
A	AM INTL INC	9	5	7.25	+0.1	+1.8
A	ANDERSON JACOBSON INC	3	1	1.88	+0.0	+0.0
O	AST RESH INC	28	11	14.88	1.4	8.5
O	AUTOTROL CORP	10	5	6.50	+0.5	+8.3
O	AVANT GARDE COMPUTING	7	3	4.88	+0.0	+0.0
O	BANCTEC INC	13	6	10.75	-0.1	1.1
N	BOLT BERANEK & NEWMAN	51	34	48.88	1.1	2.3
A	CETEC CORP	9	5	5.38	+0.1	+2.4
A	COGNITRONICS CORP	6	2	3.38	-0.1	3.6
N	COMPUGRAPHIC CORP	27	16	21.50	+0.3	+1.2
N	COMPUTERVISION CORP	19	10	17.50	+1.9	+12.0
R	CONRAC CORP	18	12	13.75	+0.3	+1.9
A	DATAPRODUCTS CORP	18	11	14.25	+0.1	+0.9
A	DATARAM CORP	18	7	8.50	0.1	1.4
O	DATA SWITCH CORP	9	5	6.38	+0.8	+13.3
O	DATUM INC	7	4	5.25	0.1	2.3
N	DECISION INDS CORP	15	8	10.38	-0.5	4.6
O	ENDATA INC	8	4	7.50	0.8	9.1
O	EMC CORP	25	11	23.50	+1.5	+6.8
O	EVANS & SUTHERLAND	31	19	30.25	0.3	0.8
N	FLOATING POINT SYS INC	46	11	12.25	1.1	8.4
O	GANDALF TECHNOLOGIES	8	5	8.13	+0.1	+1.6
N	GENERAL DATACOMM IND	15	8	9.25	+0.0	+0.0
N	HAZELTINE CORP	30	16	29.75	+0.0	+0.0
O	ICOT CORP	13	8	10.00	0.1	1.2
O	INFORMATION INTL INC	18	13	14.25	+0.3	+1.8
O	INTECOM INC	7	3	3.00	+0.0	+0.0
O	INTERLEAF INC	15	8	11.88	0.8	5.9
O	MEGADATA CORP	4	2	2.88	+0.0	+0.0
A	MSI DATA CORP	14	10	12.88	+0.6	+5.1
N	NASHUA CORP	28	15	26.25	+1.3	+5.0
C	NETWORK SYS CORP	18	10	17.00	+1.1	+7.1
N	NORTH AMERN PHILIPS CORP	48	35	44.63	+0.0	+0.0
N	NORTHERN TELECOM LTD	38	25	37.25	+2.1	+6.0
O	NOVELL INC	37	14	33.25	1.3	3.6
N	PARADYNE CORP	11	4	4.75	0.1	2.6
A	PENRIL CORP	9	4	4.25	0.1	2.9
N	PLESSEY PLC	38	22	29.50	+0.8	+2.6
O	PRINTRONIX INC	15	10	10.63	+0.6	+6.3
O	QMS INC	16	10	10.13	+0.0	+0.0
O	RAMTEK CORP	7	3	5.50	+0.1	+2.3
N	RECOGNITION EQUIP INC	20	10	18.50	0.8	3.9
O	SCAN TRON CORP	19	11	16.25	0.8	4.4
N	SCIENTIFIC ATLANTA INC	15	9	13.13	+0.1	+1.0
O	SEAGATE TECHNOLOGY	30	8	28.63	+2.5	+9.6
N	STORAGE TECHNOLOGY	7	2	4.13	+0.4	+10.8
O	SUN MICROSYSTEM INC	32	11	28.50	+1.5	+5.6
A	T BAR INC	8	5	7.88	0.3	3.1
A	TAB PRODS CO	16	12	16.00	+0.0	+0.0
O	TANDON CORP	8	2	2.75	0.3	8.3
A	TEC INC	7	3	3.50	+0.0	+0.0
N	TEKTRONIX INC	80	55	76.75	+0.3	+0.3
O	TELEVIDEO SYS INC	4	2	2.75	+0.1	+4.8
N	TELEX CORP	84	52	78.63	+1.8	+2.3
N	TIMEPLEX INC	33	14	31.50	+3.3	+11.5
N	TITAN CORP	12	6	8.25	+0.0	+0.0
O	VISUAL TECHNOLOGY INC	1	0	0.44	+0.0	+0.0
O	WYSE TECH	24	11	23.63	+3.3	+16.0
	LEASING COMPANIES					
N	COMDISCO INC	25	15	21.13	+1.1	+5.6
N	CONTINENTAL INFO SYS	12	7	9.75	+0.1	+1.3
O	FINALCO GROUP INC	5	2	3.63	+0.2	+5.4
O	PHOENIX AMERN INC	6	3	5.38	+0.3	+4.9
O	SELECTERM INC	12	5	5.56	+0.1	+1.1
N	U S LEASING	47	38	44.75	1.3	2.7

COMPUTER INDUSTRY

INSIDE

Analysts foresee a new industry of third-party PC software support firms/**67**

Apple, Microsoft, Tandy report solid quarterly growth, but NCR stalls/**72**

Sytek to broaden its horizons, support Ethernet, TCP/IP/**74**

HP cofounder William Hewlett retires/**92**

INSTANT ANALYSIS

"IBM's situation is like General Motors Corp.'s. They overexpanded their fixed assets when demand peaked, they are heavily oriented toward large systems — instead of large cars — and they have lost market share to a leaner competitor."

— Thomas Rooney, analyst with Donaldson, Lufkin & Jenrette

Wang, Unisys post losses

But most hardware firms report strong fourth quarter

By Clinton Wilder

Major losses at Unisys Corp. and Wang Laboratories, Inc. marred a generally positive spectrum of fourth-quarter financial results announced by major hardware vendors last week (see chart below).

Amdahl Corp. reported one of its most successful recent quarters as profit more than doubled on a strong rise in revenue. Harris Corp.'s earnings rose 39%, while Sun Microsystems, Inc. said profits increased more than fourfold. But Data General Corp. continued to struggle, eking out a tiny $356,000 operating profit on a modest revenue increase, and Prime Computer, Inc. reported a 19% drop in profits for the quarter.

Unisys. As announced earlier, the merged Burroughs Corp. and Sperry Corp. reported a substantial loss because of charges from merger-related asset sales, write-downs, plant consolidations and work force reductions. Unisys took a charge of $280 million, or $6.08 per share, causing a net loss of $188.5 million, or $4.68 per share.

For the year, the Detroit-based firm posted a loss of $43.4 million, or $1.63 per share, on revenue of $7.4 billion.

Chairman W. Michael Blumenthal said Unisys revenue and orders will grow less than 10% this year but that earnings should be strong because of cost savings.

Wang. The Lowell, Mass., office automation vendor reported a larger than expected $78.6 million loss, equal to 49 cents per share, on revenue that declined slightly to $668.9 million. The loss included $37 million in charges from the recently announced layoffs and inventory write-downs.

The company had said the loss would be greater than the $30 million deficit of the previous quarter, but its size surprised analysts. "They don't seem to have a handle on how much it costs to sell in today's environment," said John McCarthy of Forrester Research, Inc. in Cambridge, Mass.

Amdahl. The Sunnyvale, Calif., IBM-compatible mainframe seller reported profits of $29.5 million, or 60 cents per share — which included five cents of ex-

See **WANG** page 92

Enmasse pulls operations plug

By Stanley Gibson

ACTON, Mass. — One day before it was scheduled to unveil a new line of computers at Uniforum 1987, The International Conference of Unix Users, Enmasse Computer Corp. announced last week that it has abandoned manufacturing and sales operations.

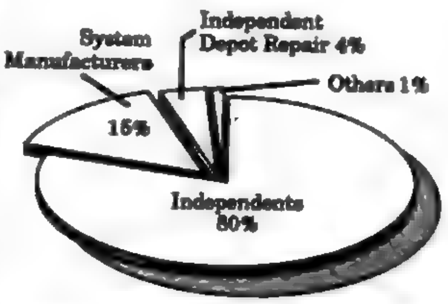
Robert Gardner, president of the start-up maker of Unix-based multiprocessors, said the denial of a last-minute request for an additional $5 million in venture capital prompted the surprise announcement. En-

See **ENMASSE** page 92

Data View

U.S. third-party maintenance

Shares of $1.56 billion market in 1986



INFORMATION PROVIDED BY INPUT

INDUSTRY INSIGHT
Bob Djurdjevic

DEC takes slice of Big Blue pie

The market share trends that started in 1985 continued in the first half of last year. Digital Equipment Corp.'s share of the intermediate systems market went up while IBM's was down. Perhaps that is why 1986 may be remembered as the year in which IBM, reacting to DEC, rained down on its competition the greatest number of mid-range system announcements in its corporate history.

The highlight of the first half of 1986 was the June announcements, when IBM aimed a flurry of some 125 new products in DEC's direction. But it was on Oct. 7 that IBM unveiled its most potent anti-DEC weapon — the 9370, also dubbed "the VAX killer."

Based on a July 1986 report from Computer Intelligence Corp., one can try to quantify the degree to which DEC has made inroads into IBM's intermediate systems territory.

DEC's market share gain in terms of the "if sold" value of its *shipments* in the first half of 1986 is especially impressive. DEC's share of shipment list value went up from 23% to 41%, while IBM's declined from 52% to 29%.

DEC's share of the U.S. installed base's "if sold" value at list increased from 28% to 30% during the same period. Market shares of most other intermediate systems vendors have not

See **DEC** page 74

Djurdjevic is a computer industry analyst and president of Annex Research, a Phoenix-based computer research and consulting firm.

Software earnings climb

Computer Associates leads with 90% increase

By James A. Martin

Analysts' predictions that this will be a relatively healthy year for the software and services industries were boosted by last week's quarterly earnings reports from several major vendors, reflecting net income increases of as much as 90%.

Computer Associates International, Inc. led the way, reporting third-quarter revenue of $93.6 million, an increase of 56% from $60.1 million for the same period last year. The IBM mainframe software vendor also reported that net income increased 90% to $16.4 million, or 66 cents per share, from $8.6 million, or 39 cents per share.

The Garden City, N.Y.-based developer's results were the most surprising of last week's reports, according to Terence Quinn, senior technology analyst for E. F. Hutton & Co. "They had been forecasting growth of about 30% to 35%, but their actual growth has been much larger," he said.

Analysts and Computer Associates officials agreed that the company's recent acquisitions, including Software International Corp., have contributed to the health of the company. But Anthony W. Wang, Computer Associates' president, noted that even without the acquisitions, revenue grew by more than 40%.

The software industry hit its low point in late 1985 and has been slowly rebounding since, according to Paul Bloom, software analyst with Johnson Lane Space Smith & Co. in Atlanta. "Buyers struggled for a while with what they were going to do with less money. Eventually,

See **SOFTWARE** page 92

1986 fourth-quarter earnings

With the notable exceptions of IBM, Wang Laboratories and Data General, results were generally positive across the industry

Company	*Net Income Oct.-Dec. (thousands of dollars)*	*Percent Change From 1985*	*Revenue Oct.-Dec. (thousands of dollars)*	*Percent Change From 1985*
Amdahl	29,500	+116	[illegible]	[illegible]
Apple	58,500	+3	862,300	+24
Computer Associates	16,400	+90	93,600	+56
DG	356[1]	-65	313,300	+7
Harris	30,125	+39	[illegible]	-5
IBM	1,390,000	-48	16,945,000	-1
NCR	124,000	+1	[illegible]	+12
Stratus	3,700	+52	35,300	+40
Sun Microsystems	[illegible]	+405	115,275	+172
Tandem	27,000	+133	236,000	+40
Wang	(78,600)	—	668,900	-10

Parentheses indicate loss

[1] Excludes $3 million extraordinary tax credit

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February 2, 1987 Volume XXI No. 5 $44/Year

COMPUTERWORLD

INSIDE

In Depth: Price Waterhouse expects more from microcomputers. **53**

Spotlight: New tools help managers of IBM data networks get a better handle on planning and problem prevention. Pullout section, follows page **52**

- ▶THROWING DOWN THE gauntlet to IBM, a reviving Storage Technology debuts a tape cartridge system featuring an automated library. Page 13.
- ▶WANG IS EXPECTED TO ROLL out a fully compatible challenger to the IBM PC AT. Page 6.
- ▶AN EVEN FASTER 80386 CHIP is readied by Intel, as vendors ponder potential upgrade difficulties. Page 10.
- ▶TARGETING THE HIGH END OF Tandem's line, Stratus readies a new line of fault-tolerant systems. Page 14.
- ▶IMS IS DEAD, LONG LIVE DB2 That's the word from a former IBM software executive. Page 19.
- ▶PLAYING THE STOCK MARKET pulls hardware leasing giant Comdisco profits down sharply. Page 75.
- ▶COMMUNICATIONS COMPANY founded by ex-IBMers unveils an SNA controller claimed to offer flexible features lacking in IBM's 3710 unit. Page 102.
- ▶TEXAS FIRMS BATTLE MIS hiring woes with an employment cooperative. Page 61.
- ▶ROUNDING OUT ITS 3270-compatible line, Telex unveils terminals and added functions for its 274 control unit. Page 49.
- ▶COMMODORE AND ATARI seek to shed their heritages as games vendors. Page 31.

IBM revs up 3090s — with a hitch

Lack of advance notice riles users

BY JEAN S. BOZMAN
CW STAFF

A wave of anger rippled through the IBM user community last week as some of IBM's largest and most loyal customers criticized the vendor for failing to tell them in advance about its plans and for limiting field-engineering upgrades to its most powerful line of mainframes.

"The first things I learned about the new products were in the next day's *Wall Street Journal,*" said one large Midwestern user who did not wish to be identified. "If IBM can't share information with me about what's coming, then they should be prepared to suffer the consequences."

That remark was echoed by other users, many of them Fortune 100 companies and each of which has invested millions of dollars in large IBM mainframes and associated operating systems software. Many of the users asked not to be identified because of their historically close relationships with IBM. Some of these firms were among the earliest to install the IBM 3090 Models 200 and 400. They learned that their machines would have to be upgraded to higher E models in order to gain the new performance features.

'Frosted'

One MIS manager, who said he expects to upgrade his Model 400 to a Model 600E at a later date, described himself as irked and said, "One of the things that frosted me was that we have a Model 400 on-site, and the only way we can go is up. Going to a 400E would mean 10 million instructions per second. I could really use 10 more MIPS for a little more work over a weekend."

Another major user, whose company has already adopted a multivendor approach and has yet to acquire a 3090 model, said the upgrade strategy presents a fundamental problem to both MIS and IBM.

"Buying IBM is no longer the safe decision," according to the user, who requested anonymity. "This is going to diminish IBM's market position as other compa-

Continued on page 6

Rolls out biggest mainframe ever

BY STANLEY GIBSON
CW STAFF

RYE BROOK, N.Y. — IBM last week replaced its 3090 mainframes with a new line of machines, including its most powerful computer ever. But the announcement was clouded by concerns over limited and costly upgrade paths set for current 3090 users.

The 3090E series features performance improvements of up to 15% compared with the current 3090 line. It also features increased expanded storage and, in some cases, doubled main memory.

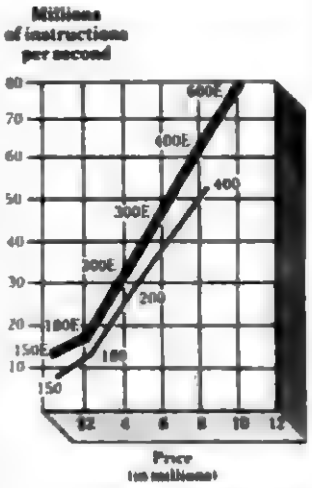
The company also announced enhancements to its VM operating system (see story page 9) and to the entry-level versions of its 3088 Multisystem Channel Communication Unit and 3800 laser printer. A 4248 line printer version was also unveiled.

Four of the six 3090E models are enhanced versions of existing models, while two — the 3090 Model 600E and Model 300E — are new machines. The Model 600E uses six central processing units, and the Model 300E has three CPUs. Both computers will be available in the third quarter of this year.

IBM said the enhanced 3090s will be shipped in two stages.

Continued on page 8

IBM high end
Price/performance of 3090 series



CW CHART: ANN FINN

Group charges foot-dragging on ONA

BY ELISABETH HORWITT
CW STAFF

ORLANDO, Fla. — Telecommunications end-user organizations last week accused the divested Bell operating companies of refusing to collaborate with their customers in efforts to develop and standardize basic service offerings under Open Network Architecture."

At the ONA Forum here, several users groups submitted a memorandum stating that the operating companies had so far refused to provide "any meaningful information on the relevant capabilities of their networks or their ONA plans."

The purpose of ONA is to ensure that AT&T and the operating companies provide consistent basic services using standardized interfaces.

The users group document "addresses the fact that there was a fairly deliberate attempt to delay information exchange [about ONA]," said Kenneth Phillips, vice-president of telecommunication policy at Citicorp and chairman of the Committee of Corporate Telecommunications Users.

Project status

Responding to the memorandum, all seven regional holding companies agreed to provide information on their ONA projects' current status and future plans at the next forum, to be held March 30 through April 2 in San Diego. Phillips suggested the presentations are likely to be "nonsubstantial, but we may be pleasantly surprised."

"We are not withholding information; we are in the process of formulating plans to be submitted to the Federal Communications Commission and trying to gather industry input in the formulation of those plans," a Bell South Corp. spokesman said.

The users organizations' memorandum represents "an unfortunate misconception," according to Southwestern Bell Corp. district staff manager Evelyn Eubank. "It is not as if we have done it all and are not telling. We are still very much in the planning mode," as are all the regional holding companies, she added. The company is also seeking user feedback on an individual basis, she noted.

Several operating company representatives at last week's forum claimed they could not define what basic services they would offer until their users defined their needs. Telenet Communications Corp. responded

Continued on page 102

Bill filed to delay tax change

BY DAVID A. LUDLUM
CW STAFF

WASHINGTON, D.C. — Legislation to delay new tax restrictions on independent computer professionals was filed in Congress last week as controversy continued to swirl around threats to the free-lance status of many contractors.

The bill, which was introduced by Rep. Judd Gregg (R-N.H.), a member of the U.S. House of Representatives' tax-writing Ways and Means Committee, would delay implementation of the changes in the tax law until Dec. 31, 1988.

"We have been inundated with calls from our constituents," said Janet Dearborn, an aide to Gregg. "The purpose [of the bill] is to hold hearings so we

Continued on page 6

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IN THIS ISSUE

Wiring Mac into the IBM world. Now that Apple's Macintosh has become a fixture in corporate in-house publishing systems, both Apple and third parties are cranking out networking products that will expand the computer's penetration in mainstream office applications. **Pages 4,43**

Cure your users of PC phobia. CW surveyed PC trainers for tips on how to get the most from end users gun-shy around their micros. **Page 61**

NEWS

4 Conference attendees say network options confusing, not helping.

4 Borland adds speedier compiler.

4 Macintosh-compatible networking software unveiled at Seybold Conference.

4 Apple fantasy becomes reality, according to conference goers.

6 Wang corrects shortcomings of AT-compatible with new micro.

8 IBM modifies price/performance of large-scale systems.

8 Users say IBM laptop system enhancements leave much to be desired.

9 NEC unveils powerful mainframe family.

9 IBM announces software package that allows users to share VM resources.

10 Intel prepares faster 80386 chip.

10 International trade unions unite against Big Blue.

10 CDC chairman predicts profitable 1987.

10 AT&T reports quarterly loss due to restructuring costs.

12 Proteon, DEC support Fiber Distributed Data Interface standard.

13 STC releases IBM 3480-compatible tape subsystem.

14 Stratus to replace, extend fault-tolerant transaction processor line.

15 OSI agreement compatible with IBM protocol.

100 Emulex resumes development, marketing products for DEC.

100 Reagan administration suggests relaxing high-tech export controls.

100 Novell intends to acquire micro-mainframe developer.

100 HP readies first commercial business processor.

102 Netlink SNA communications processor should ease IBM users' reconfiguration problems.

SOFTWARE & SERVICES

19 IBM's DB2 product manager cites prospect of data dictionary.

19 Unicorn introduces CICS environment for departmental systems.

19 Cullinet announces first in series of software development tools.

MICROCOMPUTING

31 Gupta offers SQL-based data base to run under Windows.

31 Wordperfect to port word processing program to larger systems.

31 Atari and Commodore gaining new status in industry.

NETWORKING

43 Convergent Technologies' PC Exchange enables IBM PC users to share, access files over varied media.

43 PC Xpander provides users with VAX, VMS power.

43 AT&T to expand digital network worldwide.

SYSTEMS & PERIPHERALS

49 Telex announces nine additions to IBM 3270-compatible family.

49 Fifth Generation bases system on binary tree parallel processing architecture.

49 Point 4 offers multiuser system for expanding companies.

MANAGEMENT

61 Avon Products assembling corporate information system.

61 High-tech cooperative helps Southwest firms fill positions.

COMPUTER INDUSTRY

75 Comdisco posts 66% profit drop for quarter ended Dec. 31.

75 Symantec acquires Breakthrough in effort to broaden marketing base.

75 Lotus reports fourth-quarter sales, earnings, income increases.

75 Guarded optimism emerging in U.S. semiconductor industry.

PRODUCT SPOTLIGHT

Managing an SNA network for planned growth and steady service is a complex task. Fortunately, tools have emerged to assist the different mix of network managers in the development and control of this organization resource. By Thomas W. McDonald.

Follows page 52

IN DEPTH

53 For every desk a micro: Price Waterhouse maintains one micro for every three of its employees. By 1990, the firm plans to increase that ratio to one-on-one. By Jean S. Bozman.

OPINION & ANALYSIS

17 Lecht dreams of DRAMs.

19 Babcock relays two insiders' reports on the future of DB2.

31 Zachmann reviews the Brooklyn Bridge from White Crane Systems.

43 Horwitt sees trouble ahead for users waiting for OSI standard.

49 Connolly says Wang is getting a fair deal.

61 Beeler shows how vendor delays hurt MIS managers.

75 Wilder looks back to the origins of the industry slump.

DEPARTMENTS

16 Editorial

67 Calendar

CW debuts new look, expanded sections

Nothing endures but change —
Heraclitus

This issue of *Computerworld* comes to you with several design changes, all intended to make the paper more readable and, therefore, more informative to our 600,000 readers.

The changes were carefully planned during a three-month period and tested and then fine-tuned through a series of focus groups we hosted for selected readers across the country.

Focus groups showed a strong liking for our front-page index, which we have retained in a more readable form.

Participants in these groups also indicated that color is a very effective way of improving informational graphics.

Thus, we have broken with a 20-year tradition with the color chart you see on page one. We will use color selectively throughout the paper, where it enhances informational graphics or defines a special section inside.

Navigating CW's pages

The index page has been reorganized to make it easier for readers to navigate through *Computerworld* without missing any of the important items or sections within.

Beginning with this issue, product listings formerly compiled in the New Products section have been reorganized into their respective technical sections, which are also sporting a new look.

Today also marks the inaugural run of "Inside Line," CW's "sources said" column featuring snippets of industry scuttlebutt. The column appears on page 102 and will run in the same spot — next to the inside back page — every week.

The design was executed by Ronn Campisi, an award-winning graphic designer based in Boston.

Gillin named exec editor

Paul Gillin has been named *Computerworld's* executive editor, a position in which he will play a major role in the development of both the news and features efforts at the paper.

Gillin comes to CW from *Digital Review*, a Ziff-Davis Publishing Co. publication, where he served as executive news editor.

He was previously a senior editor at Ziff-Davis's *PC Week*, covering both software and micro-mainframe communications.

Gillin is a familiar name to many CW readers. He joined the paper as a staff writer in 1982, and he eventually became the CW senior editor for software, a post he held through January, 1985.

As executive editor, Gillin will play a pivotal role in the development of *Computerworld's* news coverage, which has been enhanced with an added emphasis on microcomputing and networking news. His background in IBM mainframes, microcomputers and DEC systems brings added balance to the news staff.

Paul Gillin

Along with news director Peter Bartolik, Gillin will work closely with the paper's 20 home-office and bureau reporters.

He will also work with George Harrar, CW's features director, to ensure a unity of purpose between the publication's features and news efforts.

CORRECTIONS

The Product Spotlight chart [CW, Dec. 8] should have included a product from Nichols & Co. in Culver City, Calif., called N5500. The N5500 is an on-line, interactive, full-capacity project management package that is priced from $40,000 to $75,000.

Rutishauser of America, Inc.'s Paperpro 88 cut-sheet feeders [CW, Jan. 19] are priced from $345.

"HP unveils network strategy" [CW Jan. 26] incorrectly identified Keith Smeby's place of employment. He is employed with 3M Corp.

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Network choices confusing

BY PEGGY WATT
CW STAFF

Users trying to cut through the network options tangle for answers say they are finding more questions, especially as Apple Computer, Inc. adds equipment to the communications melee.

"I'm completely confused," said Michael West, data administrator for John Hancock Mutual Life Insurance Co. in Boston, who attended The Seybold Group Conference on Desktop Communications last week.

However, like other conference attendees, West said Apple's demonstration of new connectivity and coexistence in the world of Microsoft Corp. MS-DOS-based systems makes the Macintosh a viable option in office networks.

For example, he originally expected John Hancock's fewer than two dozen Macintoshes to remain separate or on their own network apart from the IBM Personal Computers.

However, after hearing about Apple's promise of IBM 3270 file transfer capability, West said he would take a second look at letting business users crunch numbers on the likes of Microsoft's Excel spreadsheet with figures downloaded from the mainframes.

"I appreciate the way Apple is now allowing MS-DOS file transfer," he said. "I'm in a continued state of wonderment that IBM cannot understand what people need."

A corporate network systems engineer from a West Coast savings and loan institution said he, too, would consider more Macintosh implementations because the cost of networking Apple products is lower than that of IBM PC systems.

Attractive interface

"The cost of PC local-area networks is almost the same as a minicomputer installation but not when it comes to Macintosh networks," he said. The organization uses IBM PCs heavily, but he said the Macintosh interface was attractive to many users and became a viable option with the new connectivity.

"Apple's catching my eye, and that's an incredible surprise," said Patricia M. Taylor, an associate in the data processing center of Washington University in St. Louis, Mo.

"It's good to hear Apple wants to be compatible across the board. That's better than IBM, where we're trying to piece together the strategy," Taylor added.

Apple gives out network keys

Opens door for firms to develop Mac products

BY PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — Apple Computer, Inc. of Cupertino, Calif., last week finally gave third parties the building blocks to develop Appletalk applications and links from Apple into the Microsoft Corp. MS-DOS world.

The Seybold Group's Conference on Desktop Communications set the stage for Apple to unveil a raft of communications products including file server software, protocols and hardware and software that links to IBM Personal Computers and mainframes. At the same time, 31 vendors announced support for Apple's Appletalk File Protocol (AFP) and/or products compatible with Appleshare (see story page 43).

Many analysts and third-party vendors said Apple's approach sets a high-water mark for ease of use and transparency in networking as well as integration of MS-DOS PCs into the Macintosh environment.

For example, a Macintosh user on a network does not have to learn new commands in order to access the file server but can do so simply by using a mouse.

Furthermore, the Appletalk adapter kit costs only $50 and can be installed by most nontechnical users, Apple claimed.

Despite the fact that the network has been limited in features, Apple said it has sold 250,000 Appletalk connector kits (about 50,000 actual networks) since Appletalk was introduced in March 1985.

Among the products Apple unveiled was the Appleshare file server [CW, Jan. 26] — two years after it was announced and 15 months after it was supposed to ship.

"We think you will find it worth the wait," said Apple Vice-President of Product Development Jean-Louis Gassee.

The surprise was that the $799 Appleshare is all software, although it requires a standard Mac with a hard disk to be dedicated as a file server. Since Appleshare is fully integrated into the Mac, using the server volume is like using a local disk. Other features include information security, support for files from multiple operating systems and suppport for up to 25 users, according to Apple.

Also making its long-awaited debut was AFP. AFP represents the presentation layer of the Open Systems Interconnect Reference Model for networks and is thought by some analysts to be more comprehensive than any comparable protocols for PC-based networks.

It provides developers with a well-defined interface for application development. Third-party developers also fear it will force some vendors who have already developed applications for Appletalk to revise.

Among the products Apple introduced last week were:

- The Appletalk PC Card, a half-size add-in card with an intelligent processor that allows DOS-based computers to share information on an Apple network and access Apple's Laserwriter printer. Slated for delivery in the first quarter, it will cost $399.
- The Appleline 3270 File Transfer is a protocol converter that allows users to transfer files between the IBM mainframe environment and the Mac. It is slated for second-quarter availibility and costs $99.
- The Apple Document Content Architecture Filter is a utility that translates documents from popular DOS-based word processing programs to and from Macwrite.

It will be available free of charge as a special release in the second quarter.

3Com announces Mac network for summer

BY PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — 3Com Corp. of Santa Clara, Calif., announced an Apple Computer, Inc. Macintosh-compatible version of its 3+ networking software but said the product would not be available until at least midyear.

Announced at last week's Seybold Group Conference on Desktop Communications here, 3+ for the Macintosh will eliminate the barrier of network incompatibility separating Macintoshes from office network environments based around systems using Microsoft Corp.'s MS-DOS, 3Com officials claimed.

Joining a host of other third-party vendors, 3Com, along with Centram Systems West, Inc. of Berkeley, Calif., also announced its intent to support Apple's Appletalk Filing Protocol (AFP) in future Macintosh-related products.

3+ Macintosh reportedly will transparently integrate Macintoshes and IBM Personal Computers and compatibles on the same network to provide file and printer sharing and electronic mail capabilities, 3Com said.

Macintosh users will also gain naming, backup and modem pooling services, as well as transparent internetwork routing and remote network dial-in, according to the company. Gateway applications such as 3+Reach will provide networked Macintoshes with entry into larger systems.

On the Macintosh side, 3+ supports AFP and Apple's hierarchical file system, allowing Mac users to access Apple and 3Com file servers at the same time. 3Com's 3Server3+ file server features a built-in Appletalk connector.

On the IBM side, 3+ supports the components necessary to networking IBM and compatibles — MS-DOS 3.1 and 3.2, Microsoft's Redirector and IBM's Netbios.

The mail software is compatible with 3Com's 3+Mail, and fully integrates PC and Macintosh users into a common electronic mail system.

"Macintosh network operating software is one of the largest projects at 3Com today," said Robert Bressler, vice-president and general manager of 3Com's application software division.

Borland adds fast compiler; uses RAM

BY PEGGY WATT
CW STAFF

SCOTTS VALLEY, Calif. — Borland International added a fourth language product to its lineup with the introduction last week of Turbo C, a compiler that speeds operations by doing much of its work in memory.

The compiler can use either the Borland programming interface, with pull-down menus and the built-in editor used on the company's other language products, or a standard command line. It includes the Turbo Linker used in Turbo Prolog, which is compatible with Microsoft Corp.'s MS-DOS Linker, and editing windows, according to Brad Silverberg, director of engineering.

Silverberg said Turbo C compiles up to 7,000 lines of code per minute by making a single pass to read the source file on disk and write the object code, using random-access memory for intermediate data structures. Most compilers take four or five passes, each of which is a separate executable action to the disk, he said.

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201/967-1350
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404/394-0758
James A. Martin, Correspondent
West Coast
415/424-8844
Jeffry Beeler, Chief
Peggy Watt, Correspondent
Midwest
312/827-4433
Jean Bozman, Correspondent

CW Communications International News Service
Susan Blakeney, Director

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
617/879-0700

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New Dimensions in Software Productivity.

Full compatible due from Wang

BY DOUGLAS BARNEY
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. is set to unveil a fully IBM Personal Computer AT-compatible microcomputer that corrects the compatibility shortcomings of Wang's current 80286-machine, according to users and analysts. The announcement could come as early as this month.

The Intel Corp. 80286-based machine, expected to be named the PC 280, will be targeted largely at Wang's installed base, sources said. The existing Wang APC is software compatible with the PC AT but does not accept AT expansion boards. Wang declined to comment on the reports.

The PC 280, however, will come with eight fully AT-compatible expansion slots. A version with four slots, dubbed the PC 240, will be released later in the year and will be targeted for use mainly as a terminal with the capability to run IBM compatible software, according to a beta tester of the PC 280.

The 280 will come with a choice of 10-, 20- or 30M-byte hard disk drive and a 1.2M-byte floppy, the beta user said. The processor is software switchable and can run at 6, 8 or 10Mhz.

Like the recently announced Wang Laptop Computer, the PC 280 has two sets of BIOS, a Wang BIOS and an IBM BIOS. In addition, Wang is rewriting much of its software that runs under the Wang BIOS to run under the IBM BIOS.

"The Wang software runs IBM mode, not Wang emulation," a source said. "The Wang BIOS is needed to run other programs that have not been rewritten for the IBM."

A major part of that software strategy involves a new version of VS Plus for the IBM and compatible PCs, which is targeted for release in the spring or summer, sources said.

Sources reported that price has not been set, but Wang planned to price the machine at least 25% less than a comparable IBM system.

Wang is also working on a PC based on the Intel 80386 called the PC 380, and prototypes of the machine have been built. "I don't think you will see it on the market until this fall. There is no reason they couldn't bring it out earlier, but they don't want it to compete with the PC 280," a beta tester said.

According to one source who has seen the PC 280, Wang will OEM the Multisynch monitor from NEC Home Electronics, Inc. In addition, the system will come standard with an Enhanced Graphics Adapter Card from Paradise Systems, Inc., sources reported. Wang may also sell the 21M-byte internal Bernoulli Box from Bernoulli, a source said.

According to a former Wang employee, the firm has had a fully compatible machine for at least a year but has not introduced it because of its desire to reduce inventories of its Wang Professional Computers. Users contacted by *Computerworld* also indicated that the introduction has been delayed in order to preserve sales of existing PCs, as well as to work out technical difficulties with the read-only memory BIOS.

The machines that are in the hands of beta testers are light gray, with the on/off switch located on the front of the box. On the right, the machine has room for three half-height drives, and the middle has room for either one half-height or two full height drives. A speaker is also located on the front of the machine.

Bill filed

FROM PAGE 1

can determine exactly how these people should be treated. There is concern the whole issue needs to be reviewed."

The changes in tax treatment, called for by Section 1706 of last year's tax reform act, were incorporated into the act without hearings last June and did not become known to most of the people they affect before Novemeber. The section requires many independent computer programmers, analysts and consultants who regularly work through one broker to become employees of the broker, meaning that taxes must be withheld from their pay and they lose a variety of tax benefits available to independent workers.

On Jan. 21 the Internal Revenue Service issued a clarification of Section 1706, which stated that it does not apply to individuals contracting directly with a client but to subcontractors working through a broker or other intermediary [CW, Jan. 26].

Confusion and acrimony have continued to surround the issue, however, as formerly independent subcontractors accused brokers of financially gouging them, and others debated the implications for those working under direct contracts.

Sandy Bachir, a software quality analyst who worked as a subcontractor at AT&T Corp. in Lincroft, N.J., said she has reluctantly become an employee of her broker. Bachir said that as a result, her take-home pay has been cut by a third from the $6,100 per month she previously earned. She does not receive any benefits and is paying her broker's share of her Social Security tax as well as her own.

"To be forced into an employee-type relationship is one thing but with no benefits and paying the employer's share. . . . I'm not an employee, I'm an outcast," Bachir said. Others face identical situations, she said.

"A lot of brokers are offering independents peanuts — $40,000, down from $90,000," said Joe Scordato, president-elect of the St. Louis-based Independent Computer Consultants Association (ICCA), which wants to repeal Section 1706.

The new law has affected many direct contractors as well because before the IRS issued its clarification its clients terminated their contracts due to uncertainty over the law's impact on the arrangements.

"We're afraid the independents that can remain independents are being affected because of the uncertainty," said Joseph Collins, government affairs manager for the Data Processing Management Association. "A lot of the businesses have been leery and avoiding the independent computer consultants and going to the firms that have those people already designated as employees," Collins said.

Some companies, including Digital Equipment Corp., have continued relationships with independent workers under direct contract.

However, client firms willing to contract directly with independents are "few and far between," ICCA's Scordato said. One major client deals only with seven approved firms, he said. "Even though you meet all the requirements, the clients, being conservative as they are here in New York, back off."

ADAPSO, the computer software and services trade group, which supports Section 1706, and whose members already offer technical services through employees, rather than contractors, issued a statement emphasizing that independent workers might not escape the new law by contracting directly with client organizations.

Jack Dudash, an Ohio independent subcontractor, said he was investigating a class-action lawsuit against large technical service firms that issued statements before the IRS's clarification that said it is nearly impossible for independent workers to remain independent.

"They're essentially putting an interpretation on the law in black and white and sending it out to companies. We understand the law requires further interpretation by the IRS," Dudash said before the IRS clarification.

IBM revs up

FROM PAGE 1

nies provide a better upgrade path."

IBM's two-tier performance strategy, which includes plain-vanilla 3090s and the E series, did not play well to many mainframe users.

It was reminiscent, users said, of a 1984 two-tier scheme concerning the 3083 line — except that the high-performance option was then labeled the X option.

The result was two nonintersecting price/performance curves, and the only way to jump from one line to another was through a costly upgrade.

"To X or not to X," said a user at a large bank. "That really makes me mad." What it means in practical terms is that users who lined up to buy IBM 3090 Model 200s in the $5 million range and wish to upgrade must go to a Model 300E at a cost of $1.6 million or to a Model 400E at a cost of $3.7 million.

But other managers seemed willing to upgrade. The manager of a state government data center, who asked to remain anonymous, said he will likely upgrade his 3090 Model 180 to a Model 200E.

He said he spent about $180,000 per million instructions per second (MIPS) when he purchased the Model 180 and will be paying only about $160,000 per MIPS in upgrading. However, he added, "We still perceive that as too high."

Briefings

Several users were briefed in person by IBM representatives last week. Among them were Mobil Oil Corp. in Dallas, Caterpillar Tractor Co. in Peoria, Ill., and Goodyear Tire and Rubber Co. in Lincoln, Neb.

Some MIS directors who were not briefed last week were beginning to wonder whether there has been a fundamental change in IBM's marketing strategy.

"The thing that's beginning to gnaw at me," one said, "is whether IBM is still the strong marketing organization I grew to respect over the years." Other users, if not angry, were caught off guard by the January announcement. IBM often upgrades its mainframes in February.

'Hoping'

"We were glued to our TV sets during the Superbowl on Sunday, hoping to see a new IBM Personal Computer or something," said Ed McDonald, division manager of information processing for Texaco, Inc. in Bellaire, Texas.

"Then, on Monday, we were halfway through a planning session when we got a phone call from our marketing rep. All of a sudden, we had a lot of new information in front of us," he said, "and we've been studying the announcement ever since."

McDonald and his staff were clearly impressed by the breadth of the announcement — including a new screen for IBM's laptop micro, the PC Convertible (see story page 8) and a new 3088 channel-to-channel connect that links two 3090s running VM.

"It didn't have everything we wanted, but it all looks like it's taking us in the right direction," McDonald said. "We anticipated a lot of this, but we weren't sure they would be filling in all the performance gaps so quickly."

Rick O'Hara, manager of computer services for A. C. Nielsen Co. in Green Bay, Wis., said he would have liked IBM to announce faster channels with the E models.

Rebuilt Convertible
A better screen and increased memory are added to the IBM laptop. Page 8.

However, he added, "What I really liked about the announcement was that the 600E is not going to take up any more floor space than the 400 does."

Texaco found the new 3090 products, with their higher processing speeds and shorter cycle times, attractive, McDonald added, noting they would help meet the shop's growing needs for capacity.

The Virtual Machine Inter-System Facilities software, coupled with the 3088 channel-to-channel connect, could be an important product for Texaco — and for IBM, McDonald said. "This is a key buiding block that allows you to hook two 3090s together so they can share VM files," he added.

Different needs

Other shops with different needs said they were not ready to buy just yet but admired many of the new 3090 features. Southland Corp. in Dallas, which has a 3090 Model 200 and recently acquired an Amdahl Corp. 5890, is one such shop.

"We've already built up capacity," said Data Processing Vice-President David Karney, "and we probably have enough horsepower to last us through 1988." But he said he was very interested in the new Model 600 — along with its high-performance features.

"I still don't know if I'll be able to get a field-engineering performance improvement later on," said one 3090 Model 200 user who was unsure of the announcement's implications. "And there's no way of knowing if it will be announced later on."

Staff members James Connolly and Stanley Gibson contributed to this report.

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IBM 3090E drives down cost

But used 3080 market still holds back sales

BY JAMES CONNOLLY
CW STAFF

ANALYSIS

IBM drove the cost of large-scale computing down to one of the lowest levels the company has ever offered last week. But the firm known so long for its marketing skills apparently blundered by irritating some of its most loyal customers.

On the positive side, IBM got its point across. Users of 3090s can upgrade to larger and faster models while paying less than they would have for similar moves a month earlier. IBM said an upgrade to one of the larger and more powerful "E" model 3090s translates to a 25% to 28% price/performance enhancement.

In addition, it appears that new customers can realize price/performance advantages ranging from 6% for dual processors to 15.6% for four-way processors when one looks at the price for each million instructions per second (MIPS) of CPU power.

For example, the per-MIPS list price of a 3090 Model 400E — at $136,112 — is 15.6% lower than the comparable price of the older 3090 Model 400. In comparison, the per-MIPS price of much of the previous-generation 3080 mainframe line approached the $300,000 mark several years ago.

But it is the 3080 line that complicates the announcement.

First, the number of 3080s still being purchased on the used market apparently has been one factor in the reported slowness in 3090 sales. Some analysts maintain that the lack of functional difference between the 3080 line and the 3090 line — other than the 3090s' power and use of expanded storage — makes a used 3080 a better buy than a 3090 for some customers.

Analyst Francis Gens of Framingham, Mass.-based market research firm International Data Corp. notes that used 3080s are the second largest factor working against 3090 sales after the general slowdown in capital spending. Gens says the E models' price/performance levels could bring some 3080 users into the 3090 market.

The used 3080s, the shortening of product life cycles, the aggressive pricing of plug-compatible rivals National Advanced Systems Corp. and Amdahl Corp. and the drive by Digital Equipment Corp. into IBM's markets were all factors in forcing IBM to bring out the E models when it did.

The 3090 mid-life kickers came just two years after the family was introduced, while the 3080s were effectively replaced by faster models three years after the 3081s were announced.

The second area in which the 3080s are a factor is in the memory of the IBM customer base. Many 3090 users were disgruntled last week when they learned that they cannot upgrade existing 3090s to equivalent E models (see story page 1). When users asked IBM about upgrades within a model, they were told it was technically impossible.

IBM's answers brought back memories of February 1984, when it announced mid-life kickers for the 3080s. Users were told they could not upgrade to the new 3080X models, which resulted in the older 3080s losing value.

In the case of the 3090s, IBM will allow existing 3090 architecture to be the core for an upgrade. However, several users said last week they would appreciate the opportunity to add about 10 MIPS of power through a weekend lateral upgrade to an E model.

In answer to users' criticism, IBM officials acknowledged that they may have a problem. They suggested they may be able to offer an upgrade solution if they find the problem is serious enough.

Users say laptop upgrade leaves much to be desired

BY DAVID BRIGHT
CW STAFF

MONTVALE, N.J. — IBM last week announced much-needed enhancements to its slow-selling PC Convertible, but users said the laptop system still leaves a lot to be desired.

The enhancements include an improved LCD, which uses "supertwist" technology to produce darker characters; an optional internal modem, which uses either the IBM or Hayes Microcomputer Products, Inc. Attention command set; and an optional 256K-byte memory card, which allows users to increase the maximum random-access memory to 640K bytes.

After introducing the 13-lb PC Convertible last April for $1,995, IBM shipped only 23,000 units in 1986, according to International Data Corp. (IDC), a Framingham, Mass.-based market research firm. Hewlett-Packard Co. shipped 25,000 of its IBM Personal Computer-compatible laptop systems, and Toshiba Ltd. shipped 29,000 units, IDC reported.

"These are things that they should have had in the first place," said Jeff Ehrlich, manager of product technology at General Electric Co., which has hundreds of laptop systems from various makers. Ehrlich says the PC Convertible is still limited by its lack of a hard-disk drive and by its 3½-in. floppy-disk drives.

A hard-disk drive is also a priority at St. Louis, Mo.-based shoe retailer Brown Group, Inc., but the software conversion should not be a problem, said microcomputer consultant Kevin Dopp, because Brown Group has started bringing in IBM Personal Computer XTs with 3½-in floppy disk drives.

> "These are things that [PC Convertible] should have had in the first place."
>
> JEFF EHRLICH
> GENERAL ELECTRIC CO.

Dopp complained about the readability on the earlier PC Convertible and said that not having Attention command set compatibility had prevented the system from being used with a popular file transfer program. "They're starting over from the right point," he noted.

Mainframe

FROM PAGE 1

with customers first receiving processors "equal in performance to the previous 3090 model." Components that add the increased power will not be delivered until after May 1. Current 3090 users who order upgrades will likewise not receive them until after that date. IBM said the time needed to perform the upgrades in the field would range from nine to 24 hours.

However, Big Blue said customers who order an upgraded version before May 1 will save between $25,000 and $125,000. The discount is reportedly applied after a customer negotiates for any previously available discounts. "It's designed so customers can get going before we can ship the new complete processor. It allows us to keep our manufacturing plant going," IBM Vice-President Larry Ford said.

But the field upgrade has some severe restrictions. Customers may not upgrade from a present 3090 model to an enhanced model of the same number: For example, the 3090 Model 150 cannot be upgraded to the Model 150E. Instead, field upgrades change the Model 150 to the Model 180E; the Model 200 to the Model 300E or 400E; and the Model 400 to the Model 600E. Upgrade charges range from $950,000 to $3 million.

"The packaging is such that with the 400, you have to upgrade to the 600E. You can't upgrade to the 400E," Ford said.

Notable in the pricing of the new 3090s is that buying a new E model and upgrading to a higher powered E model is almost always cheaper than buying the higher powered E model initially. The greatest savings — $530,000 — occurs through buying a 180E and upgrading to a 200E. The lone exception is a move up to the 180E.

IBM claimed that current 3090 users can get a 25% to 28% price/performance increase by upgrading. But Francis Gens, an analyst with International Data Corp. a Framingham-Mass. research firm, pointed out that, compared with a Model 200, the increase in price per million instructions per second (MIPS) for a Model 200E is about 10%, a rate fairly typical for a mid-life kicker such as this.

Thomas Henkel, an analyst with the Boston-based Yankee Group, said that although, technically, there is no apparent reason why an existing model cannot be upgraded to an E model of the same number, IBM does not want to upgrade in that manner because it does not believe it could offer the upgrade at a cost attractive to the user. "But I'll bet anything that in nine to 12 months, you'll see such an upgrade kit from IBM," he added.

The vendor said the new processors offer a 7% cycle time improvement, from 18.5 nsec to 17.2 nsec. The faster time is a result of a new 1M-bit memory chip that operates almost twice as fast as — but is only two-thirds the size of — the 1M-bit chip it replaces, according to IBM. Performance is also aided by a 32% more dense version of IBM's Thermal Conduction Module (TCM), IBM said. The number of channels in the machine was increased from 64 to 128, although the channel speed was not increased.

A 4M-byte card in the central storage arrays with the denser TCMs allows the maximum central storage of the Models 400E and 600E to increase from 128M to 256M bytes. The maximum offering for expanded storage has been doubled on the Model 400E and 600E processors to 1.024G byte.

The hardware improvements will allow better performance from software, IBM claimed. For example, IBM's IMS and CICS will work better with improved VSAM buffer management offered by the new hardware. Changes have also been made to IBM's DB2 to take advantage of the increased storage and buffering of the hardware.

Also announced were the 3088 multisystem communication unit Model A1, the entry-level member of the 3088 series. The Model A1 supports channel-to-channel communications between two IBM 370-based processors. It is functionally equivalent to the larger versions of the 3088 and can be upgraded to Models 1 or 2. The unit is priced at $50,000 and will be available in September.

IBM high end

New 3090 models

	150E	180E	200E	300E	400E	600E
MIPS[1]	10.1	15.6	31.2	46.9	61.5	79
Memory (Bytes)	32M-64M	32M-64M	64M-128M	64M-128M	128M-256M	128M-256M
Expanded Storage (Bytes)	128M	256M	512M	512M	1G	1G
Channels	16-24	16-32	32-64	32-64	64-128	64-128
CPUs	1	1	2	3	4	6
Entry-Level Price	$1.65M	$2.6M	$4.5M	$6.15M	$8.375M	$11.5M

Millions of instructions per second, based on CW estimates.

CW CHART

IBM bridges gap between VM systems

BY ROSEMARY HAMILTON
CW STAFF

IBM last week responded to a long-standing need among its VM users by introducing a software package that allows two VM operating environments to share resources.

VM/Inter-System Facilities (VM/ISF), scheduled for availability in August, allows users on two separate processors running VM/SP HPO Release 4.2 to access data files on shared minidisks, as well as share spool files and directories.

Also announced, along with the new 3090 processor models, were new versions of VM/SP High-Performance Option (HPO) and the VM/XA operating system.

"If it's what I think it is, then ISF answers a long-standing requirement the users have been asking for," said Thomas O'Leary, manager of MIS technology at North American Philips Corp. in New York.

Until recently, IBM provided few tools to allow users at installations running multiple VM-based processors to share data and resources. MVS users, on the other hand, have had such capabilities for a number of years. With VM, each system functions as an individual environment, with limited capabilities for gaining access to another VM system's resources.

Independent vendors have filled this gap to some extent. VM/CMS Unlimited, Inc. in Dorchester, Mass., has been marketing a product for multiple-processor VM environments since 1985. The product is called Single System Image (SSI).

In addition to sharing data and spool files and directories like ISF, SSI also allows program-to-program communications, President Romney White said.

Late last year, IBM unveiled a VM-program-to-VM-program communications capability with VM/SP Release 5.

While last week's VM/ISF introduction marks another step toward creating a single VM environment that will be made up of multiple processors, it only supports VM/SP HPO Release 4.2. VM/ISF cannot work in conjunction with the program-to-program facility of VM/SP Release 5.

In addition, the product was designed to work with two processors only.

VM/ISF also was designed to work with the new version of IBM's 3088 (see story page 1).

VM/ISF will be offered under the vendor's graduated pricing structure, and users will be charged a software license fee for each of the two processors in the ISF environment. A one-time charge for IBM's Group 30 processors, such as the 3033, 3083 and 4381, will be $63,000 per processor. The Group 40 one-time charge will be $100,800.

Other software announcements last week included:

- Improved data management in DB2 and the MVS/XA Data Facility Product. Both use a revised buffer search algorithm that uses enlarged VSAM buffer areas in the new 3090 models.
- Additional features for the VM/Extended Architecture Systems Facility Release 2. It supports the 3090 Vector Facility and some additional VM/CMS programs. Available in June, it will have an initial license charge of $11,220 and a monthly license charge of $3,740.
- VM/SP HPO Release 5. Designed for a large processor environment, it will carry a one-time charge of $57,665 for Group 30 systems and $92,265 for Group 40 systems.

NEC unveils powerful line

BY JAMES CONNOLLY
CW STAFF

TOKYO — NEC Corp. more than doubled the power of one of its key mainframe lines last week with three families of processors based on the NEC ACOS 4 and ACOS 6/MVX operating systems.

The System 910, System 930 and System 830 are successors to NEC's System 1000, which has been sold in the U.S. for the past two years as Honeywell, Inc.'s DPS 90 mainframe.

The System 930 and System 830 are based on the System 2000, which NEC announced a year ago, and which Honeywell said it planned to use as a successor to its DPS 90. A Honeywell official noted that the System 930 and System 830 are compatible with Honeywell's GCOS 8 operating system, and that the System 910 is compatible with Honeywell's GCOS 7.

The System 910 runs ACOS 4 and the Systems 830 and 930 run ACOS 6. NEC claimed that the System 910's five models range in performance from 8 million instructions per second (MIPS) to 86 MIPS. It said the two models of the System 830 range from 8 to 43 MIPS and that the three models of the System 930 range from 45 to 86 MIPS. The high-end models support 64M to 256M bytes of memory.

NEC officials in the U.S. released only typical lease prices for systems being offered in Japan. The 24-MIPS System 930 Model 10 would lease in Japan for $158,544 U.S. per month.

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Faster 386 expected; memory problem cited

BY DAVID BRIGHT
CW STAFF

Intel Corp. is expected to announce in mid-February a 20-MHz version of its 80386 microprocessor that provides 20% more speed than the current 16-MHz version, according to sources. However, some observers say the faster chip may cause compatibility problems with existing hardware and software.

The faster 80386 chip is expected to be available to manufacturers in the second quarter. The only difference between the two versions of the chip is speed, the sources say. Intel is expected in the future to further advance the chip's clock rate to 24 MHz.

Many manufacturers of 80386-based systems, some of whom have designed their machines to accommodate up to 24-MHz versions when those high-end chips become available, will reportedly be able to incorporate the 20-MHz chip into their existing systems.

PC vendors wary

However, some personal computer makers are wary.' Steve Holtzman, director of systems marketing at Wyse Technology, Inc., reports that Wyse will use a different architecture for the 20-MHz version of the chip than it does with its evaluation systems using the 16-MHz version because there is a break point between the 16-MHz and 20-MHz chip.

"When you get to 20 MHz and above, you really need to have an optimized memory scheme allowing an efficient use of memory at an effective cost," he says.

"Yes, you can sometimes design a system that can run at various speeds, but when you have a spread from 16 MHz to 24 MHz, like with the 386, there are significant differences in the total system," Holtzman notes. "If you design a system for 16 MHz and run it at 24 MHz, you're going to have lots of wait states or problems with your memory system."

While the faster microprocessors will maintain system compatibility with earlier versions of the chip, compatibility also may not be assured with some timing-sensitive add-on boards, according to Ron Nakashima, director of systems products marketing at Televideo Systems, Inc.

At add-on board vendor Quadram Corp., senior product manager Mark Butler notes that his company is working with computer manufacturers to investigate the compatibility issue. "We're not really sure what the ramifications are at this point," he says. "We are, of course, trying to marry ourselves as closely to the 386 as possible."

While it allows for faster systems, observers stress that this latest hardware advance further emphasizes the need for a Microsoft Corp. MS-DOS operating system that will take advantage of the extended capabilities of the 80386 or at least the 80286. Andy Seybold, president of The Seybold Group, Inc., a Torrance, Calif., market research company, says an 80386-specific MS-DOS probably will not be available until a year or a year-and-a-half from now.

In the meantime, manufacturers will target the faster chip for applications requiring lots of power, such as in technical workstations and multiuser systems, Seybold notes.

AT&T posts $1.17B loss

BY CLINTON WILDER
CW STAFF

NEW YORK — Like IBM, its counterpart in the computer industry, the world's largest telecommunications company suffered a disappointing 1986.

In results reported last week, AT&T's previously announced $1.7 billion restructuring charge resulted in a fourth-quarter loss of $1.17 billion, the company's first quarterly loss since the 1984 divestiture. For the year, income from operations, which excluded the charge, fell 8% to $1.43 billion, or $1.26 per share.

Full-year revenue also declined to $34.09 billion, a 1% drop from $34.42 billion in 1985. Fourth-quarter sales fell 4% to $8.53 billion.

Product sales of telecommunications and computer equipment dropped 9.4% during the year and 5.8% in the fourth quarter, the company said.

"Our earnings from operations were essentially flat, our costs too high and our results mixed," AT&T Chairman James E. Olson said.

AT&T's fourth-quarter charge of $3.2 billion before taxes was one of the largest taken by a U.S. company since AT&T's $10 billion pretax charge for divestiture-related expenses in the fourth quarter of 1983.

CDC sees profit by end of year

MINNEAPOLIS — Control Data Corp. Chairman and Chief Executive Officer Robert M. Price last week predicted that CDC will be profitable this year after weathering its severe fiscal crisis of the past two years.

The firm, however, will record a substantial loss for 1986. In results that will probably be announced this week, CDC will take a fourth-quarter charge of approximately $200 million for restructuring costs and inventory write-downs. In the first three quarters, CDC lost a total of $38.3 million on revenue of $2.44 billion.

Worldwide trade unions unite against Big Blue

BY SYLVIE HERIARD DUBREUIL
SPECIAL TO CW

PARIS — Following a meeting in London earlier this month, international trade unions have issued a scathing report criticizing labor practices at IBM.

About one hundred union representatives from 24 countries met in London on Jan. 12 and 13 to plan a worldwide union campaign within IBM.

Eager to give impetus to an attack on labor practices at high-technology firms in general, the organizers succeeded in forging a consensus concerning action aimed at the world's No. 1 computer maker.

The meeting was organized by three trade union bodies — the Postal, Telegraph and Telephone International, the International Metalworkers Federation and the International Federation of Employees and Technicians, a white-collar organization.

In a final report, the unions denounced what they called "the virulent antiunion attitude" of Big Blue as well as its "obsessive insistence to deal individually with each of its employees." Nonetheless, they acknowledged that the low level of union membership at the company is a result of the good salary and working conditions offered by IBM.

The unions decided to coordinate information gathering related to the multinational company, devote significant resources to their drive to unionize IBM employees, survey "all aspects of IBM activities and be ready to make public all the damaging consequences, both social and economic."

The unions plan to base their IBM campaign on documents related to multinational companies that have already been released by the Paris-based Organization for Economic Cooperation and Development (OECD) and the International Labor Organization. Both those documents have been officially recognized by IBM.

In their final report, the unions justified their actions on the basis of IBM's leading position in the computer industry and its movement into the telecommunications arena.

According to the 73-page report, IBM employs 405,535 people, 40% of whom work outside of the U.S. The level of union membership is almost nil, except in countries like France and Sweden where labor legislation institutionalizes union presence. Even in these countries, IBM union membership is lower than at similar companies.

The report is available to the public at the Geneva-based headquarters of the International Metalworkers Federation.

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	Tucson	Jan 29, Mar 25
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	Los Angeles	Dec 16, Jan 15, Feb 10, Mar 11
	Newport Beach	Jan 20, Mar 17
	Sacramento	Jan 13, Mar 10
	San Diego	Jan 8, Mar 3
	San Francisco	Dec 9, Jan 8, Feb 4, Mar 12
	San Jose	Jan 22, Feb 12, Mar 26
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	Denver	Dec 10, Jan 13, Feb 13, Mar 17
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Proteon, DEC to support FDDI standard

BY STANLEY GIBSON
CW STAFF

WESTBORO, Mass. — Swelling the growing stream of support for the Fiber Distributed Data Interface (FDDI) standard, Proteon, Inc. announced last week a migration path to the standard from its Pronet 80 network.

FDDI, the emerging 100M bit/sec. fiber-optic network design, is in the process of being cast by the American National Standards Institute (ANSI).

Proteon Chairman Howard Salwen explained that his FDDI upgrade plan allows Proteon to satisfy customers who require a high-speed, fiber-optic, token-ring network now but who also want a standard-based network in the future.

Salwen stressed that Pronet 80 equipment, including the fiber boxes and fiber cable, is usable for FDDI. "The major investment in fiber is the cost of the fiber and the fiber modules," he said. "The cost of a chip set is only a few hundred dollars."

Customers will receive hardware trade-in credit for their 80M bit/sec. interfaces toward the purchase of Proteon's new 100M bit/sec. FDDI products. Customers who wish to retain their existing Pronet 80 networks but may also want a future growth path to FDDI will be supported through an FDDI interface for Proteon's multiprotocol network router, the P4200 gateway, according to Salwen.

Proteon's Pronet 80 will ultimately be superseded by its FDDI network product. "I hope our experience with Pronet 80 allows us to build the best FDDI network. We donated our physical layer to the design, and the FDDI design is ours with one exception," Salwen said.

Priced at approximately $10,700 per node, Pronet 80 has 1,500 nodes currently installed in networks averaging 10 to 15 nodes each in size, a Proteon spokesman said. The product was introduced in April 1985.

Separately, a newspaper advertisement showed that Digital Equipment Corp. is in the process of hiring more than 15 major technical workers to work on developing an FDDI network.

"DEC is putting a team together so they can react and develop around the standard as it is fixed," said Claire Fleig, an industry analyst with International Technology Group in Los Altos, Calif. She said FDDI products can also be expected from Wang Laboratories, Inc. and IBM.

"We continue to look at new technologies and do what we have to do to hire personnel," said Fred Balfour, local-area network product marketing manager for DEC.

Proteon Chairman Howard Salwen said "It's nice to have a strong leader like DEC making a commitment to the standard."

Salwen, who has been on the ANSI FDDI committee since 1983, said obstacles remain before a standard can be cast and that he is not optimistic about a rapid setting of the standard. "I think the committee is a long way off on a decision."

That slowness would set back the arrival of FDDI products on the market, he added. "The only way to make a commercial product is to use very large-scale integration, and to have VLSI require the standard be cast in stone," Salwen said, indicating that the standard must be set before large amounts of commercial activity can occur.

> "DEC is putting a team together so they can react and develop around the standard as it is fixed."
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3317-8765

STC finally challenges IBM cartridge system

BY ALAN ALPER
CW STAFF

NEW YORK — Moving to regain a leading position in the large-scale mass storage systems business, Storage Technology Corp. (STC) last week unveiled its long-awaited IBM 3480-compatible tape subsystem, which features automated tape cartridge handling capability.

STC estimated that the 4400 can load a cartridge in roughly 11 seconds, compared with two minutes for a human to mount a tape.

Announcement of the 4480 tape subsystem and 4400 automated library system come as STC prepares to emerge from 27 months of Chapter 11 protection.

The company, which said it expects to shed its bankruptcy protection within the next 45 to 60 days, still has a number of legal and financial hurdles to overcome (see story page 80).

The 4400, under development for the last two years, uses the same cartridge design developed by IBM for the 3480, featuring a 200M-byte, 18-track, ½-in. tape. The 4400's automated tape handling system, however, cannot be used with 3480 tape subsystems, STC said.

Aiming at 3480 users

Ryal Poppa, STC's chairman and chief executive officer, said the firm did not make the 4400's library mechanism compatible with the 3480 for obvious competitive reasons. STC is aiming its efforts at 3480 customers whose leases are running out and new prospects who are only now migrating from conventional reel-to-reel technology to tape cartridges. IBM has shipped roughly 17,500 3480s in the U.S., according to Freeman Associates, Inc., a data storage management consulting company based in Santa Barbara, Calif.

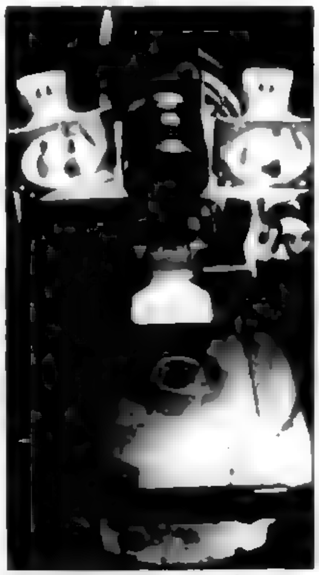
The 4480 will be generally available next quarter, although the automated library system will not ship until the fourth quarter. The firm is just now installing 4400s at four beta-test sites. STC declined to identify any of those sites. Company officials declined to project demand for the product or STC's ability to deliver in volume.

Ray Freeman, president of Freeman Associates, called the STC 4400 "an impressive product" that far surpasses the 3480 in storage capacity and efficient use of floor space. Freeman said he believes that customer acceptance of the product, however, will come after the company negotiates its way out of bankruptcy protection.

"Once they are out of Chapter 11, they'll be able to attract the customers who have stayed on the sidelines," Freeman said. "The fact that they developed a super product such as the 4400 while in bankruptcy is some accomplishment."

Freeman was not sure how many end users will require the automated tape handling capacity of the 4400. "It's tough to predict," he said. "This is a feature with no precedent, but it does put a tremendous amount of storage available in a pretty prompt way."

Memorex Corp. last week said it too plans to introduce a 3480-compatible tape drive within the next month. The firm declined to say whether it would offer automated cartridge handling capability or when the product would be available.


The STC 4400's *robotic arm grasping the tape cartridge.*

With the 4400, STC is looking to capture a market that IBM has chosen not to pursue. Observers said they believe IBM had an automated tape handling mechanism under development for the 3480 but that the company killed the project because demand was not high enough.

"They found that out of the 300 million cartridges that were out there, only 10% required the fast access of this type of device," Poppa claimed. "That's a big market for us, and that's why we're pursuing it and why we have a two-year lead on anyone else."

Replacing DASD

The firm said many companies are looking to use cartridge tape drives to replace more costly direct-access storage devices (DASD) in some applications. Poppa pointed to computer-aided design and manufacturing, in which data such as old designs need not necessarily be stored on DASDs but could be stored on cartridge tape drives that would be automatically mounted.

One member of an STC customer advisory board who requested anonymity said that while he is pleased with the 4400, he is primarily looking forward to STC's participation in the 3480-compatible business. "The more competition in the marketplace, the better it is for users," he said.

The 4400 consists of four components: a 4480 subsystem, including controller and four cartridge drives; one or more library storage modules; a library management unit; and host software. The 4480 controller costs $62,000, while the cartridge drives, with four tape transports, cost $81,900. The library storage module, including the robot, costs $243,500, and the library management unit is priced at $57,925. An intial software license fee for the host management software costs $12,300.

The library storage module is a 12-sided structure measuring 92½ in. high and 132 in. in diameter and is said to house up to 6,000 cartridges. At the unit's center is a freestanding robotic assembly that retrieves, mounts and dismounts cartridges.

Attached to the robot is a camera that reads a label on each cartridge in either bar code or optical character recognition form.

Up to 16 libraries can be linked via pass-through ports that enable cartridges to be exchanged from one storage module to another.

The library management unit controls up to 16 interconnected library systems modules and can receive mount and demount requests from as many as 16 different hosts. It selects the appropriate library and instructs the robot to select the cartridge, validate the label, retrieve the tape and mount it into the closest drive.

STC has designed host software to control the robot's mounting and demounting of cartridges. It operates on any computer running the IBM MVS/XA operating system with either JES2 or JES3. No modification to the operating system, tape management system or user's JCL is required, the company said.

STC said that in the event the 4400 breaks down, cartridges can be mounted manually. Subsystems purchased without the automated tape handling system can be field-upgraded, the firm added.

Cartridge tape system

Storage Technology debut vs. IBM 3480

Features	IBM 3480	STC 4480
Capacity (in bytes)	200M	200M
Controller Unit	$65,430	$62,000
Drive Lapse	$43,120 (with two transports)	$41,000 (with two transports) $81,900 (with four transports)
Buffer (in bytes)	512K	1M
Data Rate (in bytes)	3M/sec.	3M/sec.
Head	Thin Film	Thin Film
Automation	Auto loader system stores up to five manually loaded cartridges with mount time of 7 sec.	Auto cartridge system with library storage module ($243,500) stores up to 6,000 cartridges with mount time of 11 sec. Library management unit ($57,925) manages up to 16 storage modules.

CW CHART

Compaq cuts Deskpro 2 price

HOUSTON — In an attempt to soldify the firm's move to more sophisticated architectures, Compaq Computer Corp. last week announced a consolidation of its Intel Corp. 8086-based Deskpro line and a $700 price cut for the remaining Deskpro Model 2.

"The 80286-based business PCs will become the mainstream this year," said Mike Swavely, vice-president of marketing at Compaq. "Many large organizations don't purchase anything other than 286-based systems."

The popularity of 80286 and 80386-based machines, which last year accounted for 75% of Compaq's business, may eventually cause Compaq to drop the 8086 product. "I can certainly foresee that time. At some point in the future, we will probably take out both the initial Compaq Portable as well as the Deskpro," Swavely said.

Compaq will continue to position the Deskpro Model 2 against the IBM Personal Computer XT.

Compaq dropped both the Deskpro Model 1 and 3 last week. The Model 2 for $1,699 comes with 256K bytes of random access memory and two 360K-byte floppy disk drives. The monitor and adapter are not included with the system.

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Stratus readies XA2000 series to take on Tandem high end

BY JAMES CONNOLLY
CW STAFF

MARLBORO, Mass. — Stratus Computer, Inc. is scheduled to launch a full-scale attack on its chief rival in the transaction processing market, Tandem Computers, Inc., with the introduction of a new line of systems today.

Stratus, which previously offered fault-tolerant systems competing with the lower half of Tandem's product line, is pitting the high end of its XA2000 series against Tandem's 10-month-old premier Non-Stop VLX processor. Both companies claim peak performance rates of more than 50 transaction/sec.

Stratus officials said they anticipate a near-simultaneous announcement this week from IBM, which sells Stratus-built processors as the IBM System/88 and is expected to add the XA2000 machines to the System/88 product line.

"We are selling into a market that has an insatiable appetite for transactions per second," Stratus Chief Executive Officer William E. Foster said.

"Most new applications for computers tend to be on-line applications. That is really what is driving the market. While people are looking at an on-line application, they have to ask themselves what happens if this thing goes down," Foster said.

Designed for growth

Stratus claimed its systems are designed to cope with 45% annual growth rates in the on-line transaction processing market for the next five years to average transaction loads of more than 50 transaction/sec. and the addition of more on-line applications.

Company officials cited the XA2000's capability to be expanded in a modular, on-line manner and the fact that it is designed to handle more powerful microprocessors as they are announced.

Like earlier Stratus systems, the XA2000 is designed for fault tolerance through use of duplicated hardware with a backup processor board, disk drive or other component picking up the processing if a component fails.

Stratus is announcing five models of the XA2000 series, although the XA2000 Model 100 is a transition product providing performance comparable to that of the older Stratus XA400.

> "WE ARE selling into a market that has an insatiable appetite for transactions per second."
>
> WILLIAM E. FOSTER
> STRATUS COMPUTER

The systems are based on Motorola, Inc. 16-MHz 68020 microprocessors and Motorola 68881 math coprocessors. Earlier Stratus systems used Motorola 68010 chips.

The XA2000 systems use a different chassis than the XA400 but similar enclosures. Stratus officials said the XA2000 Models 110, 120, 130 and 140 use a single 40-slot chassis and that upgrades from the 110 through the 140 are achieved through on-line board additions.

The Model 140 runs four tightly coupled duplicated CPUs.

Operating system

Stratus also is enhancing its operating system with VOS Release 6.0, which was designed to take advantage of the hardware changes, including a 32-bit data path and the math coprocessor.

Peter S. Kastner, manager of marketing support programs for Stratus, said the floating-point processor is designed to help users in existing on-line transaction processing markets perform tasks such as financial modeling. He said the company has no plans to use the 68881 capability to enter scientific or engineering markets.

The XA2000 reportedly supports 64M bytes of memory, a 64K-byte cache, a virtual address space of 128M bytes and 46G bytes of disk storage.

Stratus officials said the Model 140 provides three times the performance of the earlier Stratus XA600 using the ET-1 benchmark and 2½ times the XA600's power using Stratus's TP-1 benchmark.

Stratus claimed the transaction-per-second cost of the XA2000 is half that of Stratus's earlier products.

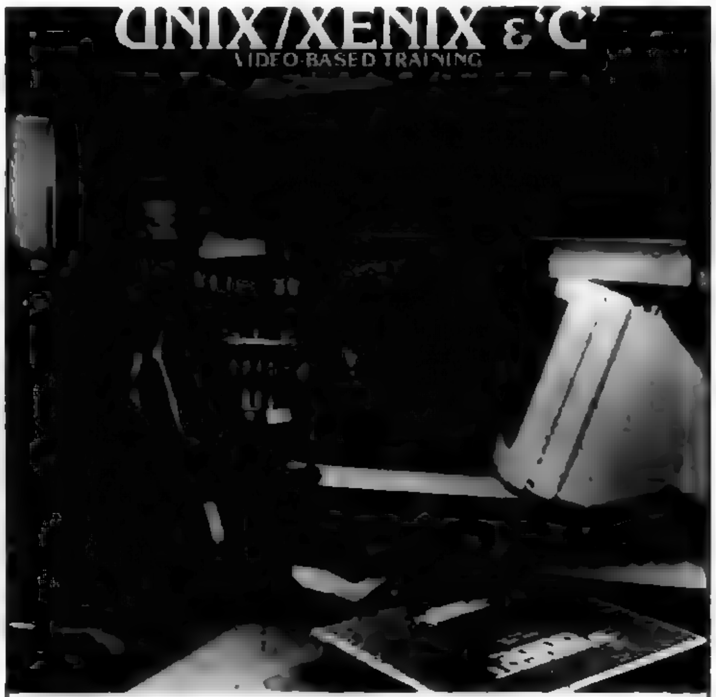
In addition, Stratus claimed ET-1 ratings of 15 transaction/sec. for the Model 110, 27 to 29 transaction/sec. for the Model 120, 37 to 40 transaction/sec. for the Model 130 and 47 to 53 transaction/sec. for the Model 140.

Analyst Thomas Henkel of the Yankee Group, a Boston-based market research firm, said of Stratus, "This is really the first time they have gotten into the VLX or IBM 3090 class in terms of on-line transaction performance, and I think it is a good move for them."

However, Henkel also questioned how long IBM will maintain its relationship with Stratus if the smaller company's products continue to compete with 3090 mainframes.

He said he doubts Stratus has enough application and data base software to support high-performance transaction processing, particularly in growth areas such as manufacturing.

Available now, the systems are priced from $260,000 to $500,000 for the Model 110 and from $770,000 to $1.1 million for the Model 140.



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OSI to embrace LU6.2 protocol

BY AMIEL KORNEL
SPECIAL TO CW

PARIS — Members of the International Standards Organization (ISO) have agreed on the specifications of an OSI transactional processing interface that is compatible with IBM's Advanced Program-to-Program Communication (APPC) interface.

The Open Systems Interconnect (OSI) interface opens up access to IBM's proprietary LU6.2 architecture.

A final draft-document, which will be submitted to standards groups in each country, should be ready by mid-February in Washington.

"If the ISO document remains as it is," said one participant at a closed meeting of an ISO standards group here recently, "it will be possible to have a common interface to OSI and LU6.2."

Strikes a balance

Industry officials and observers contacted last week said the proposal seems to strike a balance between IBM's wish to restrict divergences between OSI and IBM's SNA and other vendors' eagerness to speed development of open-systems architectures.

But observers also warned that the proposal possibly could enable IBM to dominate future OSI development.

"It would be a major coup for IBM to capture a part of the OSI stack," said Joe McGrath, vice-president of office information systems at Stamford, Conn.-based market analysis firm The Gartner Group, Inc.

"If ISO looks to IBM for enhancing APPC, IBM will always be half a step ahead in OSI," McGrath contended.

While European industry officials argue that specifications outlined in the ISO proposal differ significantly from the IBM product, a senior IBM executive called the move a face-saving gesture that does not alter the technical spirit of IBM's protocol.

"They can't expect IBM to throw a significant piece of technology away," said the IBM source, who insisted on anonymity. "What clearly will happen is that European industry will offer a modified version of LU6.2."

Nonetheless, for most computer makers and OEMs, the move should provide a much needed impetus to develop OSI applications, which have been sorely lacking.

"Even if these firms all want OSI to succeed, they will never stop their SNA development," McGrath noted. "This will permit them to leverage work they're doing on the IBM side, with their OSI development work."

"It will certainly take some of the work out of OSI," said Chris Lewis, consultant at London-based market researchers International Data Corporation Europa Ltd.

And users are likely to benefit from a faster move toward open systems. "The user will have the assurance of stability and flexibility, thanks to the fact that the interface is at a very high level," an official responsible for OSI development work at a major European vendor said. "It will be easier to port programs."

"Anything that permits users to evolve" from SNA to OSI without making a radical change "is advantageous," McGrath said.

The French, British and Italian contributions to the OSI subcommittee meeting were strongly influenced by a joint proposal submitted to them earlier by IBM, France's Compagnie Des Machines Bull and West Germany's Siemens AG [CW, Jan. 19], according to Marie-Claire Franon, an official at the Association Francaise de Normalisation, the French standards-setting body.

In what seems to be a departure from past policies, IBM did not raise any copyright or licensing issues in its joint proposal with Siemens and Bull, according to sources who have seen the proposal.

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EDITORIAL

Turnabout fair play

Try to imagine a ship — a very large ship, a supertanker, mega-cruise ship and battleship all in one — trying to negotiate an about-face in a narrow fjord, where it has strayed from open waters.

It takes all the power the ship can muster just to come about, since currents are actually pushing it deeper into the fjord as it turns. But it *will* come about, and once it does and gets its engines cranking full speed ahead. . . .

This ship is IBM. At present, most attention is focussed on what's wrong with the company, just as two years ago, few chose to see beyond the company's successes at that point in time.

There's plenty the company is doing right, however. And while IBM resets its course, there are opportunities for users that may not crop up again for some time.

On the high end, the company's battle to keep Amdahl Corp. and other compatibles makers at bay will continue to put a considerable downward pressure on price/performance curves. IBM continues to confound users with the barriers it erects to certain upgrades. And the 3080 remains a line that refuses to die. These and other factors will result in the IBM's beefed-up sales force playing the most aggressive version of "Let's Make a Deal" in years.

IBM's sales support and maintenance functions have, if anything, improved. These are areas in which other companies in relatively hard times have had to cut back. They're also areas, however, that fuel increasing profits even in the face of declining machine sales for IBM.

Within a few months, the company will start to feel the positive effects of shedding 10,000 people from its payroll. More important, IBM has moved more than 2,000 middle managers into direct sales and support functions, which should translate into greater customer support, especially now, with IBM facing a new high-end competitor in Digital Equipment Corp.

Perhaps IBM's biggest ace in the hole is the lowest cost production capabilities it bought with billions of dollars of capital investment in the last decade. This investment may have put the company in an excess capacity situation recently, given the weak demand for large systems. But it has also enabled the company to react surprisingly quickly in order to shave months off production and shipment schedules, again to the benefit of both the bottom line and customers.

In hindsight, it seems IBM is largely the victim of its own successes in the mainframe market, successes that seemingly blinded both the company and the Wall Street intelligentsia to the limits of growth of such an enormous organization. IBM's production muscle and a booming post-recession economy in the early 1980s fostered unprecendented growth for such a huge company, and this bred myopia regarding future growth. In the past year, IBM investors have recorded more than $20 billion in paper losses.

Getting back on course may see IBM acting as solicitous to its customer base as it may ever need to. It is a situation well worth exploiting.

LETTERS TO THE EDITOR

On systems design

J. Robert Riggs says in his article, "Twelve DP myths that just won't die" [CW, Oct. 6], that it is a myth that systems design cannot be separated from programming. Systems design can no more be separated from programming than architecture can be separated from engineering. A building can't be designed without knowledge of structures and the capabilities of construction materials, and a system can't be designed without knowledge of its structure and the capabilities of its materials. True, the designer does not have to be the actual programmer — although he could be — but he better know how to program.

I also take exception to Riggs's statement that "Coding from design specifications is rote clerical work." It wouldn't be hard to come up with design specifications for the "Mona Lisa," but does that mean that you could give anybody the specifications and a paintbrush and have him paint it? Design specifications spell out exactly what the system has to do, they don't spell out how to do it. If the design specifications are so detailed that writing a program from them is rote clerical work, then the programming has already been done. He also says MIS people "are reputed to be always behind schedule, over budget and capable of inflicting harm when implementing a new system." Maybe that's because the managers are listening to consultants and hiring clerks instead of programmers.

Riggs says "MIS professionals seem to have an irresistible urge to begin coding before the systems design is complete." The systems design is not complete until the customer has the system he wants. The customer isn't going to know exactly what he wants until after he sees the system that the analyst thinks he wants. I wouldn't want to be given a system and be told, "Here it is — don't ask for any changes, because we don't want to recode." It is impossible to have a complete systems design before doing any coding.

Riggs also claims programmers have no need for any contact with the user. It does not make a lot of sense to me to have a systems analyst tell a programmer, who probably earns half as much, "Mrs. Jones wants the date on the left side of the report instead of the right. Oh, and she also wants a pie chart on the bottom of page six. What do you mean we don't have a software to do that? I know our laser printer can do graphics."

Myth No. 13: Presidents of DP consulting firms know what they're talking about.

Steven H. Gove
Staff Engineer
Hercules, Inc.
Wilmington, Del.

Clever but inflexible

Several software packages designed to help the user express himself clearly in writing, such as the one described by William Zachmann in the column, "Becoming a Better Writer" [CW, Dec. 15], have appeared on the market. These packages provide an example of what the computer can do for us and what we should not expect of it. Yes, in order to ensure readability, one should prefer the active voice and avoid long sentences and jargon. However, these are only starting points. Good writing is based on the writer's judgment of what is appropriate in a given context. If you are writing for Ph.Ds, you do not want to write in a style appropriate for fifth-graders.

A software package may give guidance in unstructured tasks such as written expression, but it cannot size up the circumstances; only a human being has the mental flexibility to do this.

The answer to the problems of written communication troubling so many people in business and the professions today does not lie in a software package, however clever, but in the hard work required to develop control, flexibility and judgment.

Jean Datta
Instructor of Business Writing
United National Industrial
Development Organization
Vienna, Austria

This week in history

Feb. 7, 1983:
International Reporting Information Systems (IRIS) is sent into bankruptcy by financial backers, who abruptly cut off additional development money. IRIS, a computer-based intelligence agency, was founded in late 1982 for private organizations.

A Bentley College professor says home computer sales will not take off for at least 10 years because of people's resistance to new technology. According to the academician, home computers are likely to remain a fad until a generation of computer-literate children impact the market, which will cause sales to jump.

Envisioning an office that is fully automated

The complexities of a world of fuzzy connections

AMY WOHL

Offices are places where information is collected, processed and stored. Historically, these functions took place on something visible, tangible — from stone to papyrus, and parchment to paper.

Whatever the medium, there were the usual migration problems at the technology transformation borders. (Can you imagine the office manager going from stone tablets to papyrus? Just look at the document storage compression savings. Listen to the naysayers pointing out how much less durable the papyrus will be.)

In the end, the traditional office generally dealt with a single kind of storage with no profound ability to combine or rearrange existing documents into new ones. The automated office is a different kind of place.

A big organization today still runs mainly on paper. It will continue to do so for a considerable time, not because a paperless office is impossible, or even difficult, to design. It will continue because the supporting infrastructure — the world in which everyone has a workstation with him all the time — just doesn't exist yet.

Even those of us who are highly automated communicate with people who are automated only some of the time, or even not at all. We live in a world that is partly computer-based, a world that includes paper, microfilm and now compact-disk/read-only memory reference books and optical-disk storage. Rather like tax "simplification," our attempts to automate the office are going through a stage where everything has become more complex. We are overwhelmed by choices that lead us into the maze then steer us to a deadend. Brand A computer is better for writing, but less-than-compatible with our delivery system. Brand B storage scheme is cheap, but hard to use and incompatible with editing of the document. It is the *connections* that appear to be fuzzy or missing.

The real world should look more like this: I write on my device of choice. It fully supports me with access to anything I've ever written and any reference material I might need. It offers spelling, grammar, style and other writing support — with full knowledge of writing style. Distribution is swift and automatic, not only forwarding the article directly to its destination, but automatically converting it to that computer's needs. Storage is also automatic, including placing references to the article into my own and outside data bases.

We could actually make versions of these things happen, but they would require much manual intervention, thought and considerable effort for conversion. Also, any variation in behavior would immediately limit the degree of automation available.

The fun has just begun. As we enjoy new advances in technology — electronic publishing comes to mind — our linkages become more strained, and a seamless, end-to-end environment becomes harder to achieve. After I have beautifully laid out my desktop-published document on my specialized workstation, how do I get it to my editor's PC?

Will some of us become stepchildren, doomed to seeing only uninteresting, unenhanced versions of the elegant and colorful world others can access? Nearly all the implemented office automation is based on time-shared minicomputers and dumb, or nearly dumb, terminals, an environment that did not contemplate full-color, bit-mapped, multifont images with graphics.

What we need is a well specified and accepted infrastructure so new technologies can easily fit in. If that structure is sufficiently rich, it could absorb technological advances. Our problem stems from the fact that PCs set the standard for the infrastructure — and that standard is vastly different from formal DP and office automation as originally contemplated. Now is the time. My resolution is to put all my energy behind vendors who work within broadly accepted standards. There is no need for a single standard. Our needs are for a technicolor spectrum of possibilities, not a single black-and-white choice. We need broad bridges between the standards that assume the user will only describe his own environment; the system must understand how to provide the interconnection.

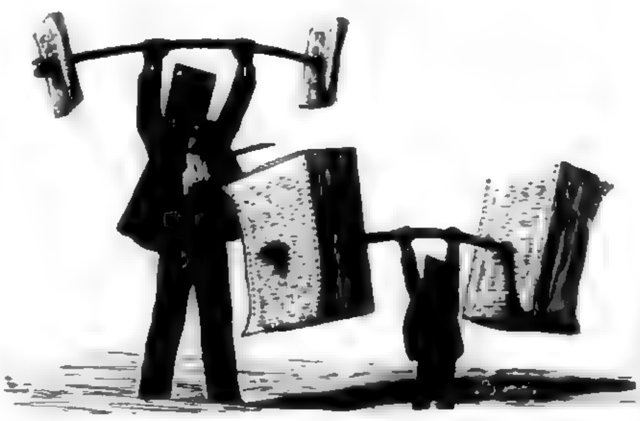
The goal: to get anywhere from anywhere; to include anything within anything else; to send anything to anyone. And to do it without becoming a full-time hacker.

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

To dream, perhaps of DRAMs

CHARLES P. LECHT

At the forthcoming International Solid-State Circuits Conference in New York on Feb. 25 to 27, Nippon Telegraph and Telephone Corp. (NTT) will announce the creation of a 16M-bit dynamic random-access memory (DRAM) prototype. With circuit widths as small as 0.5 microns and an access time of reportedly less than 100 nsec., I call this the "dream DRAM."



CHRISTOPHER BING

This achievement fulfills the dreams of the semiconductor world to produce submicron (less than a millionth of a meter) circuits, group them on a single chip and access them in times nearing those in the picosecond (trillionth of a second) world.

Observing that 16M bits is the same as 2M bytes, we note that at 1 byte per character (which is the case for English), 10 characters per word, 300 words per page, the dream DRAM could contain more than 666 pages of English text.

In the mid-1950s, it took 400 cubic feet to house 1 million characters of memory for the IBM 650 computer. Between 1959 and 1964, this storage requirement dropped to 100 cubic feet and by 1971 it was 8 cubic feet.

With the introduction of the metal oxide silicon 2K-bit (250 characters) chip in 1972, the same 1 million characters were capable of being housed in a single cubic foot. From then until the end of the decade and into the 1980s, when the 256K-bit (32,000 characters) DRAM became commonplace, the volume needed to contain a million characters slid to less than a 6-in. cube.

Just two short years ago, prototype 1M-bit (125,000 characters) chips emerged that are today routinely manufactured in the U.S. and Japan. Since only eight of these are required to obtain a million characters of memory, a cube less than 2 inches on a side suffices to house 1 million characters.

Now we can truly appreciate the NTT dream DRAM's position in the scheme of things — 2 million bytes in the space required by a single chip.

It's a bit much to believe that today's 16M-bit dream DRAM will see practical use before the 1990s, but I'd not wager too heavily against it. No one expected the assembly-line manufacture of 1M-bit chips to occur in the mid-1980s. The prospect of 2 million bytes of RAM available in a desktop computer is exciting.

True, current hardware architectures for desktops machines must change to make the most efficient use of chips with capacities above 1 million bytes, and a lot of new software must be created. These details are minor; the benefits to be obtained through large high-speed memories far outweigh the headaches encountered incorporating them into tomorrow's systems.

> ALL the data we may ever need will become available on demand and as fast as we want it.

As anyone who has been using desktop computers will attest, providing a runtime disk-free environment for applications operation is a high priority. Having finished oohing and aahing over desktop computers, many people are getting bored with waiting as their systems beg for data from a slow-moving floppy unit or even a faster hard disk.

For those large systems users, the appearance of massive, fast RAM facilities means they can expect incredible speed increases in millions of instructions per second, floating-point instructions per second and logical inferences per second. Since roughly two-thirds of the delay time in applications operation is caused by interchip communications, increases in the number of circuits that can be engraved in one chip pays off big.

The usefulness will be seen in all the classic supercomputer applications — such as nuclear energy, weather, chemistry, airframe simulation and artificial intelligence. Even with today's Cray Research, Inc. systems, physicists are limited in the amount of detail they can use to model events because of insufficient RAM memory operating at fast enough speeds.

In my mind's eye, I envision at places like Livermore Laboratories and Los Alamos National Laboratories as one might imagine a group of space pilots awaiting the day when the proper vehicle would arrive for them to travel to inner space to test their theories on what they may find on arrival. The vehicle has to take them ever deeper into the world of the atom, where things are measured in fermis (trillionths of a meter).

Because they must deal with fermi-world spaces and relate these to the world in which we live, the data bases generated by their computations would be nothing short of huge.

Resolving problems

With the appearance of NTT's 16M-bit dream DRAM, we have further reason to hope that the problems caused by memory size and speed limitations for all ranges of systems are on their way to being solved. If things proceed as they have, we can expect further dream DRAMS: a 64M-bit chip followed shortly by one with a capacity of 256M bits. After that, we won't be too surprised with the announcement of the first gigabit dream DRAM — a billion bits on a chip (125,000,000 characters).

It's my bet that these chips will appear well before the end of the century. And with their appearance, the oft-spoken-of I/O logjam will be resoundingly broken. All the data we may ever need will become available on demand and as fast as we want it.

When we have the capacity to receive real-time right answers to all the questions we care to ask, we won't spend more than a picosecond to end today's Information Age. We'll herald the arrival of the Question Age — one dedicated to providing the right questions.

Lecht is chairman of Lecht Sciences, Inc./Japan, a Tokyo-based software think tank specializing in graphics. He is also an elected public member of the Hudson Institute and a free-lance science writer.

Watch what happens next time you ask a mainframe software vendor for a complete customer list.

You may get a convincing song and dance, but underneath it's a different story. Behind those pat answers that software vendor is actually sweating and squirming.

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SOFTALK

Charles Babcock

Big Blue gets relational

"For all intents and purposes, IMS is dead. It is old technology. Everything that is new is going to be built on the DB2 engine."

To a DB2 users group in New York, these words — coming from a former IBM employee and an advocate for DB2 within IBM — couldn't be mistaken as equivocal.

IBM is moving rapidly in the direction of relational technology, and it has decided it wants to get there as quickly as possible because of the simplicity, flexibility and precision inherent in its operation.

Implicit in this move is the fact that distributed relational data base management systems, with their common SQL language, offer a means of bridging some of IBM's incompatible systems and tying end users closer to central mainframe resources.

The apostle of this direction is Sharon Weinberg, president of Codd & Date Consult-

Continued on page 22

Referential integrity eludes DB2

Top priority for users, distant goal for IBM

BY CHARLES BABCOCK
CW STAFF

NEW YORK — IBM is developing a data dictionary for DB2, but referential integrity is a more distant goal, a company official said recently.

Marilyn Bohl, IBM's DB2 product manager at its Santa Teresa, Calif., development lab, could not comment on when either feature might be available but noted that the need for referential integrity could not be allowed to hold up other improvements that could be announced more quickly.

Bohl said the IBM development team realizes referential integrity is a top priority of DB2 users, but "you're not going to see it the next thing out of the box."

Bohl made her comments before the organizational meeting of the Greater New York DB2 Users Group Jan. 22 at the World Trade Center.

Bohl said there were no insuperable obstacles to providing referential integrity in DB2 but that "it's taking longer than some other things."

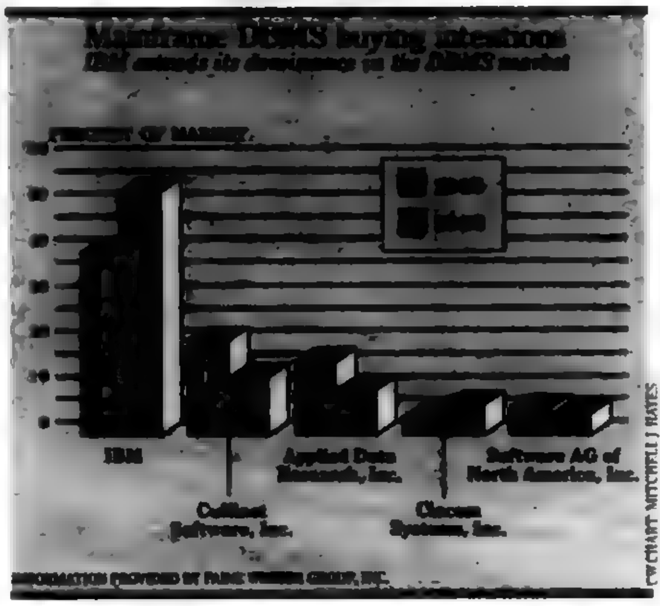
With referential integrity, a data base administrator attempting to delete information from one file would be prevented from doing so by a constraint built into the system if it were needed in conjunction with another file. In the same vein, an attempt to delete information in a "parents" file could be enforced against a "dependents" file as well, if the system was set up to enforce the elimination of the information from all related files, Bohl said.

Also speaking to the 150 users at the meeting was Sharon B. Weinberg, president of Codd & Date Consulting in San Jose, Calif.

Weinberg, the former senior

Continued on page 24

Data View



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CW CHART: MITCHELL J. HAYES

Unicorn CICS runs with VM

BY ROSEMARY HAMILTON
CW STAFF

LOS ANGELES — Unicorn Systems Co. introduced a CICS runtime environment earlier this month that it said will run directly under the IBM VM and VM-compatible operating systems on departmental computers.

Initially, the vendor will offer VMCICS for the Canaan Computer Corp. departmental systems that run under the Canaan Operating System. The operating system is reportedly compatible with the VM/CMS operating system and can run IBM CMS applications.

Continued on page 24

Cullinet preps VAX DBMS

BY CHARLES BABCOCK
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. has introduced the first of what it plans to be a series of software development tools known as IDMS/Architect, and company officials claimed they are moving toward a promised delivery of a relational data base management system for the Digital Equipment Corp. VAX this fall.

Cullinet officials also said the firm's $20 million investment in banking applications will bear fruit by the middle of this year, when it will offer an integrated package to compete with the likes of IBM-marketed Hogan Systems, Inc. and Dallas-based Uccel Corp. banking software.

Cullinet Vice-President of Marketing Jeffrey P. Papows said that Cullinet realized 15% to 20% of its revenue in 1986 from application sales and anticipates that 25% to 30% of this year's revenue will come from that source. By 1990, 50% of revenue will stem from applications, he predicted.

The first part of IDMS/Architect, Automate Plus, is an $8,000 personal computer-based tool useful in developing application prototypes. It includes a diagram editor with 12

Continued on page 24

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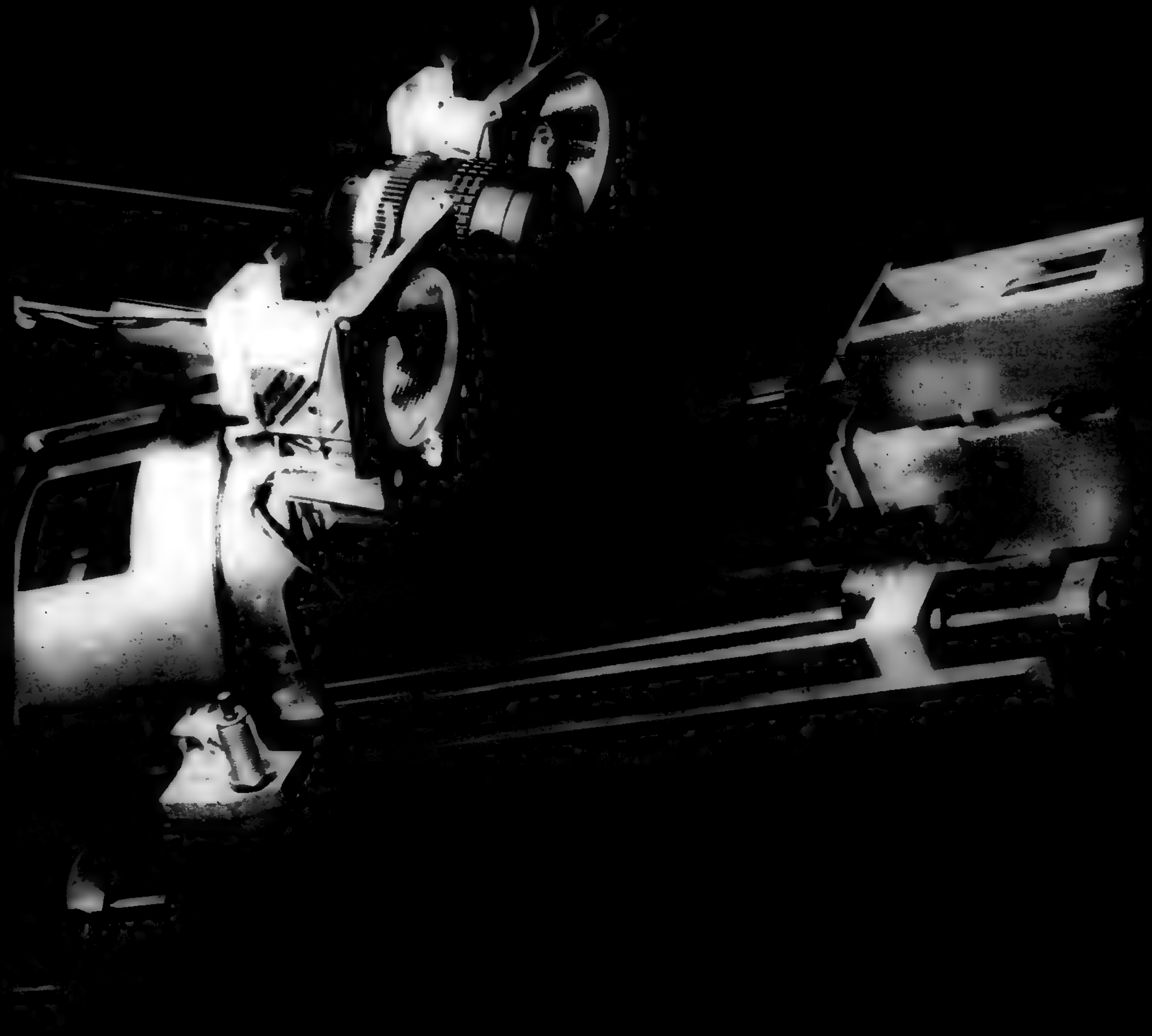

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How fast does the 4400 Automated Cartridge System make data available? The average initial service time is 11 seconds for data within a single library storage module… compared with minutes or hours for manual tape.

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It means that a strategic architecture is finally available for controlling the growth of DASD.

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Big Blue

FROM PAGE 19

ing in San Jose, Calif., and former senior technical planner for the DB2 development team. It was Weinberg, if we read between the lines correctly, who served as one of the fighters in the front lines within IBM for DB2. She left IBM last April to join the firm founded by two of her former coworkers, Edgar Codd and C. J. Date.

No longer hampered by IBM restraints on talking about future products, Weinberg predicted not only a data dictionary for DB2 but highlighted the significance of relational technology to IBM customers.

The managers of large mainframe shops, particularly those moving DB2 into production systems, have a sense that DB2 is important in ways they do not yet understand. There is even a growing suspicion that DB2 was hobbled in some fashion in its early releases so as not to compete too directly with IBM's huge installed base of IMS data base management system sites.

Weinberg addressed these concerns directly when she urged the 150 DB2 users present to "get off your duffs and start using this technology to build applications. The more you do now, the less you will have to convert later."

Marilyn Bohl, IBM's DB2 product manager, also addressed the DB2 users group and told its members that IBM's R Star project, an outgrowth of the relational System R project, has done extensive research on distributed data base systems.

While no specific product has emerged, the project has stirred the interest of the firm's Systems Products Division and Entry Systems Division, "which might be interested in relational technology for the PC," Bohl said, and has even interested the folks in Rochester, Minn., who already have a relational data base locked into the System/38's operating system, she said.

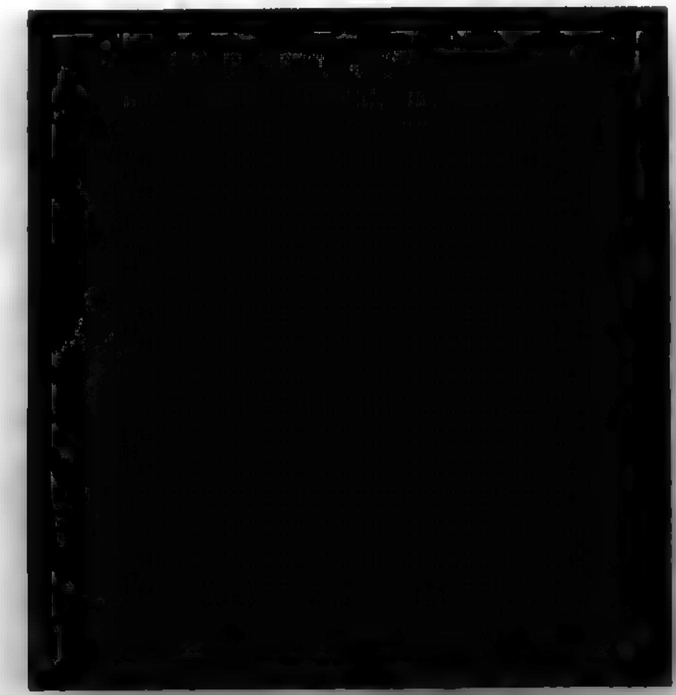
Weinberg addressed the issue more directly. When IBM starts delivering distributed data base technology, "it's going to be a knockout in the marketplace," she predicted. "A lot of this technology — not all of it, but a fair amount, enough to get started — has been worked out in the research labs," she said.

The implications here are enormous, because relational data bases sharing a standard SQL can theoretically run on different machines under different operating systems and still work together. Relational technology offers IBM the means of tying departmental and personal computing to the mainframe and sharing both data and applications.

The technology gives IBM software ammunition with which to confront another hardware vendor that has pushed into its own domain: Digital Equipment Corp. "Distributed data bases will allow IBM to start moving in on DEC the way DEC has been moving in on IBM," Weinberg asserted.

Weinberg said a single data center could provide scientific and engineering processing power along with business applications and graphics functions to many of the same users. "Imagine marrying Distributed Office Support System with DB2," she suggested.

In the end, a relational data base may help MIS managers reassert their control over corporate computing and tie end users to central resources. With training and the right interface, a relational data base is easier to use and offers more responsiveness to end-user needs than its heirarchical or networked predecessors. And that is a technology that MIS professionals will ignore at their own risk.



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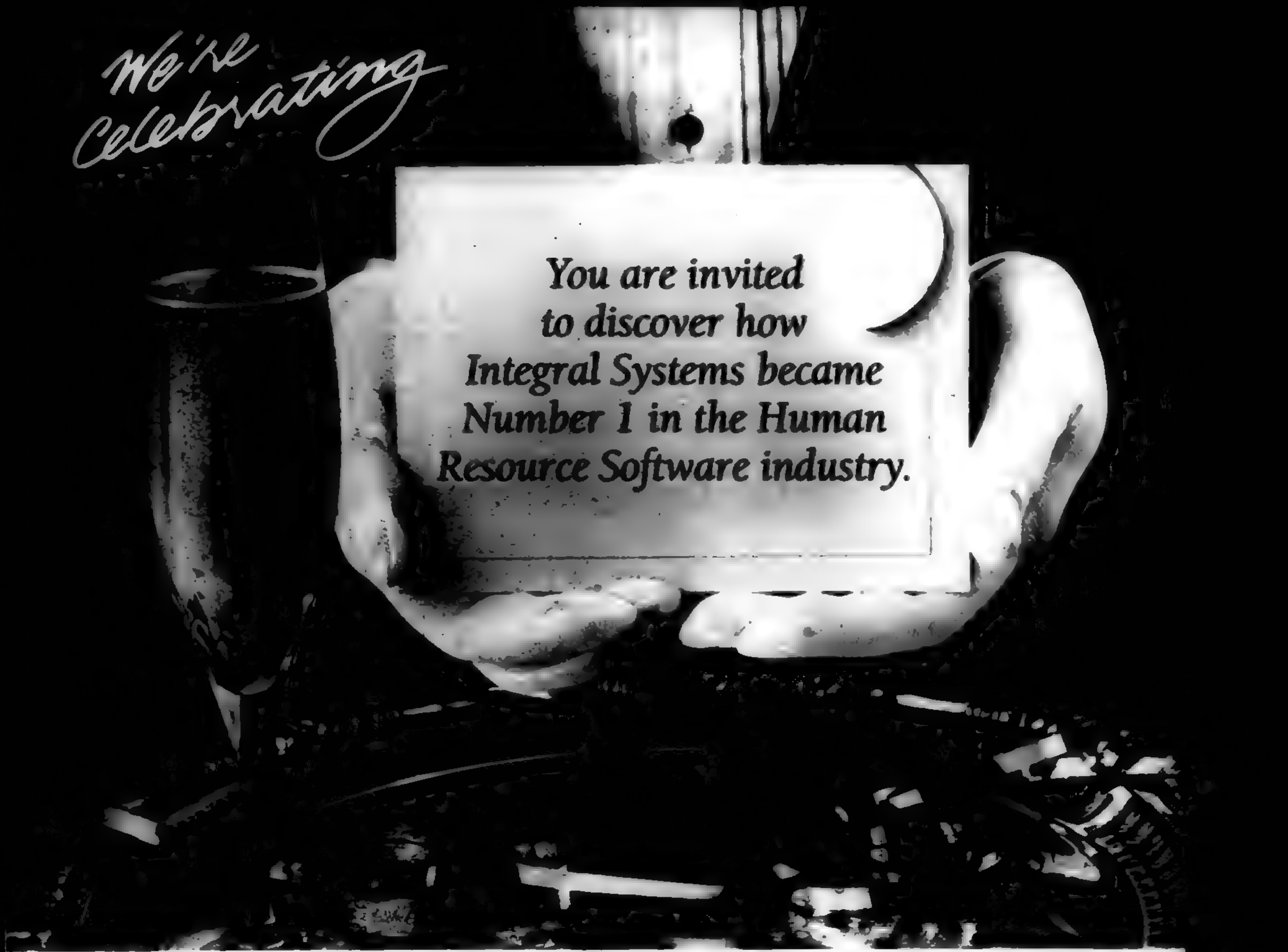
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Unicorn CICS

CONTINUED FROM PAGE 19

Unicorn also said it will market its software for the IBM 9370 departmental systems at a later date.

Currently, IBM does not offer a version of CICS that runs directly under its VM operating system. As a result, users with VM-based systems are required to run another IBM operating system, such as MVS, as a guest under VM. CICS then runs under the guest operating system.

Because of this, Unicorn claimed its product has an advantage over IBM. Since VMCICS runs directly under VM or a VM-like operating system, it saves disk, memory and CPU resources, the spokesman said.

VMCICS enables users to port Cobol and assembler command-level programs to the Canaan departmental systems for production, the vendor said. In addition, command-level CICS applications written in MicroCICS, Unicorn's CICS development software, can run under the VMCICS environment.

Unicorn President Michael Scroggie said he is certain IBM will eventually release a version of CICS for its VM operating system, but he said he does not expect such a product for at least another year.

VMCICS will be available in March for the Canaan systems, and it carries a license fee of $14,500. MicroCICS for the Canaan computers has a license fee of $16,500, Scroggie said.

Cullinet

CONTINUED FROM PAGE 19

diagram types including data flow diagrams, data models, system run charts and data structure diagrams for Cullinet's data base management system, IDMS/R, and fourth-generation development language, ADS/Online.

Automate Plus includes both physical and logical design techniques, employing entity modeling and relational data analysis. A menu-driven graphics tool allows the creation of analysis and design information in a diagram, which can be stored in a data base.

Papows said Cullinet's customer base has been eager for additional development tools and that Automate Plus, which became generally available in January, will contribute $1 million in revenue to Cullinet's first-quarter results.

On other fronts, Papows said Cullinet has shipped Release 10.2 of IDMS/R — which includes support for IBM SQL queries — to six customer test sites.

Cullinet was aided in the speedy delivery of SQL support by its acquisition of Esvel, Inc. last summer, which offered an OEM relational data base management system with an SQL interface. Cullinet will offer the Esvel product for the VAX.

The Esvel product as originally designed was a mainframe relational DBMS, but Papows said Cullinet has no current plans to offer it alongside its IDMS/R product.

Referential

CONTINUED FROM PAGE 19

technical planner for the DB2 development group in San Jose, predicted that IBM will issue a new release of DB2 within six months with both performance improvements and a data dictionary.

When asked specifically about a DB2 dictionary, Bohl said, "I won't get aboard a specific time frame like six months, but I will get aboard a time frame like the near term. It's certainly closer than a system repository," a reference to IBM's unannounced global system resources management project.

Weinberg said DB2's performance will improve "as we go from release to release," both through better data management techniques and optimization of the underlying engine.

"That engine under the covers is a very rich and very robust engine. It represents a form of artificial intelligence being embodied in a data base engine," she told the group.

IBM can revise engine

IBM can revise the engine if it wants because of DB2's high level interface to applications. "If she chose to do it, Marilyn could strip out that engine and rebuild it without affecting your programs," she said, referring to Bohl, her cospeaker and former coworker.

Weinberg predicted that future releases of DB2 will include support for primary keys, foreign keys and domains. A primary key is the unique field in a relational table that identifies it. A foreign key is a field in one table that matches the primary key in another table. Weinberg described domains as "akin to application data types." In addition, she said, both DB2 and other vendors' relational products will move toward support of the three integrity rules promulgated by Edgar Codd, author and president of the Relational Institute in San Jose, Calif., in his relational model.

Bohl said the SQL standard recently published by the American National Standards Institute, Inc. is "95% compatible with IBM SQL."

Even with minor differences between the standard and IBM SQL, DB2 will be kept compatible with the ANSI standard.

The SQL language will continue to evolve, and "hopefully the standard will evolve in step with it," Bohl said.

Weinberg estimated there were 1,200-1,300 sites using DB2; Bohl said IBM is "well on its way toward 2,000" sites.

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System software

Unisys Corp. has announced the **Knowledge Engineering System II** (KES II) expert system software said to enable knowledge-based or expert system applications to be developed and executed in a traditional information processing environment.

KES II is said to offer prepackaged expert system components, including user and program interfaces and a selection of three reasoning methods. The system is said to be portable and integratable with existing applications software.

KES II is out for the Unisys family of Microsoft Corp. MS-DOS-based personal computers starting at $500 and for Unix OS-based Series 5000 departmental computers ranging from $1,000 to $20,000.

Unisys, P.O. Box 500, Blue Bell, Pa. 19424.

Template, the software division of Megatek Corp., has announced the **Figaro software controller** for the Silicon Graphics, Inc. Iris Workstation.

The Figaro controller is said to provide full Programmer's Hierarchical Interactive Graphics System functionality on the Iris system and to take advantage of Iris's three-dimensional geometry engine to perform dynamic modeling and viewing. Figaro was designed for two- and three-dimensional modeling applications.

The Silicon Graphics version of Figaro costs $8,000 for the first workstation and $4,000 for the second.

Template, 9645 Scranton Road, San Diego, Calif. 92121.

Systems Technology And Research has announced **Q & D**, an entry-level productivity system for OS mainframe users.

The Q & D system is said to feature a structured programming language, data manipulation aids and line-printer graphics. It can be used to create reports, do CPU saturation forecasting, plan projects, populate and reformat files and generate spreadsheets.

A Q & D site license costs $2,500.

Systems Technology And Research, P.O. Box 3278, Humble, Texas 77347.

Data base management systems

Database Applications, Inc. has announced a relational version of its **NPL** data base system for the Hewlett-Packard Co. 9000 200/300 series desktop computers.

NPL includes business applications such as scheduling, accounting, budgeting, document tracking and inventory. Features include painting of data entry screens with controls on value ranges; data types filled and required fields; report writing using English-like sentences for sorting, formatting and screening; statistics; full-screen editing; and joining of data from different files to create reports.

The NPL relational data base management system costs $1,190.

Database Applications, 400 Wall St., Princeton, N.J. 08540.

Development tools

Advanced Technology International, Inc. has announced **Super PDL Version 4.2**, an enhancement of its Digital Equipment Corp. VAX-oriented design tool.

New facilities include Ada code generation, Department of Defense Standard 2167 compliance features and expanded Ada-specific syntax features.

Version 4.2 of Super PDL is priced from $14,000 to $30,000 depending on the host VAX model. The Ada-Super PDL option that includes Ada Code Generation, as well as the Ada language constructs, costs an additional $5,000.

Advanced Technologies International, 19th Floor, 350 Fifth Ave., New York, N.Y. 10118.

Tominy, Inc. has ported its **Mach 1** application system generation facility to the NCR Corp. Tower computer system running the Unix System V operating system.

Mach 1 is said to provide a software development environment for building user information systems. It consists of a full-function data base management system, screen definition facilities, print definition facilities, a systems query-language-based query/report writer, multiple programming language interfaces, automatic program generation facility and productivity language.

Mach 1 for the NCR Tower is priced from $2,500 to $28,000.

Tominy, Mach 1 Division, 4221 Malsbary Road, Cincinnati, Ohio 45242.

Application packages

Business Information Technologies has announced an integrated series of management tools for wholesalers and distributors called **The Distribution Expert**.

Designed to run on Digital Equipment Corp.'s Microvax, VAX and Micro-PDP/11 computers, the tools are said to include features such as an interactive quote module with deposit handling and automatic quote to order conversion. Other features include support for point-of-sale capabilities such as counter charge sales with on-

Continued on page 26

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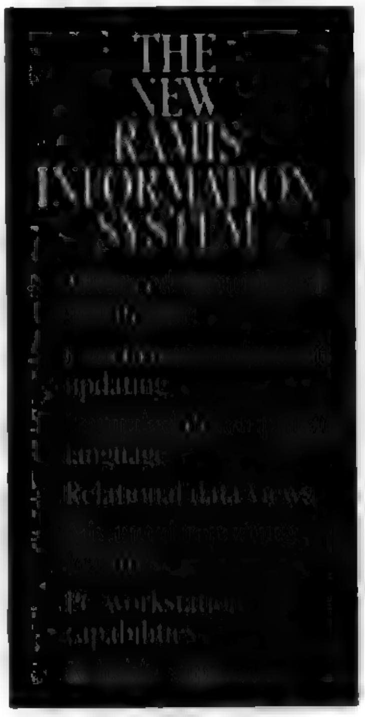

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Continued from page 25

line credit checking.

The product can be interfaced to integrated accounting and DEC's A-to-Z productivity software.

The Distribution Expert costs $24,000.

Business Information Technologies, P.O. Box 426, Burlington, Vt. 05402.

Outlook Software, Inc. has announced **Version II** of its **Outlook/36** financial modeling system to be used with the IBM System/36.

Outlook/36 is said to be a full-function modeling package designed to integrate directly with the System/36's data files.

Version II eliminates the need for any programming in transferring data from System/36 files to models.

The system prompts the user for necessary data and then automatically generates a Report Program Generator program that will transfer the data from the file to the model, the vendor said.

Version II of the Outlook/36 package costs $2,495 per license.

Outlook Software, Suite 117, One Woodfield Lake, Schaumburg, Ill. 60195.

Utilities

VIPS, Inc. has announced the **Survival Check System,** a utility check processing software product designed to allow banks to process checks on another bank's check processing equipment.

Processing is controlled via a file containing parameters, sort patterns and edit criteria that is separately testable and maintainable.

The IBM 3890-based system is said to be portable, allowing movement of the check-processing function from one operation site to another.

The Survival Check System costs $27,500.

VIPS, 54 Scott Adam Road, Hunt Valley, Md. 21030.

Alcyon Corp. has announced a version of its **C68 cross-compiler** for Unisoft Systems' Uniplus hosts and **Versatarget**, a C68 option said to provide support for cross-development to Versados target environments.

Versatarget functions under Motorola, Inc.'s Versados target environments. It includes Versados runtime libraries for the host system, plus a set of utilites that allow the users to download the C68 executable object modules from the hot system to the Versados target system.

Versatarget costs $500 for the IBM Personal Computer and $1,000 for all other hosts. The Uniplus version of C68 costs $1,495 for Motorola 68000/68010 development and $2,295 for 68020/68881 development.

Alcyon, 5010 Shoreham Place, San Diego, Calif. 92122.

Carleton Corp. has announced an enhanced version of its **CQS IDMS Data Base Interface** for the IBM mainframe marketplace.

The enhanced product is said to allow users to access Cullinet Software, Inc.'s Integrated Data Base Management System (IDMS) files using an IDMS data management language (DML) command subset incorporated into the CQS command language. Users can upgrade existing data retrieval tools and access IDMS data files using Carleton's CQS System that incorporates IDMS DML command syntax. In addition, the CQS System and Data Base Interface permit users to access multiple data bases and any combination of data base and non-data base files within the same program.

The program costs $7,000.

Carleton, 245 First St., Cambridge, Mass. 02142.

Datacube, Inc. has introduced **Maxware**, a software support package for its Maxvideo system.

Maxware is provided as a C language source code. It includes an installation guide, a library of primitive functions and Maxvideo hardware diagnostics.

Maxvideo is a family of Motorola, Inc. VMEbus-compatible real-time image and digital signal-processing modules.

Maxware costs $1,000 for Sun Microsystems, Inc.-based systems.

Datacube, Four Dearborn Road, Peabody, Mass. 01960.

Training software

Advanced Systems, Inc. has announced **SAS/FSP, SAS/Graph** and **SAS/ETS**, three courses for SAS Institute, Inc. users.

SAS/FSP is said to teach the basic skills for using the SAS/Full Screen Product, a language that facilitates screens for large volumes of data input. SAS/Graph teaches the basic skills needed to employ SAS/Graph, a three-dimensional, color graphics software package. SAS/ETS teaches time-series modeling and forecasting, financial reporting and systems modeling.

Each course may be rented for $50 to $150 per module per month.

Advanced Systems, 155 E. Algonquin Road, Arlington Heights, Ill. 60005.

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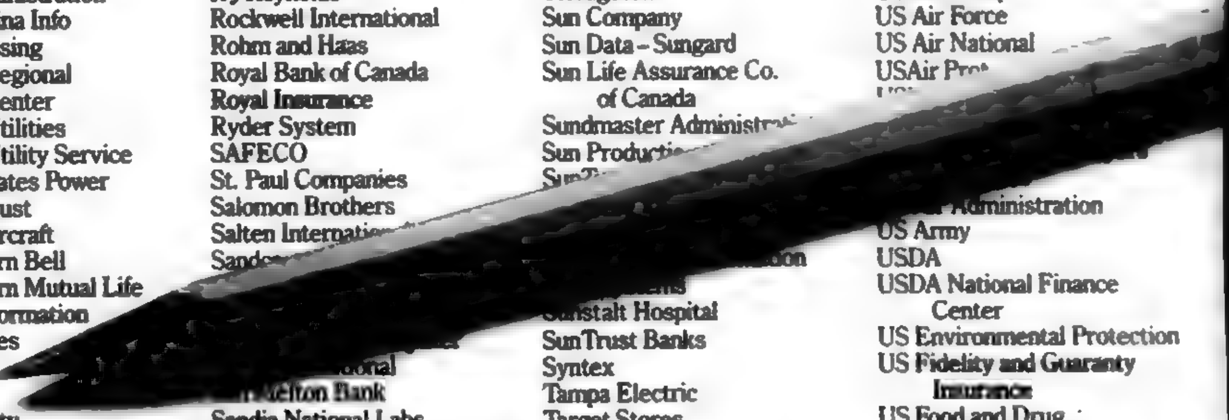

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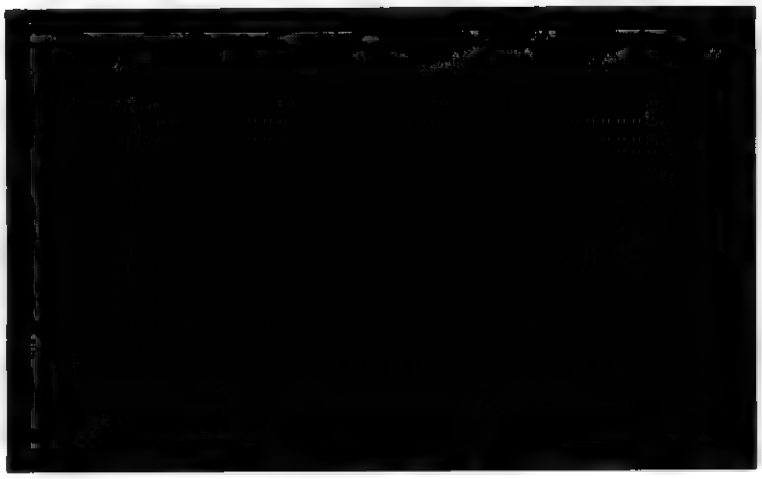

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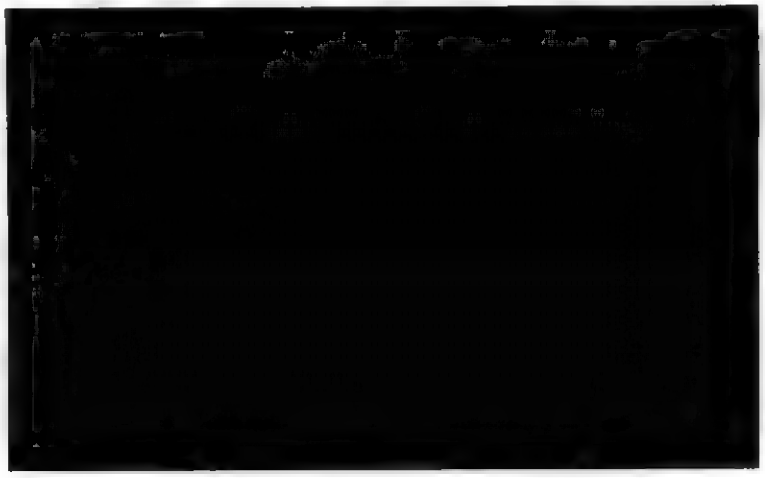

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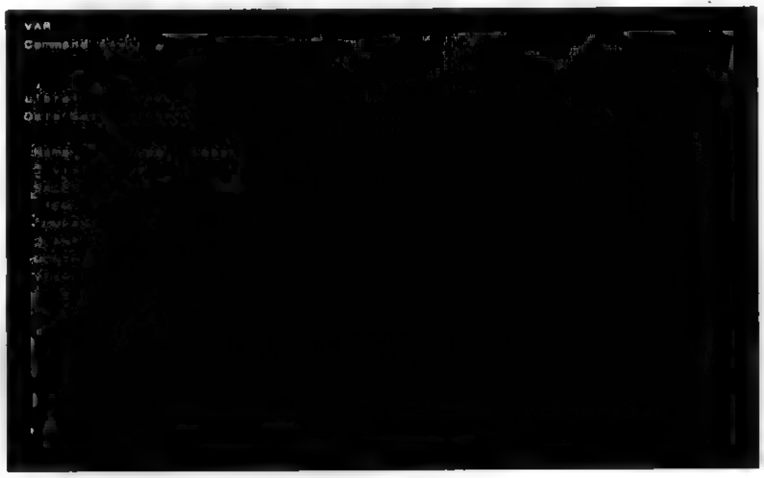

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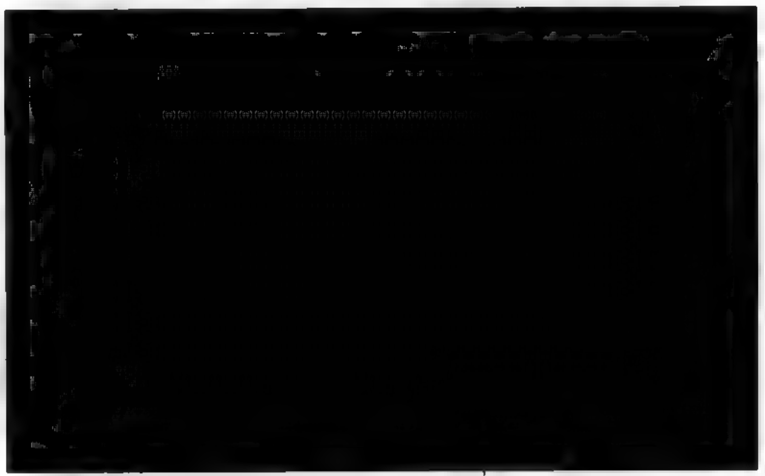

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MICROCOMPUTING

SMALL TALK

William Zachmann

Bridge tool is a winner

Examining the dozens of microcomputer hardware and software products each year can leave you a bit jaded. But once in a while, simply hearing a new product described is enough to convince you that it is a likely winner.

The Brooklyn Bridge from White Crane Systems in Norcross, Ga., is such a product. It meets a basic need for the growing number of users of laptop computers with 3½-in. disks.

The first thing you discover after becoming the proud owner of a laptop with 3½-in. hard-shell floppy drives is that a way is needed to get back and forth between it and the 5¼-in. personal computers you probably already have. Without some such pathway, you cannot use the software you've already got. Nor can data be exchanged with older systems.

Of course, you could buy a 3½-in. drive for your desktop system or an external 5¼-in. drive to attach to the laptop.

Continued on page 35

SQL DBMS distributes net data

BY DOUGLAS BARNEY
CW STAFF

MENLO PARK, Calif. — Gupta Technologies, Inc. recently announced SQLBase Version 3.1, a microcomputer-based package that runs under Microsoft Corp.'s Windows operating environment.

According to Umang Gupta, president of Gupta Technologies, SQLBase is the first SQL-based data base package to take advantage of the Windows graphical user interface.

The package offers support for distributed data base queries and updates and is optimized to run on most popular local-area networks (LAN). The package is currently available.

SQLBase is positioned several ways, according to Gupta. The package can be used for standalone applications development, provide a data base server for personal computers or serve as a gateway for data base management systems running on mainframe computers.

SQLBase consists of a data base engine along with programs that route data between applications nodes and data base server nodes.

Gupta's implementation of SQL is identical to that of IBM mainframe-based SQL/DS and DB2 in language syntax and facilities, the firm claimed.

By using the applications program interface, SQL statements can reportedly be embedded in C programs.

Although SQLBase runs under Windows, the user does not have to purchase the full Windows package in order to run the product.

The multiuser version of SQLBase sells for $1,995, and the single-user version sells for $995.

For data base server nodes, the package requires an IBM Personal Computer AT or compatible with 640K bytes of random-access memory (RAM), a hard disk and IBM PC-DOS or Microsoft MS-DOS 3.1. For applications nodes, the package requires an IBM PC or compatible with at least 512K bytes of RAM. No hard disk is required.

The package runs on all Netbios-compatible networks, including IBM's Token-Ring and PC Network and Novell, Inc. and 3Com Corp. LANs.

Wordperfect ports programs to IBM, DEC architectures

BY PEGGY WATT
CW STAFF

OREM, Utah — Wordperfect Corp. is returning to its roots in the large systems world and will port its established word processing program to several architectures, including IBM's VM environment and Digital Equipment Corp.'s VAX minicomputers. Wordperfect originally marketed word processing software that ran on Data General Corp. minicomputers.

A key aspect of the firm's strategy is to provide file compatibility among the several versions of Wordperfect, according to Dan Lunt, vice-president of marketing for Wordperfect.

The system's hardware roll call currently includes the IBM 4361 and Personal Computer, Apple Computer, Inc.'s Apple II and DG's Eclipse minicomputers, as well as unreleased versions for Unix-based micro- and minicomputers, DEC's VAX, the Apple Macintosh, the Atari

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Data View

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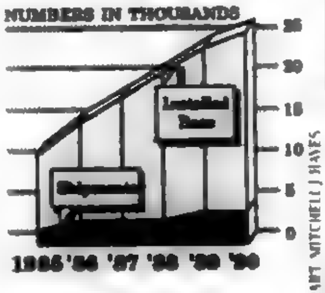
Shipments and installed base forecast



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CWCHART: MITCHELL J. HAYES

Game firms entering new realm

BY STEPHEN BANKER
SPECIAL TO CW

Commodore International Ltd. and Atari Corp. have more in common than their association with the mercurial Jack Tramiel, the 58-year-old entrepreneur who founded the first and now heads the other. They are, for example, the leaders — though the order is in dispute — in the number of computers sold worldwide. But both firms' early distribution was in home and game machines, a reputation the companies are now seeking to modify.

Both have also recently broken back into black ink after periods of massive financial losses, and success in both cases has been spurred by powerful, aggressively priced microcomputers — the Commodore Amiga and the Atari ST — driven by the Motorola, Inc. 68000 chip.

Having demonstrated new energy and viability as computer manufacturers, both are now seeking a share of the most dynamic and lucrative part of the industry, the business sector.

As part of that strategy, and in response to IBM's intentions of vacating the commodity side of the industry, they have added inexpensive IBM Personal Computer clones to their lines. Commodore's basic offering goes for

Continued on page 38

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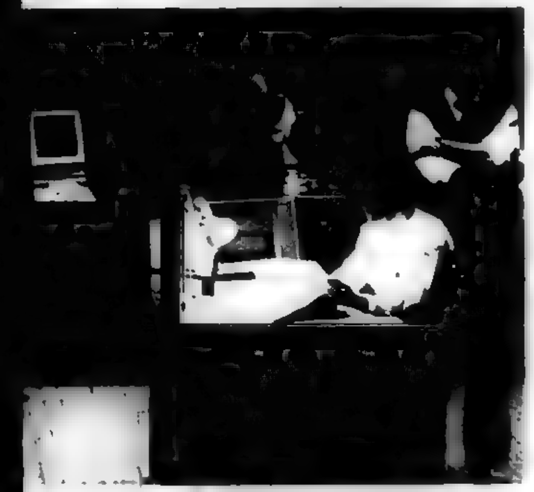

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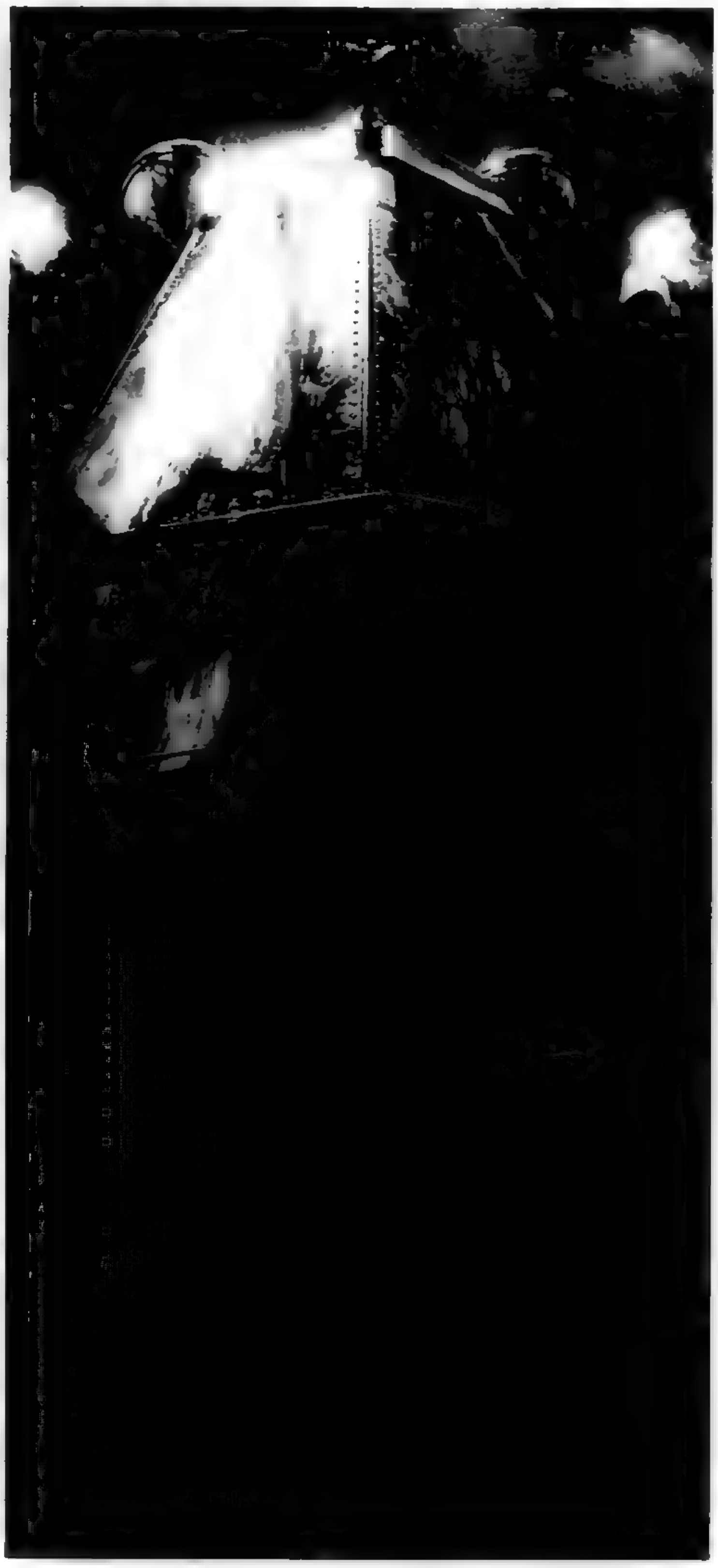

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Bridge tool

CONTINUED FROM PAGE 31

This, however, can easily be a $500 or $600 proposition.

Alternatively, you can use modem communications. That requires that both your laptop and desktop system have modems and communications software.

Furthermore, the product isn't just to link laptops with desktop systems but can be used between two desktops as well. In this manner, it serves as a kind of poor man's local-area network connecting two systems.

In fact, although it is a little tricky, it can actually be set up so that each system will have access to all the devices on the other.

Either system may act as the master system. Typically, you would use the desktop as the master and the portable as a server. In this case, were you to have an IBM Personal Computer AT with two floppy drives and a 30M-byte Winchester disk, the floppy drives on the laptop would look like D: and E: drives at the AT.

To get software onto the laptop, simply copy the relevant files from the floppy or hard disk drive on the AT to the virtual disks, which are actually on the laptop system. Similarly, you might copy your appointment calendar file from the laptop drives onto the desktop system to update it.

The Brooklyn Bridge software also allows access to other resources such as printers, the system clock and random-access memory disks. In practice, however, the ability to access the disks of the other system will be the most useful feature. In the first place, the ability to transfer disk files makes it unnecessary to share most other devices. Rather than access a printer over the Brooklyn Bridge, for example, it is just as easy to transfer the print file disk to disk and then print it on the desktop system with a printer attached.

Second, there are some limitations on the use of peripherals on the server system over the Brooklyn Bridge. Software that is not well behaved and does not work through the standard Microsoft Corp. MS-DOS device drivers won't work over the link. Therefore, using a modem over the Brooklyn Bridge really doesn't work, because communications software normally bypasses the device drivers.

The Brooklyn Bridge, priced at $129.95, provides an easy, convenient and versatile way to bridge between your laptop and desktop. It consists of an 8-ft. cable and software on two disks — one 3½-in. and one 5¼-in. — for the two systems.

In operation, the Brooklyn Bridge allows access to disks and other resources on one system as if they were part of the second.

Zachmann is vice-president of research at International Data Corp.

Wordperfect

CONTINUED FROM PAGE 31

Corp. Atari ST and the Commodore Amiga.

Under consideration are versions for Sun Microsystems, Inc. and Apollo Computer, Inc. workstations and the AT&T 3B line, according to Alan C. Ashton, Wordperfect president. "We found that users wanted compatibility across systems," he said. "We're trying to make conversions transparent and ideal for a network."

Wordperfect for IBM VM environments is still a year away, Ashton said. The VAX version, however, was formally announced recently and will ship this month. The Macintosh version is promised by April and will be priced at $395; a Unix version will be out by fall, Ashton said.

Even the large system implementations will retain the standard Wordperfect interface, Ashton added. The exceptions are the Motorola, Inc. 68000-based systems, such as Macintosh and Atari ST, that have their own distinctions.

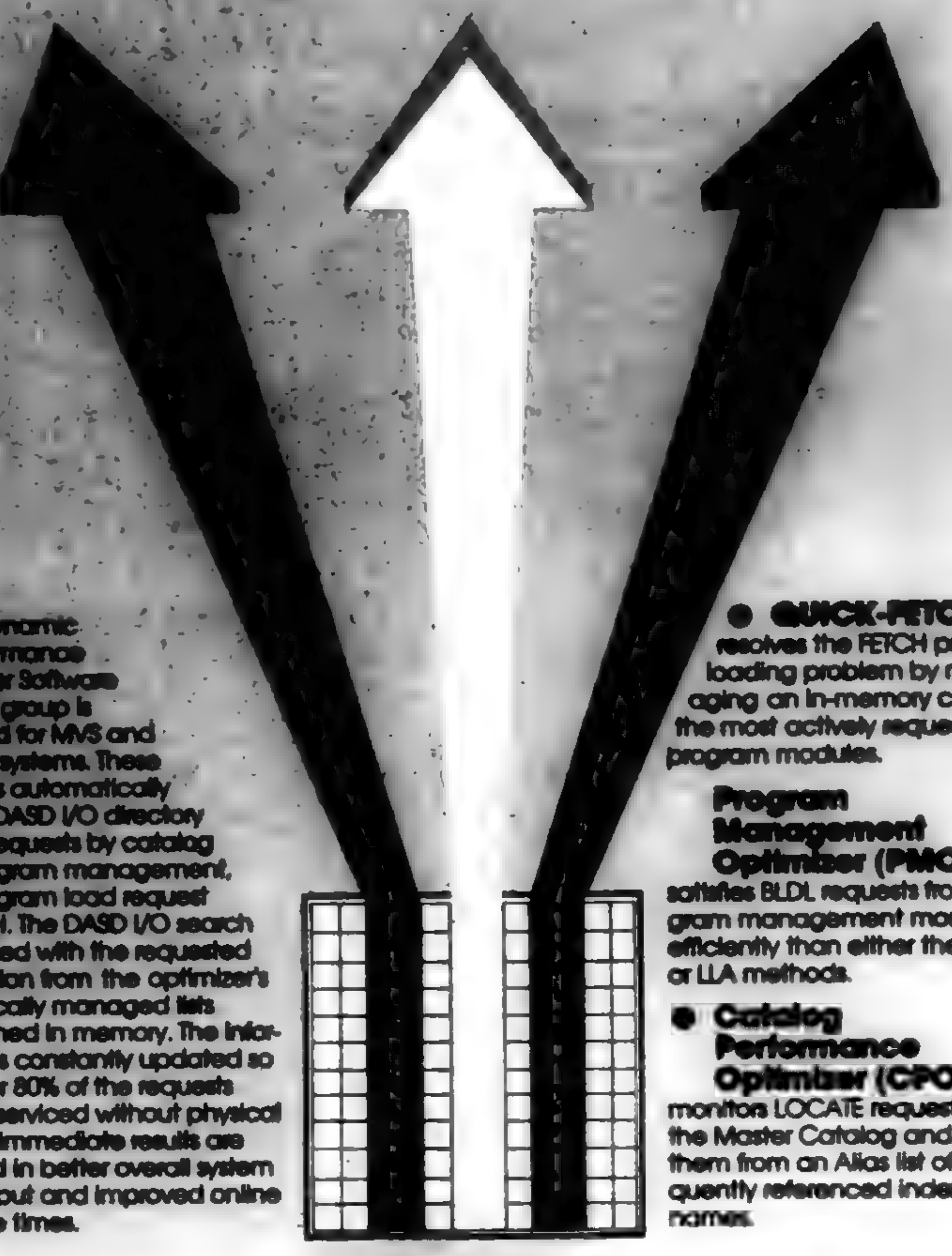
Wordperfect's planned universal implementation was greeted with approval by users, even if they had no immediate plans to change hardware. "This is probably not a big announcement to us, but it keeps some doors open," said Mark Doramus, factory MIS manager at Ore-Ida Foods Co. in Ontario, Ore. He runs Wordperfect on the DG systems that were the program's original implementation.

A microcomputer manager at a California defense industry corporation said he is intrigued to see the new implementations. "I believe in the power of the PC. I'm not in favor of doing word processing over a 2,400 bit/sec. modem," he said. Wordperfect now runs on more than 200 IBM PCs and compatibles and is being implemented on several networks under the manager's direction.

Wordperfect President Ashton said the firm will target IBM's Displaywrite, especially with the newest version's Document Content Architecture conversion capabilities. He said he plans to underprice IBM's mainframe editors and price the VAX versions to tackle high-end competition.

Ashton said the company just finished its most successful year, with $52 million in sales, which was more than double the $23 million of 1985.

Wordperfect now has more than 300 employees, approximately 80 of them on development teams for the numerous implementations of the flagship product.



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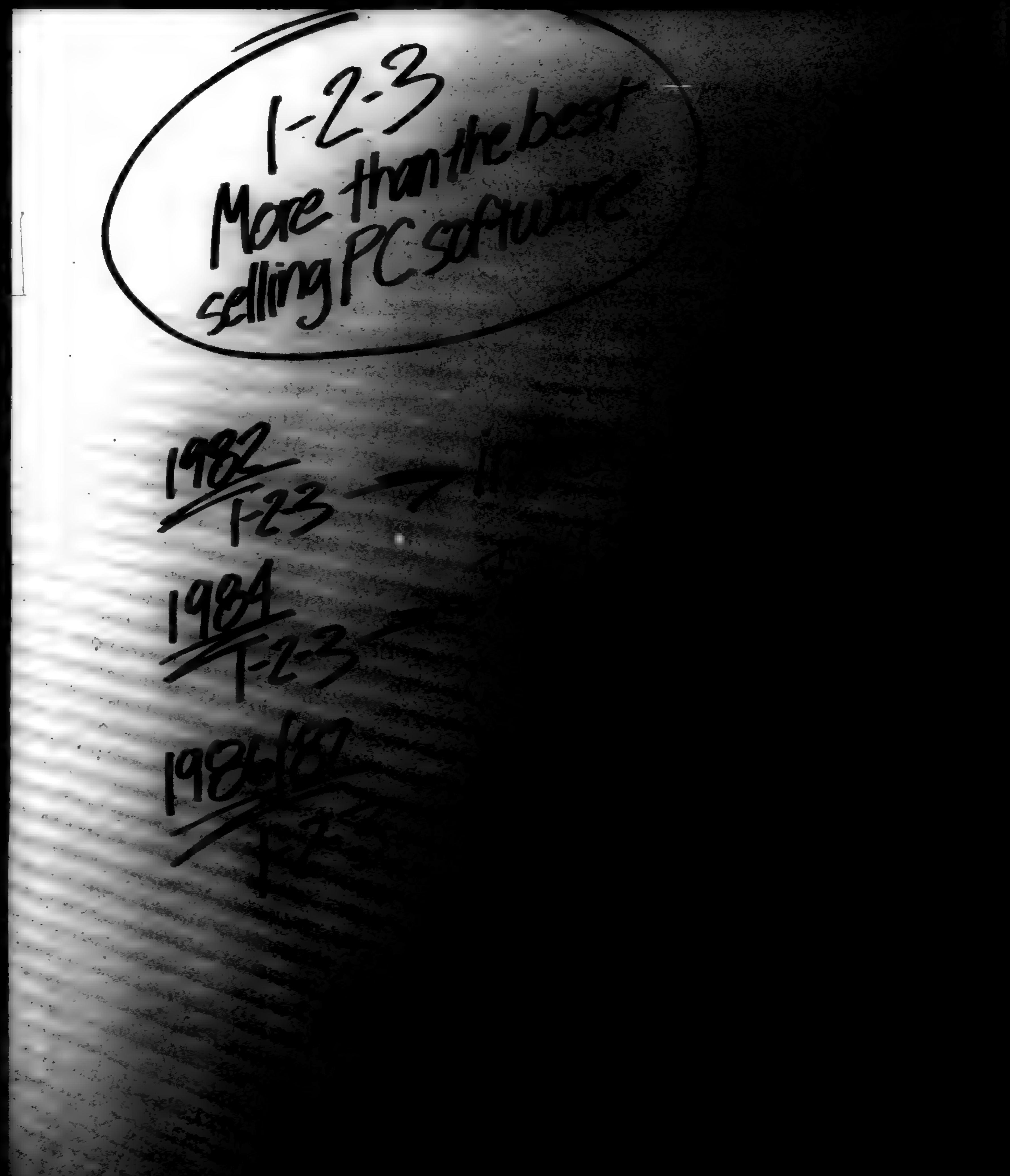
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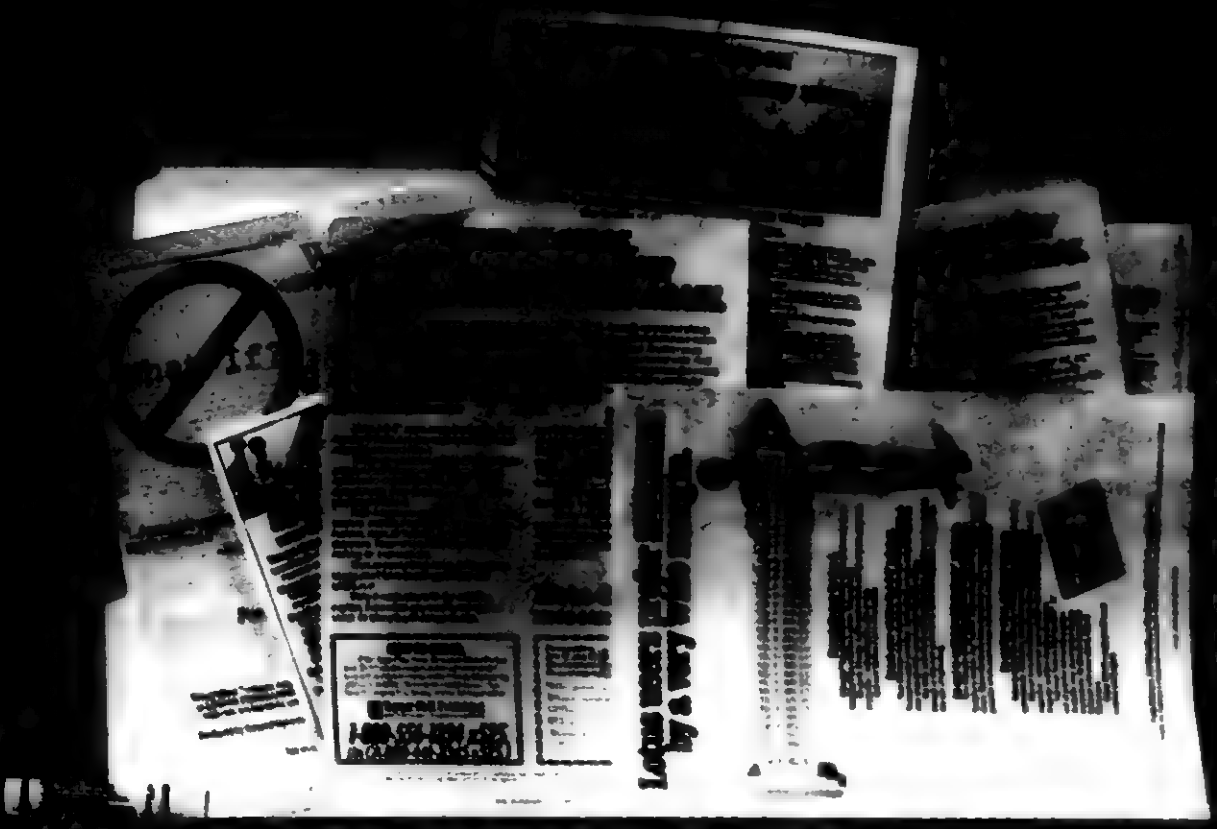

Game firms

CONTINUED FROM PAGE 31

$1,000: Atari's costs half that. However, the machines' configurations are different. This element was emphasized last month when Atari President Sam Tramiel, son of Atari Chairman Jack Tramiel, trumpeted the IBM PC clones as portending "war on the computer industry."

"I think the Atari PC will have a dramatic influence on our ability to sell into the Fortune 1,000," says Richard Frick of Atari's newly formed Corporate OEM Sales Group.

According to Frick, Atari programmers have written software to emulate the most popular terminals. "People are spending the same amount or more for a dumb terminal," he says, "when they actually could be buying not only a terminal but a computer."

Frick says he expects to see positive results by the middle of this year. "We're getting our foot into the door in large corporations," he reports, "and into systems houses, vertical marketplaces and value-added resellers."

Commodore, meanwhile, is less hopeful of an immediate breakthrough in the top U.S. corporations. "We're very strongly interested in the business market," says Clive Smith, vice-president for corporate planning and development, "but the corporate market is the furthest away."

Smith notes some success in Europe, particularly in Germany (which is also Atari's most active overseas sales area), where Commodore has placed its clones in some 200 large companies. Nonetheless, Smith says the U.S. game plan starts with "professional use in the home, small businesses, vertical markets and then corporate."

And Smith concedes that the Amiga is not perceived as, nor was meant to be, a spreadsheet or data base machine. "It's on the cutting edge of graphics and sound," he says.

One reason for the appearance of the two new IBM PC clones is the reluctance of the largest software houses to write for Atari and Commodore hardware. Current estimates show there are some 300,000 STs in use, while there are nearly 100,000 Amigas in use worldwide. That has not been enough to activate either Ashton-Tate or Lotus Development Corp., particularly since no more than half of those figures pertain to English-speaking countries.

But the lack of support from major software vendors may not spell doom for the machines. Fully enabled versions of a powerful word processor, Wordperfect from Wordperfect Corp., are expected in the next few months, and software clones of Lotus's 1-2-3 and Ashton-Tate's Dbase III are already running on both the Amiga and the ST.

In the burgeoning field of desktop publishing, Atari recently unveiled an inexpensive laser printer, priced at less than $1,500, which may spur third-party developers to create a page description language equivalent to Postscript from Adobe Systems, Inc., currently the standard for the Apple Computer, Inc.'s laser printer.

Much of the firms' future success depends on how value-added resellers and corporate buyers react to the clones. But new products based on both the Intel Corp. and Motorola chips are waiting in the wings. Commodore will show a more powerful Amiga with an IBM interface in the next month or two, and Atari, having introduced a Mega ST with up to 4M bytes of random-access memory, is planning its own versions of all the IBM-compatible micros, up to and including ones based on the Intel 80386.

So both companies, having survived the turmoil in the "toy" computer market, are headed for the business community and demanding respect. "The corporate market," says Atari Vice-President Leonard Tramiel — another son of the chairman — "is essential, because it affects people's view of what is an important computer."

Banker is a former columnist for *Popular Computing* and reports for the Canadian Broadcasting Corp.

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Text retrieval tool debuts

COLLEGE PARK, Md. — Airs, Inc., a firm specializing in text retrieval software for large data bases and archives, recently unveiled a version of its high-end Marcon software for use with optical disks.

The Marcon text management software runs on the IBM Personal Computer AT and compatibles with 640K bytes of random-access memory and can be used with a hard disk or an optical disk. It costs $1,495.

W. Theodore Durr, president of Airs, said in an interview that the Marcon software is well suited for the new generation of micros using Intel Corp.'s 80386 chip as well as the yet-to-be-released Microsoft Corp. MS-DOS 5.0 operating system. "People say that few applications need the speed of the 386, but our software does," Durr said. Marcon provides full text retrieval for 30M bytes of data on hard disks or 500M bytes on optical disks, the vendor said.

According to Airs, the product uses menus for all operations and features a pop-up window that allows the user to browse through the data base and select terms to be included in a relational search.

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December 1986

NEW PRODUCTS

Systems

Telex Communications, Inc. has announced **Magnabyte**, a computer-image projection system.

Magnabyte allows users to share a depiction of any text or graphic viewed on a personal computer display screen with large groups of viewers. It consists of a translucent LCD palette that fits on the top of any standard overhead projector, an interface card for the host PC and a hand-held remote control.

The system is compatible with Telex's Intelligent Workstation Series, the IBM Personal Computer family and the Apple Computer, Inc. Apple II family.

Magnabyte is priced at about $1,200.

Telex Communications, 6422 E. 41st St., Tulsa, Okla. 74135.

Tatung Co. of America, Inc. has announced its **Model TCS-7000** IBM Personal Computer AT compatible.

The system offers 64K bytes of read-only memory and 512K bytes of random-access memory, expandable to 1M byte on the system's main board. It operates on Microsoft Corp.'s MS-DOS 3.2 and comes with a system board, hard-disk controller card, floppy disk controller card, one floppy disk drive, keyboard, switching power supply and battery back-up.

The 6- and 10-MHz mode-switchable version costs $2,395, and the 6- and 8-MHz version costs $2,195.

Tatung, 2850 El Presidio St., Long Beach, Calif. 90810.

Peripherals

N/Hance Systems, a division of Symphony Systems, Inc., has introduced its **N/Hance 524 optical-disk reader system** said to allow personal computer users to read data stored on N/Hance 5¼-in. optical disks.

The 524 reader was designed for applications in which the information on optical disks is accessed but not updated. The system includes the drive, an interface and N/Hance's IBM PC-DOS-based Text-Scan document management and text retrieval software. It can be used with IBM Personal Computers, PC XTs, ATs and compatibles.

The 524 optical-disk reader system is priced at $2,995.

N/Hance Systems, 908R Providence Highway, Dedham, Mass. 02026.

Kimtron Corp. has announced the **KT-7/PC Kix**, a personal computer terminal designed to work with Santa Cruz Operation, Inc.'s Xenix System V operating system on IBM Personal Computer ATs, XTs and compatibles.

The terminal is said to suport all escape and command code sequences called for in Xenix. It offers a one-page standard display memory; 14-in. diagonal green or amber screen; two RS-232C serial ports; and IBM PC, ASCII and graphics character sets.

The KT-7/PC Kix costs $695.

Kimtron, Building 380, 1709 Junction Court, San Jose, Calif. 95112.

Data storage

Microsparc, Inc. has announced **The Speed Disk System**, software said to create simulated disk drives in Apple Computer, Inc. Macintosh memory.

Speed Disk works with applications such as Apple's Macwrite and Microsoft Corp.'s Excel, allowing users to configure the applications for use with Speed Disk. The Speed Disk System is said to follow the Macintosh user interface. Options allow the user to save a Speed Disk in packed format or configure it to automatically boot a start-up application.

The Speed Disk System is priced at $29.95.

Microsparc, 45 Winthrop St., Concord, Mass. 01742.

Board-level devices

Quadram Corp. has announced the **QuadEMS+ AT**, an expanded memory board for the IBM Personal Computer AT.

The board is said to be software switchable between AST Research/Quadram/Ashton-Tate Enhanced Expanded Memory Specification and the Lotus/Intel/Microsoft Expanded Memory Specification.

QuadEMS+ AT is said to utilize single in-line memory module memory.

QuadEMS+ AT costs $645 for 512K bytes and $1,395 for 3M bytes.

Quadram, One Quad Way, Norcross, Ga. 30093.

Maynard Electronics has announced **Surprise 286**, an Intel Corp. 80286-based turbo board for the IBM Personal Computer.

Surprise 286 is said to increase the clock speed of the PC from 4.77 MHz to 7.2 MHz. Surprise 286 includes a socket on the board for either a 5- or 8-MHz version of the 80287 math coprocessor. The card has 8K bytes of cache memory.

The board runs in three different speeds, turning the cache memory on and off and standard 8088 mode. Surprise 286 is also compatible with Enhanced Graphics Adapter, Extended Memory Specifications and Direct Memory Access.

Surprise 286 costs $599.

Maynard Electronics, 460 E. Semoran Blvd., Cassleberry, Fla. 32707.

"We picked Word not fancy formatting, but and easy training are there's very little

Mike Macewich, Senior Decision Support Consultant, The Quaker Oats Company.

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Microsoft® Word. If your organization puts words on paper to make a point, close a sale, push a proposal, argue a cause, you couldn't insist on more word processing power than Quaker did.

Computer Peripherals, Inc. has announced the **Overachiever Plus** multifunction enhancement board for the IBM Personal Computer XT and AT.

The board was designed to accommodate Microsoft Corp.'s Xenix, AT&T's Unix and other multiuser systems software applications. It features switch-selectable speeds from 4.77 to 8 MHz. It has 1.5M bytes of memory, which is expandable to 3M bytes.

The enhancement board is also compatible with both 8- and 16-bit modes.

The Overachiever Plus is priced at $54; which includes flip-up software for office functions and a utility software package.

Computer Peripherals, 2635 Lavery Court, Newbury Park, Calif. 91320.

Virtual Microsystems, Inc. has announced the **Q-bus version** of its **AT/Bridge**.

The Q-bus version of the AT/Bridge is said to allow users of Digital Equipment Corp. VAX and Microvax systems to run IBM Personal Computer AT application software directly from any computer terminal.

In addition, PC peripheral hardware can be attached to an expansion cabinet that connects to the Microvax.

The AT/Bridge Q-bus version is priced at $3,990.

The optional PC bus expansion cabinet is priced at $2,990.

Virtual Microsystems, Suite 300, 2150 Shattuck Ave., Berkeley, Calif. 94704.

Applications packages

Timekeeping Systems, Inc. has announced **Dbarcode**, a software program that uses Ashton-Tate's Dbase III Plus to print Code 3 of 9.

The program prints bar codes with descriptions or multiple columns of bar codes across a page. It permits adjustment of bar and space widths to suit various bar code readers and provides for variable bar code height and vertical spacing.

Dbarcode requires an IBM Personal Computer or compatible and an IBM Graphics-compatible printer. It costs $99.

Timekeeping Systems, 12434 Cedar Road, Cleveland, Ohio 44106.

Software languages

STSC, Inc. has ported its **APL Plus System** to the Apple Computer, Inc. Macintosh computer.

The APL Plus System for the Macintosh is a full-feature APL language interpreter. It is compatible with the vendor's APL Plus System for IBM Personal Computers, allowing users with existing applications to convert them to run on the Macintosh.

Features include memory expandable to 4M bytes, a library of tutorial and utility software, built-in terminal emulation, file-transfer facilities and upload and download capabilities.

APL Plus for the Macintosh costs $395.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.

Software utilities

Data Access Corp. has announced **Flex Tools**, a developer's tool kit for its Dataflex relational data base development system.

Included in the tool kit are utilities such as Flexhelp, on-line programmer's reference guide; Flexchange, providing the ability to change file definitions automatically; Strip, with the ability to remove all comments and blank lines and to left-justify all lines of source code; Relocate, which allows users to relocate data and files to new drives; Ftxref, a cross-reference utility; Ftxref2, allowing users to find source files containing specific file, field or index references; and a menu environment allowing users to define up to 24 selections per menu.

Flex Tools costs $195.

Data Access, 8525 S.W. 129th Terrace, Miami, Fla. 33156.

Computervision Corp. has announced **Personal IGES**, an Intitial Graphic Exchange Specification (IGES) package designed for its personal computer-based products.

The package is said to facilitate the communication of drawings and geometrix product information between data bases.

It defines a common data base format for exchanging computer-aided design/computer-aided manufacturing (CAD/CAM) data between Personal Systems graphics programs and other CAD/CAM packages.

Once converted to IGES format, information originally constructed with a Personal systems package can be passed to other CAD/CAM systems, according to the vendor.

The Personal IGES package is priced at $1,300.

Computervision, 100 Crosby Drive, Bedford, Mass. 01730.

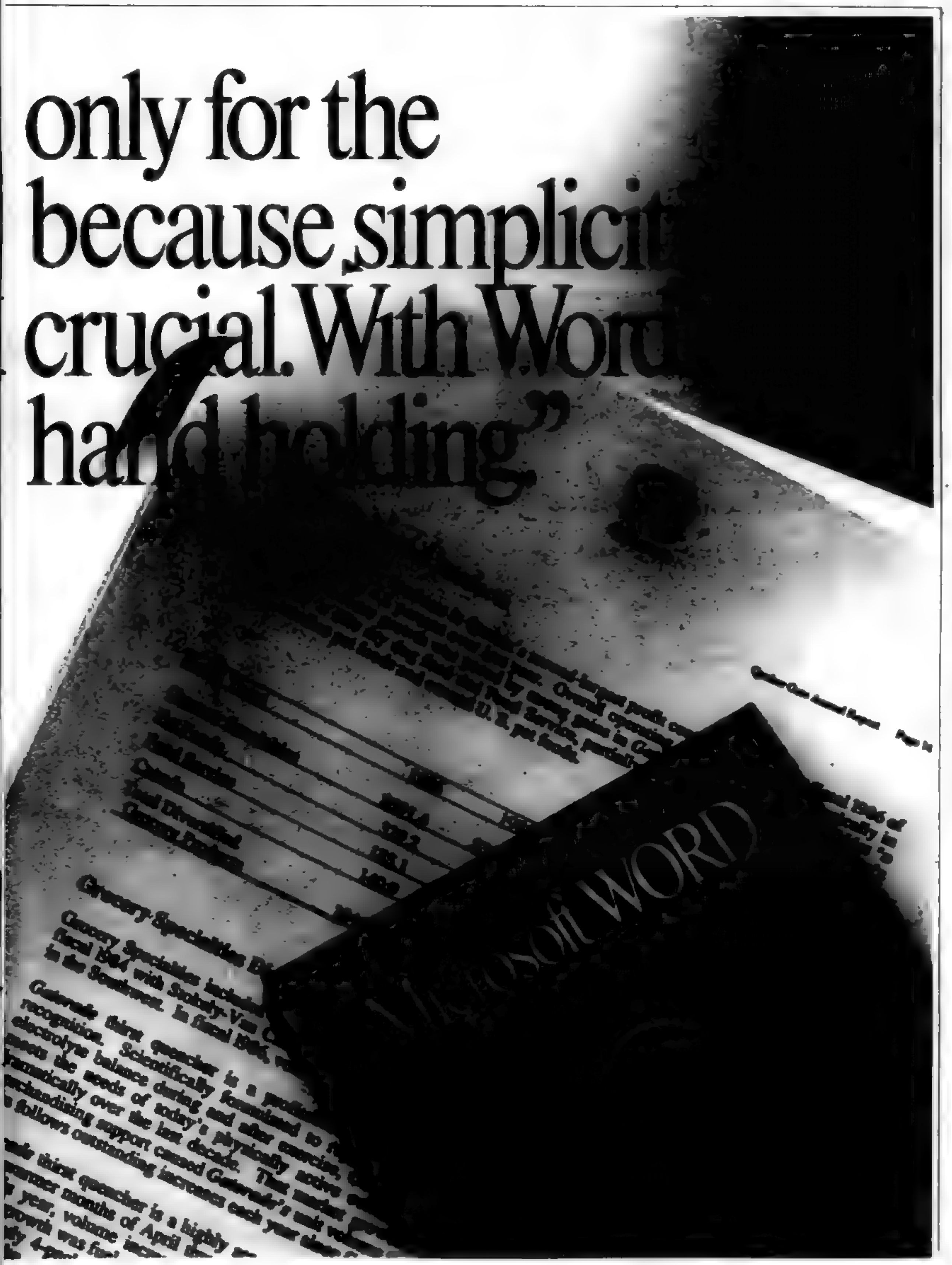
Binary Research, Inc. has announced **Q-2C**, a system said to translate all executable fourth-generation language data base Q-Pro 4 to C language.

Q-2C produces readable C code that may be edited, compiled and linked as usual.

It is available for IBM PC-DOS and Microsoft Corp. MS-DOS and is compatible with the Lattice, Inc. C compiler.

Q-2C is priced at $1,000.

Binary Research, 7100 E. Valley Green Rd., Fort Washington, Pa. 19034.



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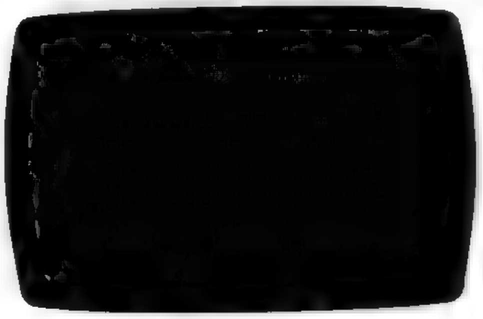

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NETWORKING

DATA STREAM

Elisabeth Horwitt

Unix won't wait for OSI

Let's face it, a lot of users want multivendor networking *now*, not several years hence, when the Open Systems Interconnect (OSI) communications standard finally reaches maturity. For them, the ground swell of support for Network File System (NFS) and Transmission Control Protocol/Internet Protocol (TCP/IP), as evidenced at Uniforum 1987, The International Conference of Unix Users, is plain good news — at least in the short run. However, users who choose to enjoy multivendor networking now may pay later, when it comes time to migrate to OSI protocols.

NFS is a distributed file system developed by Sun Microsystems, Inc.; TCP/IP is a set of basic networking protocols originally developed for the Department of Defense. Unlike OSI, both protocols specify a full set of networking functions and have been tested as commercial products at user sites.

At Uniforum, vendor support for both NFS and TCP/IP was clearly reaching the critical mass needed to generate a de facto industry standard. NFS gained support from AT&T, despite the fact that AT&T has

Continued on page 45

Convergent networks Unix

BY ELISABETH HORWITT
CW STAFF

SAN JOSE, Calif. — PC Exchange, a software package recently introduced by Convergent Technologies, Inc., enables Microsoft Corp. MS-DOS workstations to access files on Convergent's Unix-based servers over a variety of local and long-distance media.

Convergent also announced CTIX 6.0, a complete version of AT&T's Unix System V Release 3 that supports several networking environments; Multi-Processor Communications Controller, an intelligent I/O processor board that allows high-speed multiprotocol communications; and Telecluster, which implements the Convergent Cluster local-area network on twisted-pair wiring.

Based on the Virtual Network System from Banyan Systems, Inc., PC Exchange allows IBM Personal Computer users to share files, peripherals and services such as electronic mail and X.25 and IBM host gateways on multiple Convergent Workgroup Servers. Workgroup Servers, typically linked to PCs in star configurations, can now be networked together over local- or wide-area communication links to form divisional or corporatewide multiserver networks, according to Convergent.

PCs can be connected to Workgroup Servers with standard thin-wire Ethernet, RS-232C asynchronous lines, the

Continued on page 44

PC Xpander integrates PC, VAX

BY PATRICIA KEEFE
CW STAFF

CONCORD, Mass. — The PC Xpander, recently introduced by Xyplex, Inc., provides IBM Personal Computer users with access to Digital Equipment Corp.'s VAX computers, including VMS applications.

The hardware and software product converts the IBM PC and VAX into coprocessing partners, according to Xyplex. It is available as an option for the Xyplex Distributed Network Processing System, which off-loads PC-to-VAX communications tasks from the VAX, preventing potential host overload.

The Xyplex system acts as a front-end processor, off-loading VAX I/O-intensive network processing tasks such as character echo and message formatting.

PC Xpander provides terminal emulation and PC access to VAX disk drives and storage devices, according to Scott Wieder, Xyplex product manager.

But Xpander provides PC and VAX users with direct file access to the same files, he said. The software for Vaxmate creates a virtual drive, requiring users to take an extra step in order to ac-

Continued on page 44

AT&T to expand digital net worldwide

BY ELISABETH HORWITT
CW STAFF

NEW YORK — Determined to outdistance its competition in the digital networking race, AT&T announced plans to spend $2.5 billion this year and a comparable amount in both 1988 and 1989 on expansion of digital networking facilities worldwide.

By the end of 1989, AT&T's digital communications systems will link 350 major U.S. cities, key points in Europe and Japan and locations in the Far East and Caribbean, the company said. AT&T's digital network currently links 215 cities in the U.S.

At a press conference, Roy Blount, president of AT&T's Network Operations Group, outlined goals for which the above funding will be allocated during the next three years. He said AT&T will have in place by the end of the year 103 AT&T No. 4 ESS digital switches, replacing some 300 analog switches around the country. As a result, 98% of all calls will be switched digitally by the end of this year; AT&T's goal for the next three years, Blount said, is to achieve 100% digital switching.

AT&T plans to increase its fiber-optic network's route miles from 11,000 miles currently in place to 24,000 miles by 1989.

The company hopes that by upgrading its network on such a massive scale, it will outdistance its major rivals, U.S. Sprint Communications Co. and MCI Corp., which are also racing to imple-

Continued on page 45

Apple linked

Third parties add value to Appletalk

BY PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — In the wake of Apple Computer, Inc.'s increasing emphasis on communications, a slew of third-party vendors announced Apple networking products at last week's Seybold Conference on Desktop Communications.

Kinetics, Inc. in Walnut Creek, Calif., extended its Fastpath product line to include Fastpath 3, an Appletalk-to-thin Ethernet gateway. The thin Ethernet version of the IEEE 802.3 standard uses thinner, less expensive coaxial cable. Because the cable carries signals over shorter distances without repeaters, thin Ethernet is designed for single-floor work-area networks.

Fastpath 3 enables Apple Macintosh and Laserwriter products to communicate over a thin Ethernet medium, using either Appletalk or Transmission Control Protocol/Internet Protocol (TCP/IP) networking software. The product also supports Apple's Communications Framework protocols.

Linking Appletalk to Ethernet, Fastpath 3 allows Macintosh users to access host computers, such as VMS- or Unix-based minicomputers, or an IBM Personal Computer. Fastpath 3 also allows use of Ethernet as a high-speed backbone linking multiple Appletalks.

Kinetics also demonstrated its new Ether SC, a small computer systems interface (SCSI)-based Ethernet controller for the

Continued on page 45

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Convergent

FROM PAGE 43

cess files that have been generated on the VAX, Wieder said.

While Vaxmate is DEC's PC offering, PC Xpander addresses users who want to integrate their installed base of IBM PCs, PC XTs and ATs into a VAX environment, Wieder added. He said PC Xpander goes beyond Vaxmate in three areas: PC-to-VAX control, VAX-to-PC control and task-to-task communication and control.

PC-to-VAX control allows the PC to access VMS applications such as DEC's Vaxmail from Microsoft Corp.'s MS-DOS, using DOS commands. PC users can use the VAX to back up and store files using any printer connected to any VAX on the system.

VAX-to-PC control enables the VAX to interact with the PC. Data or applications can be downloaded from the VAX to the DOS-based PC programs, such as Lotus Development Corp.'s 1-2-3, on the PC.

Remote communications

Users can run two sessions on the VAX and hot-key back to an application on the PC. In addition, PC-to-PC control makes it possible for local and remote PCs to communicate with each other.

PC Xpander software resides on the PC and the VAX. The PC software costs $375 for each IBM PC and requires 80K bytes of random-access memory. The VAX software ranges in price, depending on the host model, from $4,000 to $14,000.

Xyplex offers two types of hardware connectors linking PCs to the VAX. The Cluster Controller, priced at $2,475, is a terminal server that supports eight serial ports and has communications speeds of 9,600 bit/sec.

The internal PC Controller Card, which costs $695, permits faster communications speeds limited only by the IBM PC itself.

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Xpander

FROM PAGE 43

Convergent Cluster or Telecluster. The vendor plans to introduce a token-ring connection in a future release. PC Exchange will be available in the second quarter of this year.

CTIX 6.0, Convergent's implementation of Unix V.3, supports a wide range of networking environments through a Streams-compatible interface. Streams is a set of specifications for interfacing networking systems with the Unix V.3 operating system through AT&T's Transport Level Interface (TLI) and Transport Provider Interface.

CTIX 6.0 provides Streams-based support for AT&T's Remote File System and Sun Microsystems, Inc.'s Network File System — both distributed file systems — and Transmission Control Protocol/Internet Protocol. The advantage of TLI and Streams is that they isolate networking functions from the rest of the operating system, "So if an application is written for TLI, you can plug in any networking protocol without having to rewrite the application," product marketing manager Greg Powers says.

Telecluster is a combination of a Convergent Hub Interface installed at a wiring closet — or private-branch exchange — and data-over-voice adapters. It allows ordinary twisted-pair building wiring to support a voice channel and data transmissions at speeds of up to 1.8M bit/sec. across distances of up to 1,200 feet between workstation and wiring closet.

A hub supports four communications cards, each of which can link up to 23 IBM PCs or terminals with a Convergent S-Server. The cost for the combination is between $500 and $600 per user, depending on configuration.

The Multi-Protocol Communications Controller implements multiple communications protocols on Convergent's S/320 and S/640 departmental servers. A dedicated VMEbus-compatible I/O processor board supports up to 4M bit/sec. transmission. Initially, the Multi-Protocol Communications Controller supports bisynchronous IBM 3270, with X.25 and IBM Systems Network Architecture versions to follow.

Consumer Software to link users' LANS via MCI network

BY DONNA RAIMONDI
CW STAFF

GILROY, Calif. — Consumers Software, Inc. recently signed a contract with MCI Communications Corp. and released a gateway product that is intended to enable IBM Personal Computers on different types of local-area networks (LAN) to communicate via MCI's electronic mail service, MCI Mail.

The agreement should benefit medium-size and large corporations that have personal computer LANs, according to an MCI spokesman.

With the agreement and the new Network Courier/MCI Mail gateway, which is priced at $395, any number of remote LANs running the Network Courier can appear to the user as one LAN, according to Consumers Software.

The gateway allows PC users on a network to send electronic mail and DOS files to other LAN users via MCI Mail without leaving their current application program, the company claimed.

Will resell MCI Mail

Consumers Software will resell MCI Mail services as an extension to its Network Courier E-Mail package, which is priced at $995, for personal computer LANs.

The network can handle logical addresses for electronic mail distribution up to 500,000 registered MCI mail users, including subscribers who may not be running the Network Courier.

MCI Mail can be distributed in more than 40 countries, to 1.6 million telex terminals, or to worldwide locations through MCI's Print Mail hard copy delivery services.

Operates on Netbios LANs

The Network Courier/MCI Gateway operates on any LAN that supports the Netbios networking interface for Microsoft Corp. MS-DOS-based systems, including IBM's Token-Ring and PC Network and Novell, Inc.'s Netware operating system.

Applications written for Netbios, which are designed to access files and resources over a LAN, now have the ability to communicate between geographically separate LANs via the gateway and MCI Mail.

The gateway requires a minimum of 192K bytes of disk space on a network server and a Hayes Microcomputer Products, Inc.-compatible modem.

The gateway reserves 50K bytes of random-access memory so the user can access the network in background mode while running PC applications in the foreground.

Apple linked

CONTINUED FROM PAGE 43

Mac Plus unveiled at last month's Macworld show. Whereas Fastpath 3 links multiple Macintoshes tied to Appletalk — via the Mac's Appletalk port — to Ethernet, Ether SC links Macintoshes directly to Ethernet by connecting through the Mac's higher speed SCSI port. This provides a faster, although more expensive, connection. The unit features two SCSI ports so that it may participate in a chain of SCSI devices.

Available in March, Fastpath 3 will be priced at $2,750.

Tri-Data Corp. in Mountain View, Calif., announced a joint development project with Centram Systems West to provide IBM PC users with the same capabilities now available to Macintosh users under Tri-Data's Appletalk-to-IBM host gateway, the Netway 1000A Communications Server.

"We've been seeing a desire on the part of so many corporations to use the same LAN cabling system for their Macintoshes and IBM PCs," according to Alex Gernert, who is Netway's product manager.

File-transfer tool planned

Plans are to develop a product that will provide file transfer and IBM 3270 emulation capabilities to any IBM PC running Centram's Tops network software over Appletalk, Gernert said. The PC version of Netway 1000A is slated for availability in June.

Odesta Corp. in Northbrook, Ill., announced that its Multiuser Helix, Double Helix and Helix VMX software will support Apple's Appleshare and Appletalk networking software.

Multiuser Helix, a local-area network (LAN) shared-work environment, runs concurrently with Appleshare and can act as host for customized Helix applications on workstations networked through Appletalk.

Appleshare is also fully compatible with Double Helix, Odesta's applications generator and Helix VMX, Odesta's LAN-based multiuser applications environment that runs on the Digital Equipment Corp. VAX and uses Macintosh computers as intelligent workstations. Support of Apple's products by Odesta enables users to build departmental networking solutions in which Helix VMX, VAX and Appletalk systems act as application and peripheral servers for both Macintosh and Microsoft Corp. MS-DOS workstations, the company claimed.

Odesta also announced that Helix VMX will soon support MS-DOS, enabling IBM PCs to access DEC VAX/VMS host/data base servers. The PCs will be networked with Macintosh and VAX computers over Appletalk networks through Apple's new Appletalk PC Card. Through the use of Appletalk, workstations can communicate with VAX computers on Ethernet via a network bridge. Any application generated on a Macintosh using Double Helix will run on a VAX under Helix VMX.

Unix won't wait

CONTINUED FROM PAGE 43

been pushing a distributed file system of its own, and from Apollo Computer, Inc., despite the fact that Apollo is one of Sun's chief competitors.

Communication Machinery Corp. unveiled software that implements TCP/IP on an IBM Personal Computer and supports software applications written for the Microsoft Corp. networking interface, Netbios. It is priced at $250. Informix Software, Inc. announced that its Unix-based distributed data base management system will now support TCP/IP as well as AT&T's Starlan network.

Convergent Technologies, Inc. announced an implementation of AT&T's Unix V.3 that supports NFS and TCP/IP. And both NFS and TCP/IP were used to link more than 150 computers from 44 exhibitors on a demonstration network at Uniforum that was implemented by Excelan, Inc.

The Uniforum prototype was also the first network to run OSI and TCP/IP concurrently, according to participant The Wollongong Group. Coexistence does not necessarily mean communications, however. Most transmissions over the network used either one protocol or the other, not both.

Admittedly, Excelan, Communication Machinery and Charles River Data Systems, Inc. all demonstrated OSI-to-TCP/IP gateways on the Uniforum network. However, those products do not resolve protocol incompatibilities of OSI and TCP/IP, but rather bypass them.

The gateways enable systems to communicate through programs written at the application level, which does not apply to TCP/IP at all. One disadvantage of conducting communications at the application layer of the OSI model is that transmissions must first pass through all six layers below the application level, slowing things down considerably.

"A lot of people are saying that TCP/IP makes a good stepping stone to OSI," says Charles River Data director of software development William Swee. "But the migration will be harder than they think, particularly when it comes to resolving addressing conflicts in an internetworking environment."

As OSI becomes a commercial reality, products providing true, transparent TCP/IP-to-OSI conversion will be desperately needed for the increasing number of users who must still communicate while straddling two sets of protocols.

AT&T to expand

CONTINUED FROM PAGE 43

ment fiber-optic cable and digital switches. "The bottom line is that we intend to remain profitable while all this is happening," AT&T spokesman James Byrnes said.

"When it takes this much in terms of capital expense to upgrade, you have to be pretty sure of recovering all that in business. AT&T can, but I'm calling into question whether other carriers can do the same," Byrnes continued.

The expanded digital and fiber-optic facilities will provide customers with higher quality and reliability in voice, data and video transmissions, according to AT&T. They will also form the basis for future AT&T services, such as wideband packet switching and Integrated Services Digital Network, the company said

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NEW PRODUCTS

Network Management

Tandem Computers, Inc. has announced a very large-scale integration-based communications controller for its Nonstop systems, called the **6106 Asynchronous Communications Controller**.

The controller is a single board microprocessor-based unit that is said to manage data communications between a Tandem computer and remote devices such as terminals and printers.

The unit supports 16 separately configurable communications lines that run asychronous, point-to-point protocols.

The 6106 Asynchronous Communications Controller is priced at $5,760.

Tandem Computers, 19333 Vallco Pkwy, Cupertino, Calif. 95014.

Customer premise equipment

AT&T has unveiled its **Fax 3530D** digital facsimile machine.

Features of the Fax 3530D include a built-in keypad; automatic dialing; the ability to store up to 28 letter-size pages of information for automatic distribution to up to 80 locations; document security; thermal printing technology; and sequential polling.

The 3530D is a CCITT Group 3 standard machine. It is priced at $4,495.

AT&T, 100 Southgate Pkwy., Morristown, N.J. 07920.

Links

Masscomp Co. has announced that users of its MC5000 family of supermicrocomputers will be able to access IBM hosts through **MSNA/3270**, a terminal-emulation software package from Systems Strategies, Inc.

The software allows MC5000s to access IBM hosts over a Systems Network Architecture/Synchronous Data Link Control network by emulating the IBM 3274 cluster controller. Terminals and printers connected to an MC5000 can communicate with the IBM host as IBM 3278 terminals and 3287 printers. Prices for the MSNA/3270 start at $5,000 for the software and $7,640 for a package that includes the software and a Systech Corp. DCP-8804 communications processor board.

Masscomp, One Technology Park, Westford, Mass. 01886.

Fox Research, Inc. has announced a **line of gateways** to IBM and compatible hosts for its 10-Net local-area networking system.

The gateway product line includes Systems Network Architecture and Binary Synchronous Communication gateways for stand-alone communications and 10-Net-to-mainframe communications.

The products consist of software and an intelligent board with a coprocessor for use on the gateway machine. Functions for the gateway are executed in the background.

Up to 32 logical sessions are available for concurrent use across the network.

The LAN-mainframe gateways cost $1,995 each. The stand-alone gateways cost from $795 to $1,095.

Fox Research, 7016 Corporate Way, Dayton, Ohio 45459.

Protocol convertors

Develcon, Inc. has announced the **Model 717X Integral 3270** protocol converter.

The Model 717X is said to translate ASCII to Extended Binary Coded Decimal Interchange Code and control the selection of device types, transmission speed and parity. The unit is an integral Develnet resource, allowing any asynchronous ASCII device attached to the network to request and connect to it.

The Model 717X attaches remotely to an IBM 37X5 front-end processor at rates of up to 9.6K bit/sec. It is available with support for either 60 or 32 channels, full-duplex devices and ASCII to Systems Network Architecture/Synchronous Data Link Control or bisynchronous conversion.

The 16-channel model costs $5,000, and the 32-channel model costs $6,000.

Develcon, Suite E, 6701 Sierra Court, Dublin, Calif. 94568.

Electronic mail

Interactive Network Technologies, Inc. has introduced **Intermail**, an electronic mail system for Apple Computer, Inc. Macintosh users.

Intermail is composed of a central mail-server application and a desk accessory interface. It is said to allow both local and remote communication and file transfer.

Intermail requires any combination of Macintosh computers running current Apple system software in an Appletalk-compatible network. Features include multitasking server operation, multiple message types and zone support and password protection.

Intermail costs $299 for up to four users; $499 for five to 10 users; $749 for 11 to 20 users and $949 for more than 20 users.

Interactive Network Technologies, 20 Amy Circle, Waban, Mass. 02168.

Modems and multiplexers

A-O Electronics, Inc. has introduced the **GTX-100R**, an intelligent modem said to allow a remote caller to power a distant computer on or off.

The modem operates with personal computers and other systems powered via standard 115VAC power. It incorporates dial-back verification and password security, the vendor said.

The modem is Bell 212A compatible and features auto-dial and auto-answer capabilities.

The GTX-100R costs $895.

A-O Electronics, 2137 Flintstone Drive, Tucker, Ga. 30084.

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The Solution: Now, the *All Hands On C Video Workshop* gets staff up to speed faster and better than ever before, at far lower cost. The workshop contains six professionally produced video modules that teach the full features and capabilities of the C language from operators and expressions through pointers and structures.

Students review lesson content with workbook exercises, and each module builds practical programming experience with sample programs provided on the C Video Workdisk. The package includes the acclaimed text "Learning to Program in C" by Dr. Thomas Plum, international authority on C and technical advisor to Hands On Learning.

The Secret: Roeder and his company have helped thousands to master computers and software. The secret of their system is its focus on people: using human experience to teach technical concepts. "It's like learning by osmosis" says one student, "I had no idea I was getting so much. When the tapes ended, I just started programming."

The All Hands On C Video Workshop is available in VHS or Beta at $995, and other formats at additional charge. We are sure you will find it an exceptional value. However, if you are not fully satisfied, return it for a full refund for up to 30 days. To order, or for more information, please call us or send this coupon with your business card or letterhead. Thank you.

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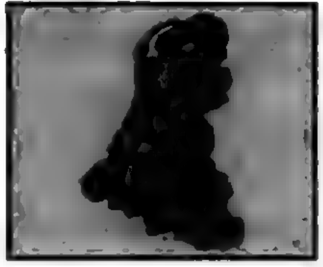

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1986 and 1987 Digital Review Target Award Winner

VIEW POINT

James Connolly

The Wang bandwagon

The recent fortunes and misfortunes of Wang Laboratories, Inc. make one wonder what it takes to offend some people — in particular, computer industry analysts, consultants and journalists who, as a group, have a knack for jumping off bandwagons.

It seems the time is right for industry observers to swipe their claws at Wang. They are doing it with IBM. They did it a few years ago with Digital Equipment Corp. It happens still more frequently with smaller companies. That is why it seems strange that in the midst of all Wang's troubles, the typical observation was, "Well, they have some problems, but. . . ."

The "but" was usually followed by a comment about Wang being on the way back, about Wang having the right idea or Wang making a good effort.

The closest things to good news coming out of Wang in recent months have been a re-

Continued on page 51

Telex adds to IBM 3270 line

BY JAMES CONNOLLY
CW STAFF

TULSA, Okla. — Telex Computer Products, Inc. last week filled out its IBM-compatible terminal and printer family with nine printers and terminals designed for the IBM 3270 market.

Telex claimed its products offer price advantages over similar IBM products and emphasized the ability of the Telex 3270 274 control unit to support windowing functions.

Telex announced three 3270-type display terminals. The Telex 3270 191 is a 12-in. display designed to be a lower cost alternative to the IBM 3191. It reportedly displays up to 1,920 characters and costs $1,235.

Telex claimed to be the only 3270-compatible voice/data terminal vendor and added color capabilities to that type of terminal with the introduction of the Telex C179 display terminal. The C179 reportedly features integrated telephony and multiple data communications with a 14-in., four-color display supporting up to seven windows. The C179 also was designed to support Digital Equipment Corp. VT220 emulation. It costs $2,995.

The third terminal is the Telex 046, which is a 15-in., single-station control unit designed for small cluster requirements in remote locations. Telex said the terminal is functionally compatible with the IBM 3276. It costs $2,495.

Telex enhanced its 274 controller by adding windowing support for display terminals and by adding support for the IBM 3179G Graphics Display Station. The windowing feature reportedly allows attached Telex

Continued on page 50

Data View

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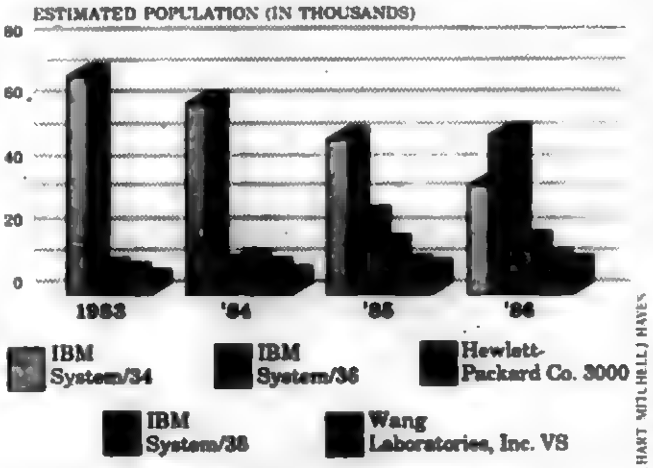

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CW CHART: MITCHELL J. HAYES

First binary tree-based system debuts

BY JAMES CONNOLLY
CW STAFF

NEW YORK — Fifth Generation Computer Corp. has announced the first system based on the company's binary tree parallel processing architecture.

Fifth Generation's Dado is initially targeted at applications such as signal processing, expert systems, speech recognition and data base searching. The Dado architecture was developed by the company's founders during research at Columbia University. Under the architecture, up to 8,191 processing elements can

Continued on page 51

Multiuser Mark 2E premiers

BY DAVID BRIGHT
CW STAFF

TUSTIN, Calif. — Point 4 Data Corp. recently introduced an entry-level multiuser system said to operate at 3.6 million instructions per second.

"The Mark 2E is the ideal system for the growing company," President William Rigby said. "A firm can get into multiuser computing at the low four-user price and have the starter system grow with the firm up to 17 users."

Priced at $11,395, an entry-level Mark 2E includes a proprietary 280-nsec CPU; 256K bytes of random-access memory; a 27M-byte hard disk drive; a 60M-byte streaming tape backup drive; a four-port multiplexer; and a license for the company's Iris operating system.

A 143M-byte hard disk drive and a 1M-byte floppy disk drive are optional on the Mark 2E. The system can be expanded to 16 asynchronous ports in four-port increments.

Applications software written for the machine with Iris Business Basic and Basic compilers from other companies take advantage of the operating system's powerful data management functions, the company said.

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Module extends multiuser system

BY ALAN J. RYAN
CW STAFF

SAN JOSE, Calif. — Counterpoint Computers, Inc. has released a four-processor expansion module that extends its System 19K multiprocessor computer from six to 10 processors and to 96 user I/O ports from an original 56.

Customers can reportedly add Motorola, Inc. 68020-based application processors, Motorola 68000-based 10-port terminal processors or 68020-based display processors in any combination to increase computer power, I/O ports or graphics processing capability.

The expansion also offers support for up to nine tightly coupled, bit-mapped graphics displays.

Powerful graphics cluster

Counterpoint claimed that with the expansion module a powerful six-display graphics cluster can be configured at a cost per station that is about 15% less than the cost of stand-alone workstations of equivalent power.

System 19K is a Unix-based system that begins as a six-user unit containing a 16-MHz, 68020-based main processor board, a file I/O processor and an optional Motorola 68881 floating-point coprocessor.

The package, 5 inches in height, incorporates a half-height, 100M-byte Winchester disk drive, six or 16 RS-232C terminal ports, a parallel printer port, an SCSI port and an Ethernet port.

Other expansion modules support additional mass storage to 700M bytes and interfaces to the Intel Corp. Multibus and VMEbus.

The system incorporates a System Composition Bus (SCB) that addresses all 10 processor boards and an Interprocessor Bus (IPB) that serves as the system bus addressing seven processor boards. In extended multiuser configurations, the IPB will absorb interprocessor traffic, which leaves the SCB to operate as an I/O bus.

The vendor said a 66-terminal system configured with three 68020 CPUs, six terminal processor boards, 400M-byte disk storage and cartridge tape backup would cost less than $50,000 in OEM quantities.

Multiprocessor version

To work with the System 19K, Counterpoint is offering a multiprocessor version of AT&T's Unix System V Release 3.0.

The C-XIX 3.0 operating system complies fully with the AT&T System V Interface Definition, the vendor said.

The C-XIX 3.0 will be provided as a standard feature of Counterpoint System 19K units shipped beginning in April. Upgrades will be free to existing customers through June and will cost $500 thereafter.

Controller gives remote support

WALTHAM, Mass. — Cambex Corp. has introduced a controller designed to let technical support staff control an IBM Series/1 from several miles away.

The Cambex Certainty 610-31 attachment lets users set up a duplicate Series/1 system console at a remote location. A typical use would be in conjunction with a central Help desk supporting users in other locations.

The support staff can modify system software, issue commands, carry out an initial program load and restart or input data. The product also allows technicians to provide round-the-clock support from consoles in their homes.

The controller was designed to reside in any I/O card socket in the Series/1 or the IBM Model 4965 I/O expansion unit. It costs $2,450.

Telex adds

CONTINUED FROM PAGE 49

or IBM coaxial displays to configure up to four display windows of four different host sessions. Sessions can be chosen from one or two IBM hosts as well as multiple ASCII hosts.

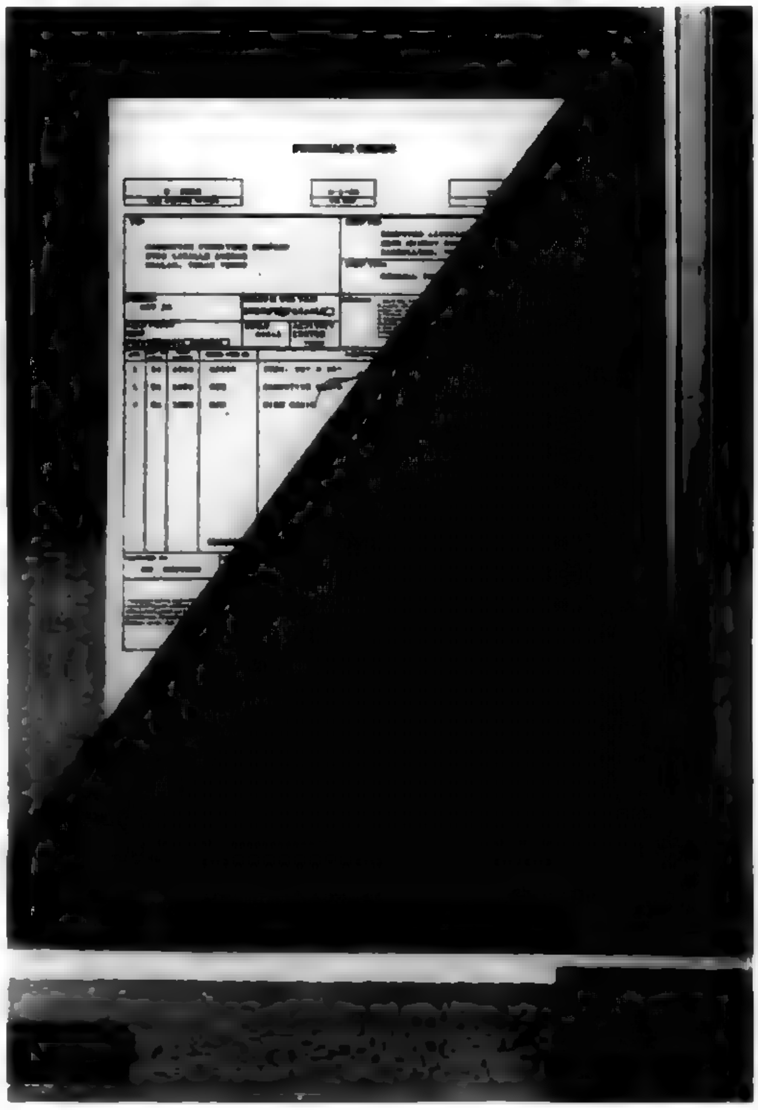
The company said the 274 Multiple Logical Sessions feature is a prerequisite and that data can be copied from one window to another, even if one window is an ASCII session.

The company said support for the IBM 3179G enables that graphics station to utilize all-points-addressable graphics support from a host. Multiple Logical Session support costs $1,750. The windowing feature costs $1,500. The IBM 3179G support is a no-charge option.

The printers include the Telex 201 matrix message printer, supporting draft-mode print speeds of 220 char./sec. and costing $545. The Telex 851 is an ink-jet printer with a noise level of less than 50 db that prints 220 char./sec. in draft mode. It costs $775.

The Telex 187 is an impact matrix printer designed as an alternative to the IBM 3287 and operating at 200 char./sec. in draft mode. It is priced at $3,995. The Telex 262 is designed as an alternative to the IBM 3262 Model 3 line printer and operates at 600 line/min in data processing mode. It costs $13,800.

Now use your computers to create, fill in and distribute all your company's forms.
And save your company millions.



Your computers have given your company paperless typing, paperless filing, and paperless mailing.

Now the paperless *form* is here, the "electronic form." It's already working in hundreds of installations worldwide and creating a virtual revolution in productivity.

Create, process and manage forms on your computers.

The technology of Electronic Form Systems integrates form creation, processing *and* management. So everything your employees do with paper forms, they can now do with electronic forms. But with much greater efficiency.

They can fill them in. Route them. Approve them. Revise them. File them. Even distribute copies. And when printed out on paper, electronic forms look like the forms they use now.

Create new forms for less.

Now, when someone in your company needs a form, they set type, they do artwork, and they get it printed. It takes weeks.

But a new electronic form can be created *and used* in less than two hours. It's done on a Formcoder workstation, and it doesn't take a programmer; a good word processing operator can do it.

The new form can be sent to field offices through your computer network. The expense of shipping paper forms between offices is eliminated.

Cut storage and inventory costs.

Electronic forms are stored in your system so most of your company's present cost of forms inventory and warehousing can go right to the bottom line. You can store as many as 5,000 different forms on an IBM Personal Computer AT® or PC XT®, an unlimited number on your mainframe.

One major insurance company projects annual savings of $1.8 million in warehousing costs alone.

With electronic forms, supply always equals demand.

Your company will never run out of

Wang wagon

CONTINUED FROM PAGE 49

structuring of the high end of its VS minicomputer line, promises — once again — of a new high-end system and resource sharing facility sometime in the future and company claims that order rates are picking up.

On the down side, Wang has suffered massive financial losses, layoffs, production line delays, operating system bugs (which the company says have been corrected), continued user complaints about service and support and the assorted headaches that come when a company's founder steps into the background and leaves the president's job to his son.

In addition, Wang has had to watch its Massachusetts neighbor, DEC, reap profits and positive publicity at the expense of every computer company's chief rival, IBM.

Objective criticism

Despite that down side, the criticism of Wang seems to have remained objective and restrained.

Analysts say, for example, that the management change was overdue, the software seems to have been fixed and the ultra-high-performance CPUs are less crucial to Wang users than customers in other markets.

In that respect, Wang has been lucky. Consultants and analysts have turned on companies for much more minor problems than those Wang has endured, even where those companies have had the best of intentions and made their best efforts.

Finally, the user community appears to have remained loyal to Wang. Wang users are as vociferous as any other customers, and sometimes more so, when they have complaints.

But rather than looking for an excuse to dump Wang, the users seem to be encouraging the company to make the necessary technological and management changes.

With that kind of support, Wang cannot blame the consultants or customers if the current revival efforts fail. The company is getting a fair shake.

Wang adds tape drives to replace 2219V family

BY JAMES CONNOLLY
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. recently announced two tri-density tape drives designed to run with its higher performance minicomputers and replace the existing Wang 2219V tape-drive family.

Wang officials said the 2248V-1 and 2248V-1S offer improved reliability and greater capacity for backup and restore.

The drives are intended for use with Wang's VS 85, VS 100, VS 300 and VS 7000 series systems. They run at 75 in./sec. and record at 800 bit/in., 1600 bit/in. and 6.25K bit/in. They use 10½- by ½-in. open-reel technology and feature automatic thread and load and automatic error detection and correction.

The 2248V-1 acts as a master unit and the 2248V-1S is an add-on unit, with each 2248V-1 able to support three add-on drives. The master unit costs $32,000 and the 2248V-1S costs $27,000.

Binary system

CONTINUED FROM PAGE 49

be strung together in tree-root fashion.

Dado uses Motorola, Inc. 68020 microprocessors as processing elements and features 128K bytes of local memory for each element. The processing elements are connected via proprietary direct memory-access circuitry.

"Dado uses a directed architecture to bring the power of parallel processing to the execution of specific classes of applications. Until Dado, the hardware platform needed to develop and run complex, advanced expert system and signal processing applications has not been available," said Leslie Hersh, vice-president and general manager of Fifth Generation.

> "DADO uses a directed architecture to bring the power of parallel processing to the execution of specific classes of applications."
>
> LESLIE HERSH
> FIFTH GENERATION COMPUTER

Dado can reportedly be used as an attached processor or accelerator to a general-purpose system or workstation.

Fifth Generation has several agreements in place in connection with development of Dado, including contracts with AT&T for developing a real-time speech recognition system and through AT&T with the Defense Advanced Research Projects Agency.

A configuration with eight processing elements costs $25,000 for digital processing and $32,000 for signal processing. A configuration with 512 processing elements costs $575,000 for digital processing and $750,000 for signal processing.

With the Formcoder Workstation you can create electronic forms that look like your paper ones. It doesn't take a programmer; a good word processing operator can do it. The workstation is based on the IBM Personal Computer AT.

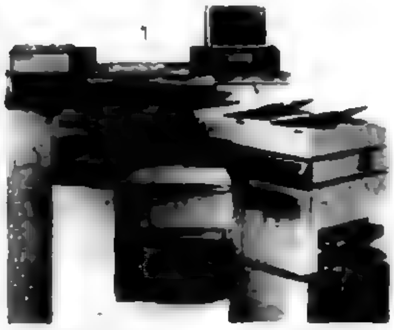
electronic forms. So employees don't waste time and delay revenue trying to replenish form supplies. Supply always *equals* demand — exactly.

One major insurance company produces 15,000 policies every night using electronic forms. They are never short a single policy page.

Obsolete forms no longer waste your company's money.

Needs change, laws change, and suddenly a lot of your paper forms aren't worth the paper they're printed on. One major bank estimates that out-of-date forms were costing them $35,000 per month.

Electronic forms eliminate this waste entirely. When a form goes out of date, you just move it to another computer file and put the new one in its place.



Laser printers print the form and the information that goes on it at the same time. No one has to align paper forms in an impact printer, then burst, assemble, and collate.

More accurate and efficient data entry.

Electronic forms can improve the quality of data.

Data entered for an electronic form can be transferred to your mainframe. In many cases, that means you can eliminate the tedious and error-prone step where someone copies information off a paper form and enters it. The person who fills out the form has *already* entered it. Data is captured at the source, and some of the people who now do "heads down" data entry can be reassigned to more productive tasks.

Finally, break the speed limit of paper.

Electronic forms are faster.

They can be filled in faster. The computer can automatically fill in standard information like a customer's address. When the same information goes on several pages, you enter it once; the computer puts it in all the right places. (A title company went from six sets of documents per person per day to thirty-six.)

Electronic forms can be printed more efficiently. Laser printers print the form and the information that goes on it at the same time. *Nobody has to align paper forms in an impact printer, then burst, assemble, and collate.*

And electronic forms get where you want them to go faster than paper ones. They go through your network instead of interoffice mail.

Works with your existing system.

Electronic forms can be used with the computers you already have. They work in your IBM environment with your existing applications software. You don't have to turn your department upside down or scrap any of your present applications investment to start using them.

You can implement electronic forms as a centralized system based on your IBM® mainframe or a distributed system using IBM personal computers. And you can use many different brands of printer.

Liberate your company's forms from paper.

With electronic forms, you can streamline thousands of tasks and make your forms the efficiency tools they were intended to be.

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NEW PRODUCTS

Processors

Infotek Systems has introduced the **AM380**, an 8M-byte memory board for Hewlett-Packard Co.'s 9000 Series 200/300 technical workstations.

The AM380 is said to allow users to take advantage of the maximum 7.5M-byte storage capacity of the workstations with a single card that occupies only one I/O slot. It is said to provide an access time of 200 nsec. and a cycle time of 400 nsec.

With special programming software from Infotek, users can configure their systems to use the full 8M bytes of storage capacity offered by the AM380, the vendor said.

The AM380 is priced at $5,600.

Infotek Systems, 1400 N. Baxter St., Anaheim, Calif. 92806.

Data storage

Distributed Logic Corp. (DILOG) has introduced a multipurpose disk controller, called the **MQ606**, said to permit the mixing of Winchester and floppy disk drives on a single Q-bus or Digital Equipment Corp. Microvax interface.

The dual-size controller allows a maximum of two ST506 Winchester drives and two SA450 floppy disk drives to be interfaced. Both 5¼-in. and 3½-in. form factors can be handled for both types of drives.

The MQ606 is priced at $1,450.

DILOG, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

Data terminals

Tektronix, Inc. has announced a **16-in. display monitor** as an option to its 4120 series of intelligent color graphics workstations.

The monitor is said to offer 1,280- by 1,024-pixel resolution and a 60Hz noninterlaced refresh rate. It comes with a tilt and swivel base that provides 20 degrees of tilt and 360 degrees of swivel.

The 16-in. monitor interfaces to the 4120 series via standard 4120 series cables and connectors.

As a field kit for current 4120 series owners, the monitor costs $3,950. It can be used to create a dual monitor configuration.

Tektronix, P.O. Box 500, Beaverton, Ore. 97077.

Printers and plotters

Versatec, Inc., a Xerox company, has introduced a **44-in.-wide electrostatic plotter.**

The plotter is said to produce images at either 200 or 400 point/in. resolution on opaque paper or polyester film. It can produce color hard-copy output as well as create monochrome plots at speeds of up to 1 in./sec.

The list price for the 200 point/in. electrostatic color plotter is $72,500. The 400 point/in. model costs $82,500.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

CAD/CAM/CAE

Telesis Systems Corp. has announced a 32-bit accelerator for use with its EDA-300 and 700 Design Workstations, called the **EDA-610 Workstation Processor.**

The EDA-610 is said to deliver 1.7 million instructions per second of processing power. It consists of a Sun Microsystems, Inc. 3/52 computer, a black-and-white graphics terminal, 4M bytes of system memory, a 70M-byte Winchester disk, a ½-in. tape cartridge and one Ethernet-based communications drop. It supports Unix-based applications such as the vendor's Insight router.

The accelerator costs $15,000 for the hardware configuration; the software license fee for the Insight router is $10,000.

Telesis, Two Omni Way, Chelmsford, Mass. 01824.

Graphics systems

Force Computers, Inc. has introduced the **AGC-1**, a very high resolution VME-bus graphics engine.

The AGC-1 is said to be capable of computing 1,600 by 1,280 pixels with 16 colors or 1,160 by 870 pixels with 256 colors. It comes with 2M bytes of dual-port video random-access memory and can be integrated with very high resolution CRT displays capable of a wide bandwidth between 32 and 64 MHz.

Capabilities implemented by the AGC-1 include hardware zoom, smooth scrolling, clipping, direct palette access, windowing and red-green-blue outputs.

The AGC-1 is priced at $5,995.

Force Computers, 727 University Ave., Los Gatos, Calif. 95030.

Jupiter Systems, Inc. has introduced its **Satellite** line of color graphics display subsystems for use with Sun Microsystems, Inc. workstations.

The line offers graphics and imaging capabilities. It has a resolution of 1,280 by 1,024 pixels and frame-buffer configurations with up to 28 bit-planes of image memory per pixel.

Satellite costs from $15,000 to $30,000.

Jupiter Systems, 1100 Marina Village Pkwy., Alameda, Calif. 94501.

JUNE 8–14, 1987

COMPUTEX
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Taipei World Trade Center
Exhibition Hall

Looking for new computer products and their suppliers?
This is one trade show that you must include on your travel schedule.
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COMPUTERWORLD

SPOTLIGHT

SNA NETWORK MANAGEMENT TOOLS

After-the-fact problem solving and piecemeal planning won't work with today's networks. The job of managing these increasingly critical business support structures calls for a kit of automated tools.

FEBRUARY 2, 1987/SPOTLIGHT NO. 2

Introducing... Computerworld DIAL-INQ

Now you can request immediate information about products in this SPOTLIGHT section with just one phone call.

Now you can request immediate information from many different companies with just one telephone call. All you need is DIAL-INQ, *Computerworld's* new telephone-access inquiry service. Instead of having to call individual companies for valuable data on their products or services, you can request the information you need in just a matter of minutes.

How? That's easy. Virtually all you do is identify the respective DIAL-INQ reader service numbers assigned to the advertisements or product listings within the SPOTLIGHT section — and then directly input them via touch-tone telephone. *Computerworld's* DIAL-INQ service takes care of the rest.

What's more, DIAL-INQ is accessible seven days a week, 24 hours a day! Plus — you can inquire about products and services up to three months after each *Computerworld* SPOTLIGHT issue is published.

If this is your copy, this is where you'll find your 7-digit DIAL-INQ subscriber number.

··············· 5-DIGIT 01701
CW XXXXXXX -8 V
John Doe
Company, Inc.
123 Computerworld Drive
Everywhere, MA 01701

If the label does not bear your name, call 1-413-637-0605 (9:00 A.M. to 9:00 P.M. EST, Monday through Friday) and ask for *Computerworld's* DIAL-INQ service. An operator will then assign you a 9-digit DIAL-INQ subscriber number which will become active immediately.

Use Computerworld's DIAL-INQ to request information as quick as a wink. Here's how:

Please note: You will be asked to use the "star" (*) and the "pound" (#) symbols on your touch-tone telephone set during your telephone call.

1. Write your DIAL-INQ subscriber number in the boxes in step 4.

2. Identify those products/services for which you're requesting more information. Write their respective DIAL-INQ reader service numbers in the boxes provided in step 6.

3. Call the *Computerworld* DIAL-INQ inquiry service via touch-tone telephone and wait for the recorded instructions.

Dial 1-413-637-3170 anytime, 7 days a week, 24 hours a day.

4. When prompted by the instructional recording, enter your DIAL-INQ subscriber number and symbols as recorded below.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ # #

5. When the recording says, "Enter magazine code and issue code," enter these numbers and symbols:

1 4 5 # 7 0 5 # #

6. You will be prompted to enter the DIAL-INQ number, including the symbols, for the first product/service you've identified below. You will be prompted to repeat this step as needed to input additional DIAL-INQ numbers.

To key in more than 17 inquiries, simply make another telephone call once you've signed off from the first.

1. ☐ ☐ ☐ # #
2. ☐ ☐ ☐ # #
3. ☐ ☐ ☐ # #
4. ☐ ☐ ☐ # #
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17. ☐ ☐ ☐ # #

7. Complete your phone call by entering the following symbols:

# #

You've now successfully completed your inquiry call to *Computerworld* DIAL-INQ. Remember . . . you can make as many phone calls as you wish — and request information about products/services in any SPOTLIGHT section up to three months from the issue date.

INSIDE

Product Face-offs
IBM's Netview and Cincom's Net/Master network management packages square off while response-time monitors from Chicago-Soft and Uccel are chosen to challenge IBM's NPM. Pages S4 and S13.

Q & A
Mario Morino of Morino Associates discusses market trends, IBM's networking strategy and the need for an integrated approach to information management. Page S5.

Service Delivery
An automated problem management package helps Federal Express keep tabs on its 28,000-terminal network. Page S7.

Vendor Viewpoint
Multiple session products permitting easy access to CICS, IMS and TSO have caught on among IBM mainframe users. Page S15.

At a Glance
Two easy-reference charts of performance monitoring and capacity planning packages for IBM SNA networks. Pages S23 and S24.

SENIOR EDITOR
Joanne Kelleher
ASSOCIATE EDITOR
Penny Janzen
RESEARCHER
Sally Cusack
DESIGN CONSULTANT
Ronn Campisi
DESIGN EDITOR
Marjorie Magowan

Cover illustration:
Tim Lewis

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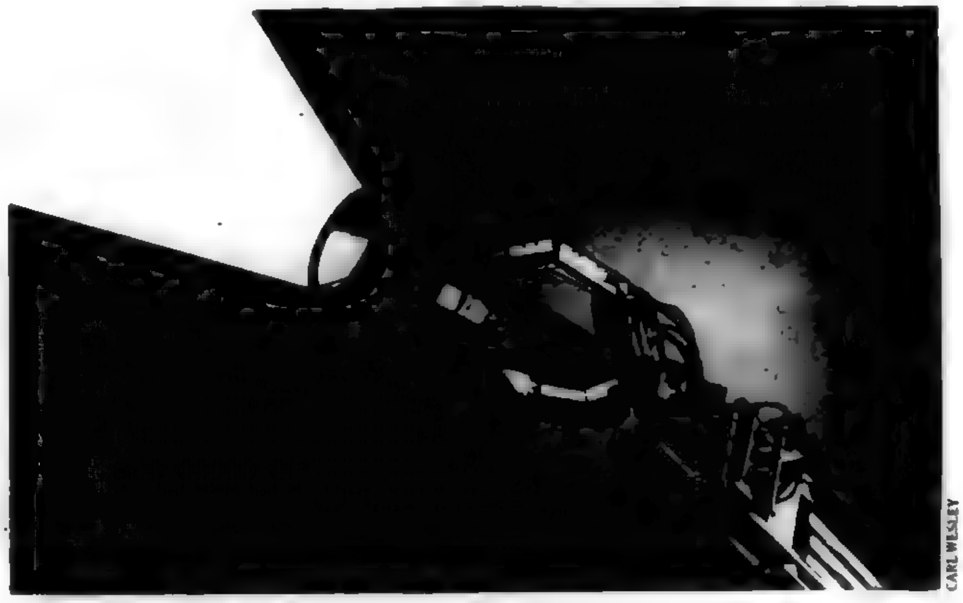
Telecommunications technology is burgeoning, but without strategic controls, networks can wind up awash in confusion.

CONTROLS FOR WIDER REACH

BY THOMAS W. MCDONALD


CARL WESLEY

In 1690, Isaac Newton was questioned about the preponderance of new theories in physics and related sciences that were being put forward by himself and his contemporaries. "The world of science advances slowly, pedantically, certainly, always in a direction toward greater knowledge. This movement forward is powered by periods of brilliance when new ideas burst forth to uncover new possibilities, new beginnings."

Telecommunications technology is currently in the midst of one of those Newtonian periods of brilliance. New beginnings and new possibilities for the users of information systems are in abundance.

Technology in the telecommunications arena has been advancing at a prodigious rate, especially in the area of end-user interconnection with centralized and distributed informational data bases.

Users who had been isolated from information systems or tied to specific sources of information have recently found themselves able to freely access multiple data bases, not only inside their corporate network but outside it as well.

Integrating these options into the working system, in conjunction with evaluating new options for the sharing of transport facilities between previously segregated varieties of information — for example, voice, data and video — presents a formidable task for the network manager.

Network managers have realized that without sound strategies of network management, new technologies will bring no benefits to the network user. They have learned that without such strategies, the network does not deliver service in a reliable and consistent manner and that to implement new technologies on top of existing management structure will compound the many problems that are already apparent in managing networks today.

Today's network plays an essential role in the strategic plans of all types of businesses. Travers Waltrip, vice-president of telecommunications for The Travelers Corp. in Hartford, Conn., says, "What we manufacture is knowledge. We are a knowledge company. The capability and flexibility of our data network plays a key role in our corporate strategy. Without it, our product doesn't get delivered. It's that simple."

Bill Won, vice-president at Chemical Bank in New York, says, "We all know that the availability of information is key to the enterprise being able to do its business. The network is the conduit between information and the end customer. In the financial services industry, where we must tie into external networks and are often faced with government regulations concerning timely delivery of information, the ability of the network to provide consistent, reliable service is an absolute must."

Network management is equally critical in the communications industry. "If a network fails or

---

McDonald is a founding partner and principal consultant of MGT Technology Group. The firm is headquartered in Waltham, Mass., and provides software, consulting and education for network and host performance management and planning.

WITHOUT THE DATAPHONE II SYSTEM,

WE KEEP YOU UP AND RUNNING.

Behind the frantic scenes of a typical trading floor, a family's at work, keeping everything under control.

2248 Analog Switched Network Modem

The DATAPHONE® II System family from AT&T is a series of integrated data communications products designed to keep a computer network up and running. By constantly monitoring and measuring it, the DATAPHONE II Network Management System enables the network to handle the tremendous flow of buy and sell orders.

2024T/2048T Modems

With millions of dollars traded every minute, consider what a half-hour of downtime would add up to. And what the same amount of downtime would cost *your* company.

Little wonder why having reliable data communications equipment is so critical.

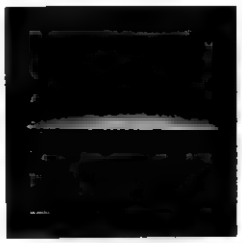
BRAINS RUN IN THE FAMILY.

Each member of the DATAPHONE II System family has vast ability. There are *Analog Modems* for point-to-point or multi-point applications. *Data Service Units* provide digital data transmission at a range of speeds along with the capability to handle added diagnostic tasks through our network management system. *Multiplexers*, an important part of network management, channel a number of low-speed lines into one efficient high-speed link.

2600/2700 Series DSU

DATAPHONE II *Network Management Systems* are the nerve centers of the family, permitting you to monitor and manage your network and keep

THIS PLACE WOULD BE CHAOS.



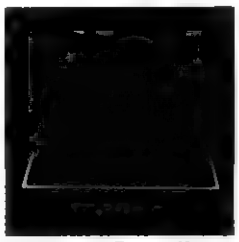
724 T-MUX

your system up and running. Finally, AT&T's *Maintenance Operation Control Centers* (MOCC) provide remote monitoring and testing of your network—and dispatch our service staff should the need arise.

By enabling each component to interact synergistically, the DATAPHONE II System takes your mind off computer networks and puts it back on business.

WE MAKE THE PIECES FIT.

The fact that AT&T is a leader in data communications equipment should come as no surprise. After all, we built, manage and service the largest network in the world. We know firsthand the benefits of an integrated system.



System Controller

And why a whole system, rather than stand-alone pieces, is what keeps your network up and running.

For more information about the DATAPHONE II System, call your AT&T Account Executive, or call 1 800 247-1212.

It can have a calming effect on your workplace.

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AT&T

The right choice.

Controls

FROM PAGE S1

communications industry. "If a network fails or behaves in a degraded mode," says Jerry Vidlak, network specialist at Centel Corp. in Lincoln, Neb., "it has a serious impact on the performance of our company.

"A network operating at less than acceptable levels means customers' orders go unfilled, inventory backs up and personnel sit around idle," Vidlak continues.

In the oil industry as well, smooth-running network operations are a must.

As Blake Wood, network design specialist at Chevron Information Technology Co. in San Ramon, Calif., explains, "Successful network operations can be directly related to successful corporate operation.

"The network has got a whole lot of attention here over the last few years, basically due to the Gulf merger," Wood continues, "but also because we moved one of our major data centers.

"I don't have to say how high up the repercussions can be felt when the network is a visibly failing component during these types of activities," he says.

> "A network operating at less than acceptable levels means orders go unfilled, inventory backs up and personnel sit idle."
>
> JERRY VIDLAK
> CENTEL CORP.

One does not have to understand the intricacies of telecommunications or even data processing to relate to many of the problems that result when a network does not deliver expected service.

Users certainly notice when there is a problem and react to it, even though they do not know or particularly care about the exact cause.

To get an idea of the havoc that interruptions in network performance can cause, just think of some of these all-too-familiar scenes:

- Backed-up lines in front of an automated teller machine.
- Waiting on hold for a long period of time when you are attempting to make airline reservations.
- A satellite launch postponed at the last minute.
- Long lines at department store check-out areas during a busy shopping season.

Some of the problems that networks experience are less public but equally devastating to an enterprise.

- An insurance agent chooses to write a policy with an alternate agency because the dial-up connection to his initial selection fails.
- A roomful of entry clerks sits idle.
- A money transfer to the Federal Reserve System does not make a deadline, resulting in millions of dollars in interest payments being lost to a financial institution.

These are extreme instances; but everyday events have no less of an impact on corporate performance than the more dramatic instances.

Centel's Vidlak, for instance, notes that his company's network handles warehouse scheduling and inventory checking for customer orders in addition to handling work force scheduling and delivery personnel assignment.

If a network like this one were to repeatedly have trouble while performing ordinary, everyday tasks, it would have just as critical an impact on the corporate profits and on the network manager's career as one that causes a space shuttle launch to be scratched.

Well-managed network

What is it, then, that distinguishes a well-managed network, and what is it that users expect from a network?

Well, there are a number of criteria by which a network can be judged:

Reliability. The end user has come to look upon the network as a utility. It is as indispensible to the operation of his business as electricity and the U.S. mail.

User companies cannot be expected to put up with anything more than occasional outages to stay in business.

Adequate levels of service. Adequate performance of the business is tied to adequate performance of the network.

When the network service slows down or becomes inconsistent, so does the business's ability to deliver to its customers.

When the end user's service-level expectations are not met, then tasks are not completed on time, local business goals are not met, budgets are overrun and overall corporate business plans fail. Degraded network service translates directly into lost productivity.

Timely resolution of system performance problems. The end user will forgive the network if the problem is fixed quickly and does not reoccur within a reasonable period of time.

Accommodation of new requirements. When the end user determines that a new feature, available through networking, will contribute to his competitive edge, he expects prompt implementation of this feature.

Continued on page S6

PRODUCT FACE-OFF
Netview vs. Net/Master

BY THOMAS W. MCDONALD

IBM's Netview and Cincom Systems, Inc.'s Net/Master have the same purpose — to provide a single presentation structure at a host-based terminal, which then allows a network manager to manage the operation of the physical network from the same place that he manages the operation of the logical network.

Hence, component failures are flagged and diagnosed from the same location as are failures in end-to-end logical sessions.

From this single presentation structure, a network manager can be alerted to a network's failure to meet service criteria and can investigate the cause of that failure and remedy the problem by treating its source or by activating backup resources.

Focal-point applications

Both Netview and Net/Master are focal-point applications in IBM's Open Communication Architecture strategy and receive their data from the same sources — Systems Network Architecture (SNA) network components sending information through VTAM.

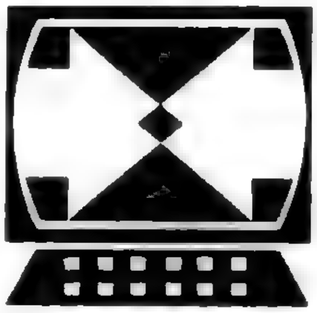
IBM's Netview/PC, announced in September and scheduled for delivery in the first quarter of this year, will allow these products to monitor data from non-SNA sources.

Like Netview, Net/Master is a standard VTAM application and requires no VTAM facilities that are not commonly available. It does not require any of the Netview facilities to run. In other words, Cincom has written its own versions of Network Problem Determination Application, Network Logical Data Manager and so forth.

Net/Master has the advantage over Netview in two areas, both of which are rooted in the sophisticated fourth-generation language that Net/Master provides for coding user procedures — Network Control Language (NCL).

Net/Master allows the programmer to write sophisticated procedures in NCL, which handle routine operational tasks, implement automatic recovery procedures in response to component failures and provide automatic problem diagnosis and resolution.

IBM's Command List (CList) facility also allows precoding of relatively simple command sequences that can automate many standard network operational tasks; however, as the procedures become more involved, use of CList can prove to be cumbersome and time-consuming.



For example, when creating programs to respond to network alerts and alarms with appropriate diagnostic and remedial action, the advantages of NCL become clear..

In fact, users tend to attribute qualities to NCL that one would expect to hear in reference to an expert system. "NCL allows us to pull off activities that we couldn't do at all, or only under great difficulty, if we were left to using CLists," says Jerry Haas, host support specialist at Northwestern Mutual Life Insurance Co. in Milwaukee, Wis.

"We had a network control program (NCP) that was repeatedly entering NCP SLODOWN. We traced the problem to our interface with a public packet data network. Essentially, someone was hanging up and a DISCONNECT wasn't occurring. Volumes of garbage were getting sent up the line, and the NCP was flooding.

"This was serious," Haas continues. "The network essentially was shutting down when we entered this SLODOWN situation."

Haas's group was able to set up an NCL procedure in Net/Master that recognized the problem session and issued a DISCONNECT before the user actually hung up.

The problem has not yet been corrected at the source, but from the network users' perspective, the problem is fixed.

"We've treated other problems the same way, using NCL procedures to treat the symptoms," Haas says. "It gives us time to catch our breath and fix the problem at the source in a methodical fashion. It is a robust language that our systems people get more excited about every day."

As networks get larger and as network expertise becomes more diluted, the ability to automate the responses of trained personnel to crisis situations will become more important.

Cross-domain

Net/Master's second advantage, though less striking than the first, lies in the area of cross-domain communications.

Both IBM and Cincom recognize that as the size of a network grows, it becomes increasingly difficult for a single operator to monitor and manage the network.

Because the volume of operational alert messages coming into VTAM is so large, the messages often roll off the screen and into the log before they are seen.

Therefore, it makes sense to segment the network logically into various levels of operation, whether based on application, geography or business classification.

At the same time, however, it is necessary to maintain the ability to implement operator commands from a central facility.

Net/Master, through NCL, maintains an advantage in its cross-domain communications by allowing commands to remote domains to be issued and carried out without the Net/Master operator establishing a logical session with those domains.

This can play an important role in recovery operations when backup procedures may cause operational impacts across multiple domains.

A user of the IBM tools who works at a large lumber and paper products company in the Northwest counters, "I approximate this facility by using an IBM 3290 multisession CRT.

"I have four sessions going on simultaneously and can roll from one to the other at a keystroke. It doesn't give me the complete assistance the process in Net/Master does, but it's close," the user says.

"The important item for me is whether or not I can gather critical operational data from any domain at my one central location. And I can do that with Netview," he continues.

IBM provides more than 150 CLists with Netview, but any user who wishes to implement automated tasks in a sophisticated manner must perform a lot of customization.

In the view of Chip Jarnagin, manager of network software at Southland Corp. in Dallas, IBM has some catching up to do in this area.

"Sure, this is IBM playing catch-up. But as we've seen over and over, if you're able to practice a little bit of patience, you will be delivered a whole lot — an up-to-date solution, fully supported and which integrates fully into your overall network and host system strategies."

INTERVIEW

TOWARD TOTAL IS MANAGEMENT

BY THOMAS W. MCDONALD

Morino Associates, Inc. has been providing products and services for the management of information systems (IS) since 1973. The company's flagship product is the Morino Information Control System (MICS). The integrated MICS data base and MICS applications, which were expanded in 1986 to include support for IBM network data, provide the basis of a complete IS management system.

Morino Associates offers two other products that contribute to an IBM Systems Network Architecture (SNA) management strategy. TSO/MON assists management and technical personnel in understanding and controlling IBM's TSO. The Problem Alert System — also known as the Software Management System — locates known, unresolved, high-impact systems software problems as well as their related fixes.

Mario Morino, cofounder, chief executive officer and president of Morino Associates, has been at the forefront of information systems management for more than 20 years. He was interviewed recently at the company's headquarters in Vienna, Va.

Many people perceive Morino Associates as providers of industry-standard products in information control systems for the IBM mainframe and I/0 arenas.

At one point in time, the perception was accurate that our firm provided information control systems for the mainframe and the I/0 arenas, which were mainly focused on the capacity planning and performance management areas. However, we have always provided products directed at the broader problem of overall IS management while offering specialized solutions for particular technical disciplines.

Our purpose is to provide products and services that can be used to establish a total IS management system.

Who do you see to be the users of the information you provide in networks? Are you selling to the same people that you are selling to in the host arena?

In some organizations, users are the same individuals with whom we have dealt in addressing mainframe issues. In other enterprises, our users are the network side of the house, since they are the ones who have the responsibility for network analysis, control and improvement.

Recognizing that there are separations in network responsibilities, we introduced a system called MICS/Net, which provides an entry-level foundation on which the network side can build a full IS management system.

Is it necessary to change the perception that the network area is a separate service; and, if so, how do we do that?

No, because it will probably change as a normal course of evolution. The pressure to meet user demands, the need for quality, responsive service and new integrated host and network technologies will cause the perceptions to change. Host and network groups will have to work ever more closely together and therefore resolve their attendant organizational and political differences.

In too many organizations, mini autonomous services have been established for network, VM services, office automation and so on. As is often the case, these separate units are more concerned about their individual success than the mission IS must address for the enterprise — which is providing usable, responsive, cost-effective information systems.

Why has the network arena lagged so far behind the host and I/O arenas in producing sound, workable strategies in network management?

As usual, a combination of factors is involved. First, there has been more time on the host side to evolve host-based strategies, because mainframe processing was dominant well before networks, as we now know them, were even introduced. Thus, host-based analysis capabilities had time to develop before networking was even viable for most organizations.

ALAN WITSCHONKE

Mario Morino

Second, there has been such an extraordinary growth in networks in most organizations, and such a lack of trained personnel to implement and maintain them, that there just hasn't been time to implement network management strategies.

Third, there has been a general lack of good, usable tools and information sources.

Fourth, it wasn't until network usage started to grow and become integral to the services offered by many enterprises — ATMs for banks and point-of-sale terminals for retail establishments — that top management began to focus on end-user service problems. Once that happened, tools and techniques began to emerge.

IBM's strategy seems to be to pull all its operations and performance tools together under one presentation structure, that is, Netview and Netview/PC. Is this the solution you think users are looking for?

Users are looking for an integrated strategy. There is much enthusiasm for IBM's integrated approach through Netview, but the delivery of Netview is only the beginning of what appears to be a strategic action by IBM to comprehensively address network management.

The complaints we hear about Netview remind me of what we heard in the late '60s and early '70s when IBM introduced the Systems Management Facility [SMF]. Few people remember that most of the industry thought SMF would never be accepted. Today, it is the lifeblood of information in every MVS organization in the world.

The big difference is that, by comparison, Netview is much more sophisticated as a delivery vehicle and, more important, is much more important to IBM's ability to market its products

What remains, however, is for network information to be combined in a meaningful way with all the other information that is needed to manage and control information systems.

Is there a general void in network management expertise? Will expert systems and artificial intelligence help us here, and how soon will this happen?

Networks are growing at a furious rate, and most organizations cannot keep up. There aren't enough adequately trained network specialists. And the situation will get worse, not better.

I personally believe that the application of AI and expert systems to the problems of IS management has been significantly overstated. The application of expert systems is proving most effective in other sectors for handling diagnostic problems, where rules and procedures have been well defined, and in clerical and semiclerical tasks, where procedures lend themselves to an expert systems solution.

In this context, network diagnostic systems for analyzing network hardware are clearly achievable in the foreseeable future and, in fact, are already being developed in certain circles. On the other hand, those who aspire to providing an expert systems solution for resolving general response-time problems are highly optimistic at best.

The scope and diversity of required knowledge, the number of elements in the solution process and, most important, the lack of defined rules and guidelines make an expert systems solution for this type of problem impractical, to say nothing of the staggering expense of such an undertaking.

Controls

FROM PAGE S4

THE objective of a sound strategy of network management is to ensure that information flows among centralized and distributed information systems and the users of those systems in a manner that is timely, reliable, cost-effective and consistent with corporate goals.

A sound strategy of network management is essential to meeting network users' expectations. And like every other variety of strategy, this one too should be thought out in terms of objective and the means of reaching that objective.

The objective of a sound strategy of network management is to ensure that information flows among centralized and distributed information systems and the users of those systems in a manner that is timely, reliable, cost-effective and consistent with corporate goals.

The means for reaching this objective is to execute proper strategies of network operation management, performance management, problem diagnosis and resolution and capacity planning.

Each of these four substrategies has in turn its own goals and methods, which can be pursued only after acquiring information on network behavior. Both software and hardware tools are used to carry out this acquisition.

The goals of network operation management would be the following:

- The initiation, termination or alteration, in a methodical manner, of the operation of the individual components of the network and of the network as a logical whole.
- The maintenance of a facility that will alert the network manager to exceptional situations, such as degraded activity of network hardware and software components or the loss of logical sessions between end users.
- The maintenance of a base of information for interpretation of the network's level of end-to-end reliability.

In the area of performance management, the goals that must be kept in mind are the following:

- An awareness of the consistency and effectiveness of the network services provided to the end user.
- Constant awareness of message response times and throughput rates; the resource utilization of individual network components and logical end-to-end paths.

When it comes to problem diagnosis and resolution, the goals become even more clear-cut. At this level, a network manager pursues the acquisition of detailed information to isolate and determine problems reported by operation and performance management activities and the capability of remedying those problems in a timely fashion.

Capacity planning has only one goal, but one that is critical for any forward-looking company. It is the production of a system model capable of depicting future or alternative network designs or activities so that possibilities do not have to be tried out in a live environment.

The methods for attaining these goals are in software and hardware tools that vendors have provided. They are abundant both in number and in range, from the crude to the highly sophisticated.

Before discussing how these tools can be employed to achieve the goals of reliability, adequate levels of service, timely resolution of system performance problems and accommodation of new requirements, it might be useful to examine how information flows over a network.

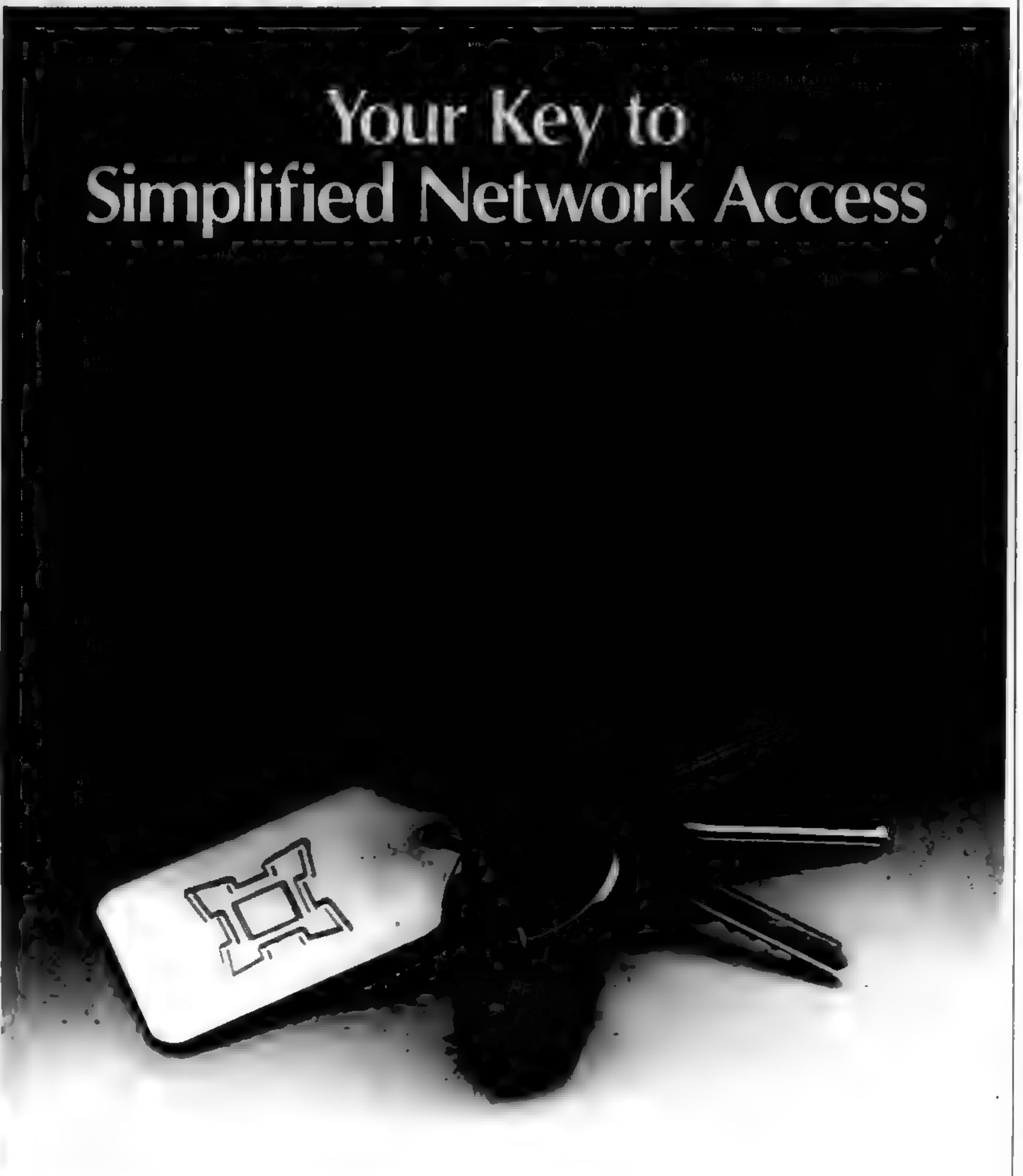
Any network, no matter how simple, is a nonhomogeneous system made up of separate but interdependent parts, so it is possible to trace the path that a message takes in its route between an application program and a network end user. A message may start in an application program — for example, payroll or inventory — usually resident in a mainframe processor.

The application interfaces to the network through a teleprocessing monitor program such as IBM's CICS and IMS or Cullinet Software, Inc.'s IDMS and through the host-resident network access method — IBM's VTAM or TCAM. In making this transition, the message must cross an I/0 channel to arrive at a telecommunications control unit (TCU).

The TCU, which may also be called a front-end processor or a communications control unit, is not a simple hardware I/0 device. It is a processor with multimegabytes of system memory and an operating system that controls the network.

After passing through the TCU, the message arrives at a modem unit. The modem provides the interface between the digital world of the TCU and host mainframe and the analog world of most existing transmission facilities. For digital transmission media, a digital service unit (DSU) is used in place of a modem.

From the modem, the message is passed on to the transmission medium, which could be a terrestrial phone link, a microwave unit, a satellite link or even fiber-optic cable. Then having crossed that medium, the message moves through a complementary modem or DSU on the



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opposite end of the transmission media and enters into a cluster control node (CCN).

The CCN is a processor of limited intelligence that controls the CRTs, printers, office automation devices and other devices in which a message may terminate. Examples of CCNs are IBM's 3174, 3274, 4700, Series/1, 8100 and System/36 and 38.

Many vendors offer plug-compatible devices for these IBM products. Minicomputers from Digital Equipment Corp., Wang Labortories, Inc., Data General Corp. and other vendors may also be configured to behave as CCNs.

Gateway processors

As more intelligent processors are used as CCNs, they become gateway processors between IBM backbone networks and non-IBM networks such as local-area networks (LAN) and networks of minicomputers.

The network exists so that the end user sitting at the terminal device on the CCN can exchange data with the application system in the host and with other end users in the network.

Between the host-attached TCU and the CCN, the message may pass through multiple intermediate TCUs. The startling fact is that it is not unusual to have each of the components listed above supplied and supported by a different vendor. In fact, a scenario in which all the components are supplied by a single vendor is, in the Systems Network Architecture (SNA) world, a rather rare occurrence.

> A scenario in which all the network components are supplied by a single vendor is, in the SNA world, a rare occurrence.

Many network managers who have pieced together their networks throughout a period of years and who have looked at each component separately, not maintaining an end-to-end perspective, are now finding out that the old build-as-you-go methods do not mesh with the kind of unified management strategies required in today's data processing centers.

Chip Jarnagin, manager of network software at Southland Corp. in Dallas, has already discovered the necessity of a new approach.

"We are today at the crux of major network design and operational decisions," he says. "The old way was, 'How do I screw it together?' Then, after the fact, I would consider how I might manage it."

But as networks grew in complexity and as the information they carried became more critical, Jarnagin's group realized it could no longer manage in such a piecemeal fashion.

"Now, people are asking themselves before they screw the pieces together if each one fits into their network management strategy. I don't care how spiffy an individual component may be: If it doesn't fit into the overall management plan, I'm not going to use it," Jarnagin says.

Fits with management plan

By taking a look at the implementation of a management strategy for even a simple network, it becomes clear why Jarnagin and many of his contemporaries have come to this conclusion.

Looking at what is involved in implementing a basic facility that maintains operation alerts for exceptional network events, like failed or faulty components, it is possible to see that even a simple system can become a complicated affair.

As explained above, a message passes through many individual components during its movement between end users.

To be prepared to report on a failure in the delivery of this message, it is necessary to maintain information from each of the individual components, since a failure in any one of them jeopardizes the delivery of the message.

In a simple setting, this could easily mean interpreting and integrating operation alert messages from up to eight different vendors.

Of course, when LANs, departmental systems and non-IBM protocol networks are integrated with SNA, the problems are further complicated.

Either the network control center has to be equipped with an alert terminal for every vendor and the network operator — responding to a user who has lost communication with an application — must wheel from one screen to another as he tries to find and solve the problem, or the information from all the vendors must be brought to a central point and translated into a common format.

While the first solution is too cumbersome to be considered a long-term one, the second is too difficult for companies to implement independently.

The unpalatable choice between make-do and do-it-yourself is actually no longer necessary.

Multivendor integration

Responding to this need for multivendor integration in a network context, vendors have created a new class of highly sophisticated tools to handle this kind of network operations management.

Continued on page S10

USER PROFILE

System organizes net service

BY MICHAEL SULLIVAN-TRAINOR

Network trouble? *Fred Rice stands in front of Federal Express's problem management system*

Envision a network consisting of 28,000 on-line terminals operating 24 hours a day. Now imagine that you are responsible for ensuring there are no problems anywhere on the network.

If you think this task sounds impossible, then you would not want to trade places with Ray Peek, senior manager of network control for Federal Express Corp. Peek's 45-member network control staff keeps the 28,000 terminals up and running in the company's nearly 1,400 locations worldwide.

In addition to the problems Peek faces in managing the current situation, the network is growing at a rate of more than 5% each month because of the rapid growth of Federal Express.To keep up with this ever-expanding network, Federal Express decided to implement an automated problem management system.

In August 1985, the company acquired PNMS/Problem Management by Peregrine Systems, Inc. in Irvine, Calif. The system, based on the proprietary fourth-generation language Peregrine Four, incorporates a relational data base and report generator.

Tracks problem reporting

The goal for the system was to automate the tracking and reporting of problems in the network. But shortly after the system was implemented, Peek says, Federal Express discovered that the system might require too much processor storage capacity to make it feasible to install as a problem tracking system for the entire network.

As a result, the system has been installed to allow tracking of only those problems that require contacts with vendors or reports to the company's internal systems support. Federal Express is currently working with Peregrine to resolve the resource usage concerns.

The network's VTAM environment includes four IBM 3090s and four IBM 3084s as well as IBM terminals, controllers and Paradyne Corp. modems. Federal Express uses its own customized network management system to deal with technical problems. The Peregrine system runs under TSO on one of the 3090s.

Despite its drawbacks, the problem management system has enabled the company to develop a network control program data base that includes information on the location and type of each terminal, the front ends they are linked to, AT&T data circuits and modem types.

When a user reports a problem, the network control staff uses the automated system to identify the equipment at the problem location. Information about each terminal is listed in the data base according to an identification number for each system.The staff, which is located in Memphis, handles between 1,600 and 2,000 calls each day from terminal users throughout the world whose systems are not working properly.

According to Fred Rice, who is manager of on-line systems availability, before the automated system was installed, the staff spent a large part of its time just tracking down basic information, such as the type of equipment involved and the exact location of the problem. As a result, there was no time to keep records on many of the calls and no way to anticipate where a problem might arise.

"With the manual system, we tried to determine trends in the problems that were being reported, but the volume of data absolutely killed us," Rice says.

Alleviates user concerns

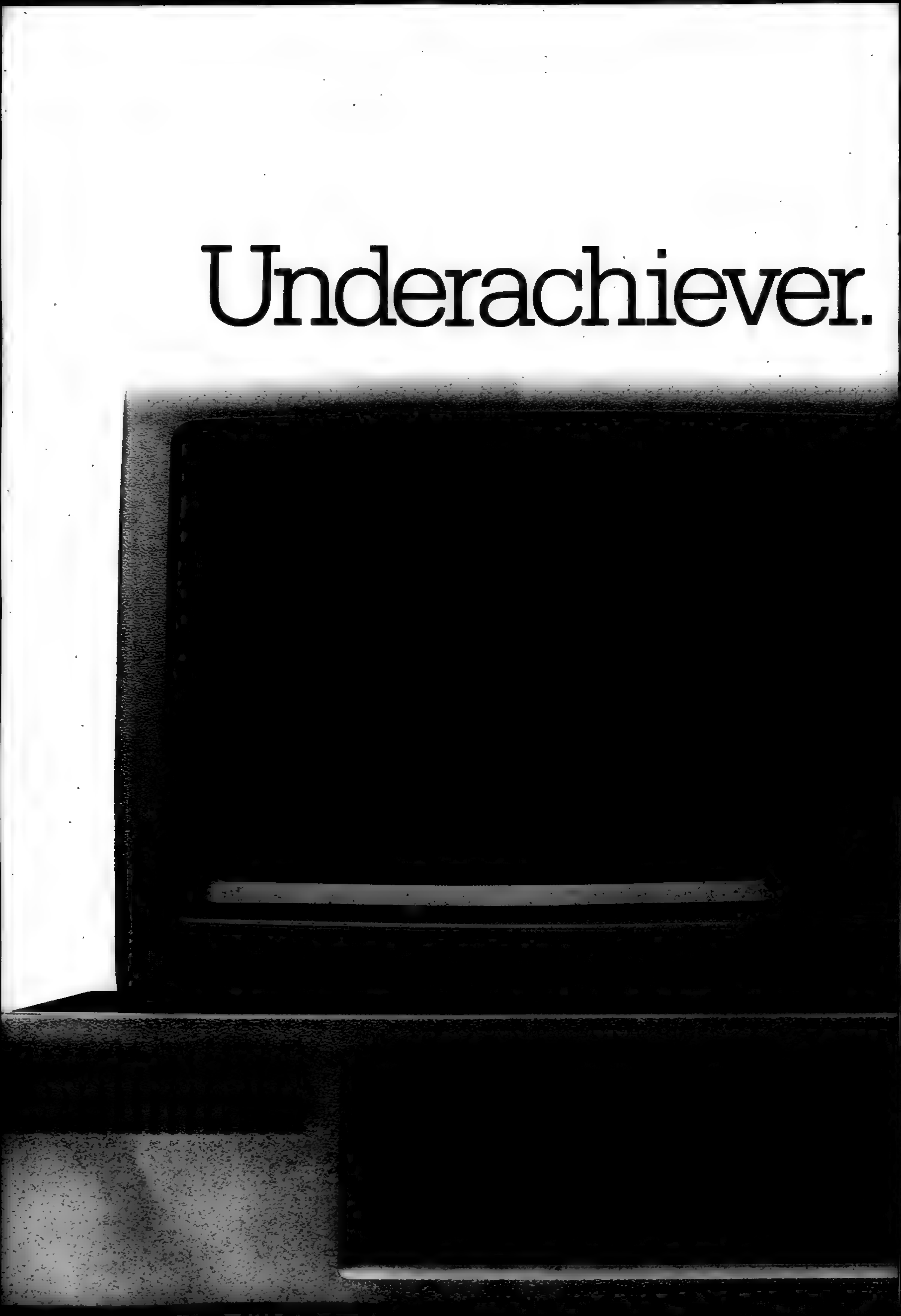
The system currently allows user departments to check on action being taken on problems they have reported. This not only alleviates user concerns but also reduces the volume of phone calls the network control staff receives.

Before the problem management system was automated, Rice says, the staff could easily become overwhelmed with calls from users and not have time to respond to the problems that had already been reported."Because we were unable to identify chronic network problems," he says, "we had to wait until somebody out in the field got so mad about it that they called a management person in network control and raised hell with them."

According to Rice, 85% of the problems can be resolved simply by locating the terminal and its associated equipment, killing it and then restarting it from the main office.

If a terminal cannot be restarted, then test equipment is used to examine the circuits and other devices involved.Often, the problem is traced to an AT&T circuit. Circuit problems are addressed by placing a repair call to the vendor.

Sullivan-Trainor is a *Computerworld* senior writer.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Controls

FROM PAGE S7

> IN Zen Buddhism, there is a saying, "When the student is ready, the teacher will appear." In this instance, we can say that when the network marketplace was ready, the vendors appeared.

When it comes to network performance monitoring, however, development has been slower. Next to the criticality of maintaining network operations, the concept of monitoring performance levels seemed less than a top priority to developers.

The importance of maintaining network operations is obvious. If an operation strategy were not in place, a network could not function. The messages would not get delivered. If a major component were down, then to a certain number of users, the network would be rendered completely inoperative.

When it comes to performance monitoring, the situation is not as severe. If a performance monitoring strategy were not in place, the network manager may not know what level of service he was providing to the end user, but he would still know whether the message got delivered.

A network, though delivering a response time that was grossly unacceptable or one that was acceptable but on the brink of entering a degraded mode of operation, could still be considered to be functioning.

The second reason that the performance issues seem less critical than the operation issues is that the nature of performance measurements make the independence of the components less of a problem. Performance is chiefly concerned with response time, message throughput and component utilization. These can all be measured independently at single spots in the network without giving regard to measuring them at every component.

There were three things that eventually happened to alert network users to the need for more sophisticated and well-integrated performance tools.

Network users awaken

First, as networks became more complicated, it became increasingly difficult to tell when a problem was an operational one and when it was due to degraded performance.

Second, as users became more savvy, they realized that there was variance in the level of quality of service the network was delivering — the network was not just up or down. They began to request service-level guarantees.

Third, as corporations implemented accounting and network chargeback systems, they determined that service-level guarantees were necessary to determine rate structures. The strategy of performance management began to carry more significance.

Corporations recognized that there would have to be further sophistication of the performance management strategy, and, like the operation strategy, there was a need to integrate all the pieces.

Impact on capacity planning

The need for more sophisticated tools was also soon felt in the capacity planning area. With the recognition of the critical nature of network activity and its direct effects on corporate operation, another need was recognized — the need to bring new users and functions onto the network within the existing service levels.

The old way of adding new users, watching performance degrade and then fixing the network to provide adequate service, was no longer acceptable. The users and their data were too critical. Office managers were betting their budgets on their workers receiving an expected service level from the network.

When the network failed to supply the expected level of service, workers did not complete their assignments on time, local budgets were overrun and overall corporate business plans failed. Tools that allowed the network manager to plan effectively were necessary.

Clearly, for the network to fulfill its role as a crucial component of the corporate strategy, an integration of tools and the development of more sophisticated ones was necessary.

In Zen Buddhism, there is a saying, "When the student is ready, the teacher will appear." In this case, we can say that when the network marketplace was ready, the vendors appeared.

Products appeared that allowed us to integrate operation alert tools, integrate and provide a greater level of detail in performance tools and tools to plan and test-drive future network situations before we implemented them. These products provide the means for achieving the goals of the four substrategies that make up the main strategy of network management.

What has the availability of these tools meant at the bottom line?

Centel's Vidlak says, "Five years ago, before we had a network management strategy in place, we operated like all shops did then — and like many, unfortunately, still do today. That is, a response-time problem could come up, and it might never get resolved, unless by accident.

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"The Help desk in those days was more of a comforting station," Vidlak continues. "A user would call with a problem, and we'd reply that we'd get back to him in an hour or so. We really had only the most basic tools — that's all that was in existence then.

"Now with the network operation, performance and planning strategy we have in place, problems are often solved before the end user ever notices them," Vidlak continues. "In the time period in which our network has grown by 36%, our trouble calls have been reduced from a rate of almost 60,000 a year to about 20,000."

Network operation encompasses a wide range of activities, including interactions with the lowest levels of the network architecture for both mechanical functions — like matrix switching — or maintenance activities like bit error-rate testing of transmission media.

There are literally hundreds of vendors that supply products in this arena. This article, however, will concentrate only on operation management tools that deal with the higher levels of system operation, that is, products that help to perform continuous surveillance to detect exceptional network events — like failed components or conversations — and to implement solutions when such exceptional events occur.

> "WITH the network operation, performance and planning strategy we have in place, problems are often solved before the end user ever notices them."
>
> JERRY VIDLAK
> CENTEL CORP.

These tools form the basis of network operation control and are installed in every shop. They are tools the network cannot live without.

The VTAM access method resides in the host and is the controlling software for network operation.

It is from VTAM that commands are issued that activate, deactivate and switch network components.

When a network component senses a hardware or software problem, it sends the alert to VTAM. VTAM passes this operation alert information through its IBM Communications Network Management and Principal Program Operator interfaces to applications and command processors that are designed to accept this information and that format the information for presentation.

These applications also accept network operator input that they forward to VTAM, which in turn issues network commands.

The type of data handed back and forth across this interface, between VTAM and the application, consists of solicited or unsolicited system information — such as notification that a network control program (NCP) has failed or that a user's conversation with an application has been interrupted — and operator-solicited data such as information on requesting a modem to initiate a self-test.

These applications are the tools that make up the operation management strategy. IBM markets a set of products with industry standards for these tools. These include Network Communication Control Facility (NCCF), Network Problem Determination Application (NPDA) and Network Logical Data Manager (NLDM). These products form the backbone of almost all IBM network management strategies.

A functionally compatible product is offered by Cincom Systems, Inc.called Net/Master (see story page S4).

Functions of the tools

NPDA keeps network operators informed of the health of the physical network resources and provides alerts about transmission errors, failures in network components or a component's need for intervention — for example, a printer that has run out of paper.

NPDA is an application program operating under NCCF, the command processor for NPDA and NLDM. Information is passed to NPDA from the NCP in which user-set threshold limits for temporary transmission errors are monitored.

Whenever these limits are exceeded, information is forwarded to NPDA. Information is also forwarded on network component failures or permanent link errors.

These exception messages are presented at the network operator's screen, then rolled to a log file or formatted to a data base, where they are available for review.

Like NPDA, NLDM operates as an NCCF application. NLDM allows the network operator to maintain a watch over the logical end-to-end conversation taking place among network end users.

For instance, the network operator can determine who is in conversation with CICS or any other application or subsystem at any given time and how long the conversation has been going on.

When a problem occurs in a particular conversation, NLDM can be queried to display a blow-by-blow account of what led to the problem.

IBM refers to this type of information as "accounting and availability" because NLDM will gather information from the implementation of a VTAM path information unit trace and produce data on session connect time and traffic statistics.

Continued on page S13

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DIAL-INO READER SERVICE NUMBER 11

"Front or back, left or right; no matter where our ad in Computerworld appears, it pulls extremely well."

Tom Sullivan
Director of Marketing
Falco Data Products
Sunnyvale, CA

Falco Data Products likes to describe its new Falco 500 high-performance video display terminal as *"spectacular."* And, in late 1985, when Falco wanted to tell MIS/DP directors — who buy terminals in quantity for their companies — about this *"spectacular"* device and its distribution through national sales channels, the company chose Computerworld — along with some other MIS/DP publications.

But, says Director of Marketing Tom Sullivan, when sales leads started coming, the number of leads generated by Computerworld was twice the number generated by the other books. *"That's pretty spectacular in itself,"* Tom says. *"We were also using the other well-known MIS/DP publication and a host of other books. When you consider the fact that Computerworld outdrew them all by a 2-1 margin, I think the only word for it is "spectacular."*

And those leads are still coming in. *"We're continuing to receive a steady flow of responses,"* Tom confirms. *"Front or back, left or right; no matter where our ad appears, it pulls very well."*

Shortly after seeing the success of Computerworld ads, Falco dropped the other major publication from its list. *"Our leads and feedback from the field told us that Computerworld is better. Besides,"* he adds, *"how can you argue with a 2-1 margin?"*

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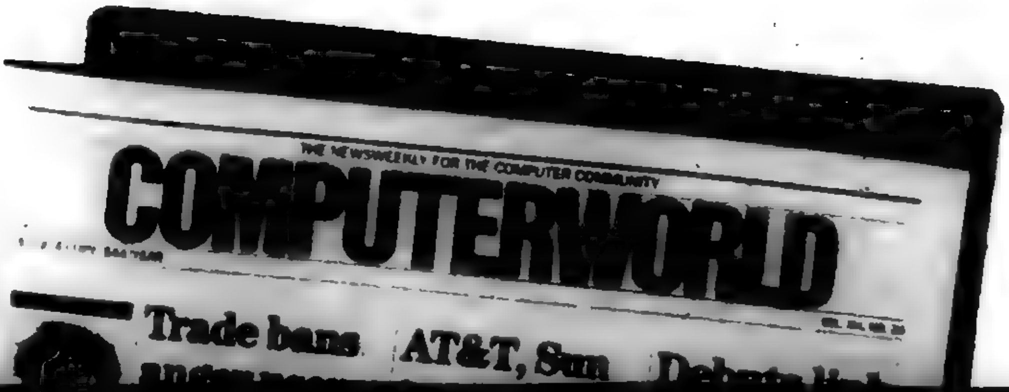


CONTROL

FROM S11

While a case can be made that this information could be helpful in rudimentary accounting procedures, it is not the information normally considered usable for availability diagnosis, since data is produced only for those users who have a functioning connection — that is, a terminal, control unit and front-end processor — and when transmission media are all operational.

Also, many users have stated that the CPU and common storage area overhead incurred when gathering this information exceeds acceptable limits.

NLDM also gathers limited response-time information through IBM's Response-Time Monitor (RTM) feature.

General uneasiness

While IBM's network management strategy was being implemented throughout the industry, there was a general uneasiness among users with this group of rather cumbersome, hard-to-use products. Generally, these products were perceived as difficult to install and operate.

Initial releases of NLDM left many people complaining about the host resources it required and about bugs that could cause serious problems for VTAM. To perform other than rudimentary functions, much customization was required. Chevron's Wood says, "There's no doubt that these are indispensable products. We use them every day. But unless you spend a lot of time customizing the product, they don't do what you need.

"If something major goes wrong," Wood continues, "I have to know 'right now.' With NPDA, if I lose a major node — an NCP for instance — the message on the NPDA panel looks the same as the message that tells me a 3800 printer just ran out of paper. And sometimes, those messages come in so fast, they roll off the screen and into the log before I've even seen them."

Filling the bill without IBM

Unhappiness with these IBM products led Share and Guide, IBM users groups, to formally request a more cohesive, easy-to-use and easy-to-install network management product. Some users chose to take advantage of the value-added features in the Cincom products, while others waited for IBM to deliver what it had promised.

In May 1986, IBM announced Netview, which is now generally available. The product runs as a VTAM application program under the MVS/370, VM or MVS/XA operating systems.

Netview integrates and enhances the functions of NCCF,

Continued on next page

PRODUCT FACE-OFF

Netspy vs. Mazdamon

BY THOMAS W. MCDONALD

Most managers of IBM networks who have chosen to use software to gather response-time information for interactive applications running under VTAM use IBM's Network Performance Monitor (NPM). However, four major drawbacks of this package merit consideration:

- The application must be running in definite-response mode.
- No response-time information is reported for TSO.
- Report structures are rigid and are designed and formatted to be read by systems personnel.
- A significant portion of direct access storage devices (DASD) must be dedicated to collecting the information.

Some of these drawbacks are inherent in software monitors, no matter which one is used. Some, however, can be remedied by replacing IBM's product with one of its major competitors — Netspy from Chicago-Soft Ltd. in Chicago or Mazdamon, recently acquired by Uccel Corp. Both of these vendors approaches the four problems mentioned above in different ways.

The need for definite-response mode. Because software monitors are resident in the host processor, the only way they can collect response-time information is to start a timer when a message exits the host and to stop it when the response to that message returns to the host.

> THE problem of implementing definite-response mode turns out to be more one of politics than of technology.

As a result, either the response-time monitor generates its own control message, or it monitors existing network mechanisms of control such as definite-response mode.

The problem of implementing definite-response mode turns out to be more one of politics than of technology (see main story). Netspy circumvents the politics by offering a facility called FORCEDR. The FORCEDR command allows definite-response mode to be turned on without involving application personnel.

The application remains isolated from the operation, and no application buffers are used. The network manager can operate the needed commands without involving mainframe systems personnel.

The significance of this facility is pointed out by one Netspy user:

"When I request of the IBM CICS programmer that he turn definite-response mode on for me, I am putting myself in an extremely vulnerable position. I'm going to get blamed for anything that might go wrong in the system. If a programmer gets run over by a truck on his way to lunch, it's somehow traced to the fact that definite-response mode was implemented. With FORCEDR, nobody even knows a change has been made."

Inability to report response time for TSO. Definite-response messages for TSO are not handled in the same fashion as they are for other applications. VTAM measurement probes are positioned so that they are unable to detect the definite-response messages destined for TSO.

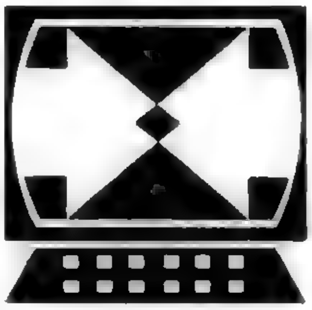
Both Netspy and Mazdamon are able to report on TSO response time by placing the measurement probes at the appropriate positions in VTAM.

Lack of flexibility in reporting structure. All three products offer batch and on-line reporting facilities. All users of these products implement reports through batch mode. Most also use the on-line feature.

NPM provides complete information in its reports but is lacking in presentation style. IBM's Service Level Reporter can, however, be used to enhance the systems programmer orientation of NPM's reporting style with a management orientation.

Netspy offers a more flexible reporting structure and provides an interface to SAS Institute, Inc.'s Statistical Analysis data bases. Netspy users claim the process is effortless for integrating raw Netspy data into commonly used performance data base systems such as Morino Information Control System (MICS) from Morino Associates, Inc. or MXG data base from Merrill Consultants.

Mazdamon, however, is clearly the leader when it comes to reporting. This product offers a relatively sophisticated SAS-based data base with more than 100 reports available in an easy-to-use format.



After-the-fact reporting is not always enough to maintain sound network performance. On-line notification is often needed for problem awareness, diagnosis and resolution. All three products offer on-line reporting of response-time information with a minimum of processor overhead.

Mazdamon holds the advantage in on-line reporting due to its level of detail, the variety of its on-line reports and the number of exception criteria that can be specified.

For instance, a Mazdamon user could ask to see a report that specifies all users within two different application groups who share terminal residence on a specific transmission line and who have received response times greater than six seconds during the last three-minute period. Neither NPM nor Netspy offer this level of detail.

Mazdamon offers features that allow personnel who may possess only a rudimentary knowledge of networking to produce management-level reports on network performance and planning. Full-screen prompts guide such users in the production of graphics or tabular reports.

"The IBM ISPF-based facility has allowed me to set up procedures for my manager and other systems personnel who might not be directly related to the network," one Mazdamon user says. "My manager can get the particulars on an irate user's problem immediately, right from his terminal in his office, and he doesn't have to understand JCL or SAS or Mazdamon to use it."

Both Netspy and Mazdamon offer interfaces to MICS.

None of the three products offers alerting features as robust as those offered by the hardware response-time monitor vendors that take advantage of stand-alone processors and color CRTs to present vivid and detailed alerting information.

Requires significant DASD resources. There seems to be no way around the problem of DASD requirements. All three products mentioned are equally flawed in this respect. Consequently, many organizations still need to implement response-time monitoring through a hardware solution.

Each of the products possesses some unique attributes. Mazdamon is the only one of the three able to manipulate information at the application transaction level. For sites that wish to treat individual applications that run under CICS, IMS, TSO or any other subsystem as independent entities, this is a crucial consideration.

NPM, for its part, is the only one that supports the VM environment. And when IBM pulls together all the pieces of its network strategy under a common umbrella, the NPM data will be controlled from the same central terminal as the operational tools.

In a three-way comparison, each product can claim some distinct advantages. Mazdamon stands out because of its data base technology and its on-line and management reporting flexibility. It is clearly the most robust product, but there is a price for the added power: Mazdamon costs about twice as much as either of the others.

> THERE seems to be no way around DASD requirements. Many organizations still need to implement response-time monitoring through a hardware solution.

Also, users note two major drawbacks in using it. The first concerns implementation requirements. Mazdamon comes up as the main task in the address space, and it attaches VTAM. The second drawback, a lack of support for NPM's network data collection and analysis, will be remedied in the first quarter of this year, as Mazdamon has recently been acquired, and the product's author and developer, Soli Surty, is contracted to stay with the product for at least one year.

Netspy, priced comparatively to NPM, is notable for its ability to ease the pain of implementing definite-response mode and for its flexible report structure.

NPM has the undeniable advantage of being supplied and supported by a powerful vendor, widely recognized for its technical support.

Controls

FROM PREVIOUS PAGE

> IF Netview and Net/Master are attempting to provide a single interface to monitor the entire corporate network, then they must monitor data from non-SNA and non-IBM sources. IBM's Netview/PC accomplishes this.

NPDA and NLDM and adds the capabilities of two additional products — VTAM Node Control Application and Network Management Productivity Facility (NMPF). These provide functions such as Help screens, Command List (CList) support, Help desk facility and on-line log browsing capability.

Single presentation structure

Netview's most obvious improvement is that, through the command facility — the functional equivalent of NCCF — the network operator need only cope with a single presentation structure for all of the components of Netview. It is no longer necessary to flip among multiple products when tracking down a problem.

Any Netview command can be entered at any Netview screen. From the same screen, an operator can activate or deactivate network resources, recognize problems as they occur, isolate a failing component, invoke line and resource tests and take corrective actions.

With this product, data is presented in a consistent manner and color, and program function keys are consistently used by all of Netview's components.

More than 150 CLists are supplied and supported with Netview, making it much easier to set up lists of VTAM commands that will initiate regularly scheduled network operation activities. CLists may also be built to handle more involved tasks of network diagnostic and recovery functions. While these products solve many of the problems for the network manager, they do not, by themselves, handle the problem of integrating information from non-SNA and non-IBM components.

A separate facility is still maintained at the network control center to handle alerts coming from common carriers, T1 vendors, private branch exchanges (PBX), Rolm Corp. Computerized Branch Exchanges (CBX) and any source of non-IBM equipment. This problem is addressed, instead, with Netview/PC.

Netview/PC

If Netview and Net/Master are attempting to provide a single interface to monitor the entire corporate network, then they must monitor data from non-SNA and non-IBM sources. IBM's Netview/PC accomplishes this.

Announced in September, along with the Open Communications Architecture (OCA), Netview/PC is scheduled for general availability in the first quarter of 1987.

The OCA defines three architectural layers:

- Focal point — This is physically implemented as the network management host. The focal point provides for the consolidation of network management data from all resources managed by that host.

This information is brought together under centralized network management applications called focal-point applications. Netview and Net/Master are both examples of focal-point applications.

The term "focal-point application" will be used in this article as a generic term to refer to both Netview and Net/Master.

- Entry points — These are logical locations within SNA components that forward data concerning their own operations — and that of components under their control — to the focal-point applications. Commands or control protocols for the manipulation of these components and resources flow between focal point and entry point.

Examples of components that house entry points include IBM 3705 or 3725 or 3720 TCU, 3174 or 3274 CCN, System/36 or 38, distributed processors and any other physical unit in an SNA network.

- Service points — These are components in the SNA network that can serve as gateways to the focal-point applications for network management data coming from non-SNA products, such as CBX/PBXs, LANs and other vendor networks. The service point does not transfer end-user data. Netview/PC is a service point.

Netview/PC is a problem management and alert management tool. It is the bridge by which the central monitoring facility in the host, that is, the focal-point application, is able to access operational and alerting information from sources beyond the SNA environment, such as from non-SNA-addressable networks, voice networks and networks supplied by other vendors. Netview/PC is also a means to solve problems occurring in remote networks.

Open architecture

Last summer, IBM invited seven communications software vendors to Raleigh, N.C., to assist in the development of Netview/PC. It was clear from the start that this would be an open architecture, and more than 15 vendors have already announced plans to interface to Netview/PC.

Continued on page S18

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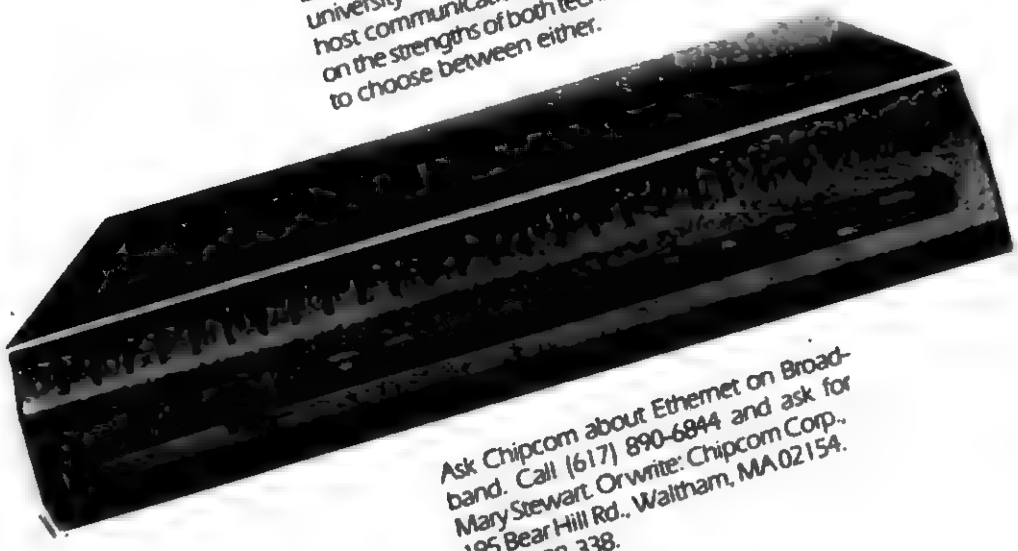

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DIAL-INQ READER SERVICE NUMBER 12

VENDOR VIEWPOINT

Managing VTAM sessions by SNA rules

BY THOMAS J. VOLLMAR

Multiple-session products for VTAM networks attracted a large following of IBM mainframe users in 1986. The technology does in fact offer some useful benefits.

Multiple-session products allow users of IBM CICS, TSO, IMS and so on to switch between those systems without having to sign off of one and on to another — a process that can consume as much as one hour a day per user.

For a company with 20 users, this translates to a productivity loss in excess of $100,000 per year.

But, in order to realize the productivity and ease-of-access benefits offered by these products, it is necessary to understand how they address issues such as these:

- The access needs of a wide variety of users.
- Network security.
- Administering system use.

Easy access for all users

The primary goal in implementing these products is to provide users with easy access to systems like CICS, IMS and TSO. Users access the network in a variety of ways.

For the sake of discussion, network users can be classified according to their work habits.

Type A users are authorized to access only one application or a single session. Type B users can access multiple applications one at a time, and Type C users are authorized to access multiple applications concurrently.

In a typical organization, the user population breakdown will approximate the following:

- Type A — Single application users: 10%.
- Type B — Multiple nonconcurrent users: 70%.
- Type C — Multiple concurrent users: 20%.

Most session managers focus on only the 20% of users requiring access to multiple concurrent sessions.

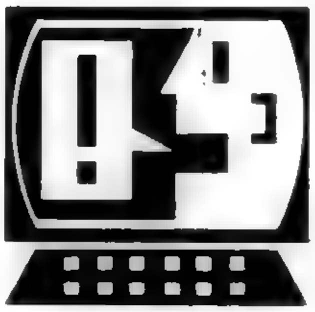
The managers provide no facilities for making the systems accessible to the other 80% who actually need this help the most.

The majority of productivity opportunities does lie with the servicing of this small group of power users, yet the value of improving productivity and service levels across the entire network is well worth considering.

Today's network staff must be foresighted enough to anticipate the growing needs of its users and, consequently, of the network. The staff must also begin thinking in terms of access management tools that will help it to service all users on the network.

Secure access for users

A product well designed and engineered to accommodate this broader responsibility of the network staff will pay big dividends in improved service levels for all users and reduced maintenance for the network staff.



Most multiple-session products that are available today provide security that is designed to prevent unauthorized access to the network.

Typically, they also provide interfaces to popular security packages such as Uccel Corp.'s ACF2, RACF Productivity Aid from IBM and Top Secret from Computer Associates International, Inc.

Yet, the implementation will vary depending on whether the product was built to handle only concurrent multiple-session users or all types of users.

The foresighted network staff will also do well to address the network security issue for all users of the network rather than for only one group.

That way, the installation can control who gets into the network, who gets into CICS, TSO and so on and how users may access these systems — whether through concurrent sessions, through a single application at a time or through a single application only.

Administration of the software

Administering the use of these systems also has broad implications. Can the Help desk broadcast to all users on the network?

Do the products play by Systems Network Architecture (SNA) rules? If access to computers is made easy and productive for all users, can the system still be reasonably managed and controlled?

Playing by SNA rules is an absolute prerequisite for any network management software.

VTAM is a strategic core of SNA, and for that reason, it is best to stick with standard VTAM interfaces and adhere to the rules defined in SNA. These rules include the following:

- One terminal may carry on only one session with an application at a time.
- An application may conduct parallel sessions with more than one terminal.
- The log-mode table for a particular terminal must match the terminal control table (CICS) or the IMS logical terminal entry for that terminal.

How your software manages single and multiple sessions while conforming to these SNA rules will affect your ability to administer the software.

How often do you have to define virtual logical units: Initially? Every time a terminal gets moved? Are user IDs duplicated in ACF2 and in the access/session manager?

Most systems allow operators some degree of network management through broadcasting capabilities.

At the very least, the operator or network staff has a vehicle to more efficiently communicate with users. But there are several different flavors that can be found in the software design.

A basic question you should ask is, Can I use the same broadcast facility to reach the following:

- Single and multiple session users?
- CICS, TSO, IMS and other users?
- Active and idle terminals?
- LU2- and LU1-type terminals?

Another helpful feature is the ability to set up broadcast messages to be sent automatically when some event occurs within the network.

In some cases, the broadcast message can be tailored to a particular situation or sent only to the appropriate user or groups of users.

There are other questions to ask: If a CICS needs maintenance, can you suspend logons to keep users off CICS? Can the operator route users to another CICS while the maintenance is being performed? Can this rerouting be set up to occur automatically — without operator intervention and without the users knowing they were signed on to CICS/A or CICS/B?

Operators, like users, will fall into Type A, B, or C in terms of their access requirements. So, it is useful to ask if the access/session management software will service all types of operators as well as users.

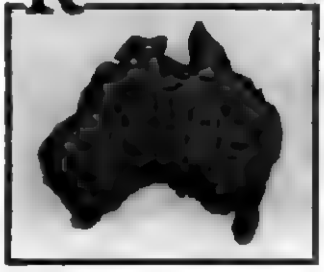
In other words, will you be able to manage and control the security and access requirements of LU1 terminals or X.25 devices emulating IBM 3767 devices?

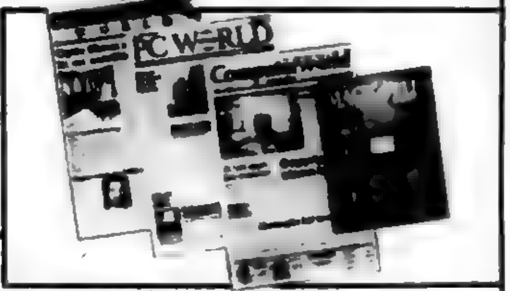
Multiple concurrent sessions represents a great advance in technology. But it is just one variation on a broader theme of network access. Multiple-session products should evolve to make network access easy and productive for all users.

They should provide common security, common broadcasting and common network management capabilities to all users.

Network staffs are playing a catch-up game already. Increasingly more users require access to computers through the network. Those networks — and the number of users — are growing faster than the ability to manage them.

Vollmar is market manager for Cincom Systems, Inc.'s Net/Master network management systems product.





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Control

FROM PAGE S14

What does this mean? It means that information such as alert records from a personal computer-managed LAN, call detail records from a CBX, operational statistics from a T1 handler and error rates from long-distance carriers can now be made available to a focal-point application for operational or accounting purposes.

Device-specific applications will reside in the PC housing Netview/PC. The non-SNA device or network that forwards the information will be linked to the PC.

The PC application will accept the alerts coming from the specific source and convert them to a common format, such as IBM's Communications Network Management format, acceptable to the focal-point application. These applications will, for the most part, be written by vendors that wish to integrate their information into the focal-point application.

IBM is offering applications for the Rolm CBX to interface with both the alert monitor and the call detail records collector. Soon to follow is an application for the IBM Token-Ring network.

A PC running Netview need not be attended; it could operate in a locked closet. The aim is to have the PC software recognize the alert messages and problems and solve the local problem at the local level by initiating remedial action whenever possible. If this is not possible, then the message is forwarded to the focal-point application in the host.

> A PC running Netview need not be attended; it could operate in a locked closet. The aim is to have the PC software recognize the alert messages and problems and solve the local problem at the local level by initiating remedial action whenever possible.

The lowest level

The aim is to solve the problem at the lowest possible level. IBM provides eight standard CLists to carry out local functions such as status check, test, change physical configuration and display path.

Netview/PC forwards data to the host via two mechanisms. The first uses a standard VTAM-to-PC System Service Control Point to physical unit) SNA session. Netview/PC forwards the data to the focal-point application through the same VTAM interfaces from which it regularly receives data.

The second mechanism is via the establishment of an LU6.2 Advanced-Program-to-Program Communications (APPC) session between Netview/PC and a host application. CICS is currently the only 370 host application that supports LU6.2 communication.

It is unlikely that large volumes of data received by Netview/PC — such as CBX call detail records — will be sent to the focal-point application through the standard VTAM interface. The focal-point application is set to handle alerts and commands off this interface — messages it expects to receive one at a time.

It is more likely that the call detail records will be sent via APPC to a CICS application that will produce a report or format the data to a data base. The focal-point applications are a less likely place than CICS to write application code.

Product or strategy?

This leads to the question about focal-point applications: Is Netview a program product, or is it an idea, a strategy? While IBM maintains that Netview is a specific host-based program product, Netview/PC is sending data to a host CICS application, not to Netview.

The next logical step — that of allowing two-way communications between the focal-point application and Netview/PC and the various networks — has not been implemented.

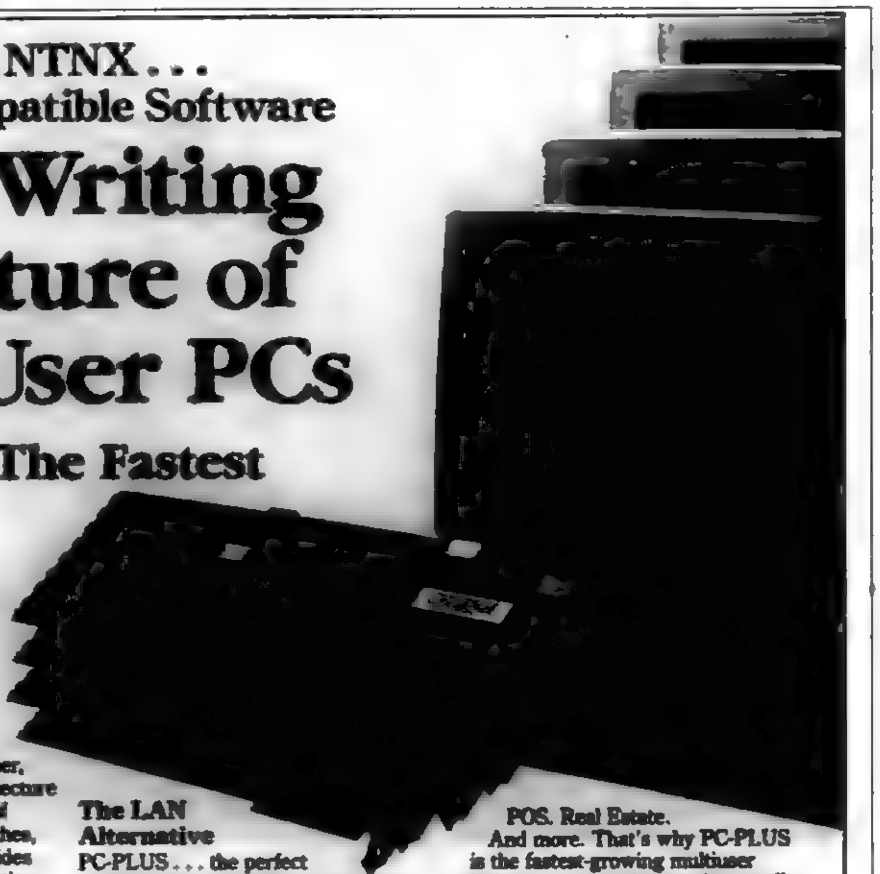
If it were, the focal-point application could react to a problem situation and send commands via Netview/PC to initiate diagnosis or remedial action in the various networks.

For instance, if a network operator discovers a problem at a T1 handler in the field, he must step outside of the Netview-to-Netview/PC chain of command to run diagnostic tests or implement a configuration change.

As it now stands, Netview/PC, used in conjunction with a focal-point application such as Netview or Net/Master, takes a giant step in allowing for a fully integrated approach to be undertaken for the management, problem diagnosis and problem resolution involved in the operation of a network managed from a central IBM facility.

Net/Command from Avant-Garde Computing, Inc. provides a similar function to that offered by Netview/PC. Net/Command functions similarly to Netview/PC in that it requires vendors and end users to write program interfaces between their own systems and Net/Command.

As an adjunct to the operational management tools mentioned, Netpic from Travtech, Inc., one of The Travelers' companies, offers popular features. Netpic provides a pictorial control-tower



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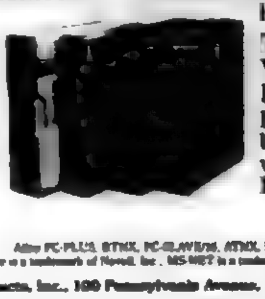

DIAL-IN READER SERVICE NUMBER 14

view of the network.

A color-coded display shows all of the major network components — TCUs, transmission groups, hosts, access methods and applications.

Further, if any of the major components of the backbone network fail or if a transmission group begins to operate in a degraded fashion, the display presents a vivid alert.

Chevron's Wood, a Netpic user, appreciates the extra warning. "Before Netpic, it sometimes took up to half an hour for us to realize we lost an NCP," he explains. "It's not as easy as you might think. You get calls at the Help desk that say, 'My session went away.'

"You're probably looking at things on a terminal-by-terminal basis," Wood continues, "and the problem gets exacerbated by the sheer numbers of calls, terminals and NCPs.

> "PEOPLE ask me: 'Is that all it does?' That's right. [Netpic] is a pure alerting tool. The beauty of it is that it's so simple."
>
> BLAKE WOOD
> CHEVRON INFORMATION
> TECHNOLOGY CO.

"The Help desk queue would finally build up to a point, and someone would notice the number of troubled users who all pass through a certain NCP. You don't have to be locally attached to an NCP for its failure to affect you," Woods says.

Netpic is not, however, a technological breakthrough. It gathers data in a fashion similar to Netview and Net/Master and issues standard VTAM commands. What it does provide is one very useful feature — a vivid visual alert — that some managers deem critical.

And since Netpic displays the network simply, in its building blocks, a manager of any facet of the information system who may not be familiar with network jargon can have access to network alert information on his desk to reply to queries of system service.

Wood admires the simplicity of Netpic. "People ask me: 'Is that all it does?' That's right. It's a pure alerting tool," he says. "Nobody's going to go to a secondary screen and leave it unattended. Nobody is going to be sitting at it doing updates when an alarm comes in. The beauty of it is that it's so simple. You cannot mess it up."

Travtech is releasing a complementary product for the boundary network in the first quarter of this year.

Performance monitors

Whereas operations monitoring provides an indication of whether the network is delivering service to the end user, performance monitoring takes the process a step further to indicate how well the network is performing its service delivery.

It indicates the state of health of the network and the rate at which messages are delivered to the end user.

Managing the performance of a network is dependent upon monitoring three key areas: network component utilization, traffic statistics and response time.

Monitoring the utilization of network components — such as the TCU buffer and cycle capacity, transmission media and CCNs — as well as traffic statistics, such as link error rates and message retransmissions, provides the network manager with enough information to diagnose, as well as predict, the health of the network.

With this information, the network manager is not only able to take action to cure an unhealthy network but also to evaluate how much energy is left in a healthy one.

The network manager uses this information for three purposes. First, in order to ensure that an adequate level of service will continue, he must know how much reserve resource is available in the network components.

Network components do not degrade gracefully. A critical component such as a TCU can operate at full throughput capacity until it suddenly reaches a buffer threshold and abruptly turns a normally functioning network into one that, for all intents and purposes, is down.

Second, this information plays an essential role in performance problem diagnosis and resolution.

An irate user's complaints of poor response time can be treated immediately if performance information shows that a TCU is out of resource or is attached to a line with an inordinately high number of errors.

Third, this information, along with other traffic rates, plays an essential role in a network capacity planning strategy.

Response-time monitoring is the most important aspect of performance management. It is the yardstick by which the end user evaluates the service he receives.

It does a network manager little good to tell an end user that the TCU is using only 20% of its buffers or that its local link is operating at less than 10% utilization if the end user is experiencing a 14-second response time.

Response-time measurement is not exclusive to performance management; it is used in operation management as well. However, the operation management focal-point applications mentioned so far have limited ability in reporting it.

The source of response time information for both Netview and Net/Master is IBM's RTM, which is provided by a board that may be installed in a CCN.

RTM does, however, have some shortcomings. While it runs on most of IBM's CCNs, it does not run on plug-compatible CCNs. It also does not break response-time value into its host and network components, and it is difficult to get information at the application and transaction levels. In short, RTM is useful mainly to verify service-level complaints from an end user on an IBM control unit outfitted with the RTM feature.

While certainly a useful function, this is by no means the ultimate in response-time analysis procedure. To be fair, IBM does not claim that it is.

It considers RTM to be a sentinel, an early warning system of response-time problems, while other products it offers allow investigation of the problem.

Response time is the single most important measurement that the network manager makes, so it is not surprising that many vendors offer products to report on response time. There are both hardware and software approaches to it. We will first look at software approaches.

Software monitors

IBM released the Network Performance Monitor (NPM) in 1985. The product runs as a VTAM application and under the OCA as a focal-point application. It monitors network component utilization, message statistics and response time — the three areas necessary for a complete strategy of performance management.

NPM integrates two formerly independent products, Network Performance Analyzer (NPA) and VTAMPARS. The NPA process is now referred to as Network Data Collection and Analysis. The VTAMPARS process is known as Session Data Collection and Analysis.

> RESPONSE time is the single most important measurement the network manager makes, so it is not surprising that many vendors offer products to report on it.

The NPA, or network, data has a collection mechanism that resides in NCP and, at user-defined intervals, sends files to an application in the host. This application formats the data to SMF formats.

Information is provided on network component utilization, including TCU cycle and buffer usage, link utilization, link error counts and path information unit counts between applications and TCUs, CCNs and terminals.

This data is provided in an SMF format (record type 38) or in a BSAM format. The BSAM-formatted data is for on-line viewing.

The VTAM, or session, portion of the NPM handles messages as they flow through VTAM on their path between host application and end user. The VTAM session file provides information on message rates and sizes and, most important, on end-user response time. This data is written to a VSAM file.

Alternative vendors in this arena include Chicago-Soft Ltd. — maker of Netspy — and Uccel Corp., which recently purchased Mazda Computer Corp.'s Mazdamon (see story page S13).

There are two major drawbacks to using a software monitor to measure response time — the necessity of implementing definite-response mode and the amount of direct-access storage device (DASD) required to store the information.

Definite-response mode is an SNA request/response protocol that takes place at the upper layers of the architecture and that ensures that data communications among network end users takes place in an orderly fashion.

This mechanism is not to be confused with link-level responses, which take place at lower layers of the SNA and keep track of frame sequence numbers in link headers and trailers.

Definite-response mode functions as follows: When VTAM receives a message from an application destined outbound to an end user, it checks to see if the application has requested that definite-response mode be implemented.

If definite-response mode has been requested by the user, VTAM sets the appropriate bit in the transmission header of the outbound message. When the message is received by the CCN of the receiving end user, the bit is decoded.

The CCN will respond to the next inquiry for inbound traffic with a response frame that includes the sequence number of the last message received from the application.

When the application receives notification of the successful receipt of the message, it is then free to send additional messages to this end user.

Software monitors, through the implementation of a VTAM trace facility, can take advantage of this mechanism to monitor response time. When VTAM sends the message outbound, it may issue a time stamp.

When it sees the response frame come back, it issues another time stamp. VTAM has captured the entire network delay, including outbound transit and wait times, poll-wait time and inbound transit and wait times.

It should be pointed out that the inbound transit time of the response message will differ from the inbound transit of an end-user data message as the size of the inbound data message increases.

VTAM may perform a similar function as the data message enters the host and I/O area inbound and when it exits, therefore capturing host time as well.

Software monitors can take advantage of this facility by requiring that the VTAM trace facility be turned on and then by reducing the information produced to report formats to indicate host and network response time.

There are two negative aspects usually associated with running in definite-response mode. The first is heavy overhead on the network as a result of the additional response messages being generated.

Actually, the added overhead has been measured extensively and found to be negligible. The extra control message flowing through the network for each user message does not measurably affect performance.

The second perceived problem is overhead in host cycles, which is incurred in processing the response message. This issue has also been found to be fairly negligible, although shops with common storage area constraints have experienced problems when using some software monitors to handle a large number of users.

While these two issues associated with implementing definite-response mode are actually nonissues, one major nontechnical problem does exist.

In order to turn on definite-response mode, the network manager must request assistance from mainframe systems personnel. For example, if a network manager wishes to turn on definite-response mode for CICS, the CICS systems programmer would have to be involved in the process.

And what systems programmer would not balk at twiddling with an application that was up and running fine? No one could be blamed for hesitating to jump in as requested, yet this reluctance is usually the main roadblock to implementing definite-response mode and gathering response-time statistics with a software monitor.

It is usually the case that IMS applications have definite-response mode turned on under

Continued on page S21

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Controls

FROM PAGE S19

normal operations, and CICS applications do not. TSO has it turned on under normal operations, but some monitors are unable to use the information.

The second objection to using a software monitor to gather response-time statistics is the amount of DASD resource required.

How much DASD is too much?

One large insurance company is currently using Uccel's recently purchased Mazdamon to measure response time for all 15,000 terminals in its network. The company has two dual-density IBM 3380s dedicated to supporting the Mazdamon libraries and the response-time data. Most sites, however, would consider this amount of resource unacceptable.

"No one has defined what is an appropriate amount of host resources to use to support these network management processes," Chevron's Wood says. "Host performance people think anything is too much.

"Obviously, as a network manager, I have a different opinion," Wood continues. "Could we justify dedicating a couple of 3380s to gathering response-time information? I think that would be considered definitely too much resource. But things change pretty quickly in the network area. Check back with me in a year, and you might find that solution implemented here."

One solution to the DASD problem is to monitor selectively — to turn the collection mechanism on only for certain users or for short lengths of time. This is a workable alternative, but most network managers agree that the aim of this strategy is to provide a continuous awareness of everybody's response time.

Hardware monitors

The hardware approach to monitoring response time sidesteps the problem of definite-response mode and DASD usage, but it is not without its own drawbacks.

A hardware monitor is a stand-alone device — a mini or cluster of microcomputers — that interfaces to the network through a monitoring unit at the digital interface between the TCU and the modem.

Information is formatted for reporting and inclusion in a data base at a terminal that is local to the monitoring unit, or it is forwarded to mainframe software for manipulation in the host.

The hardware monitor passively views all data that travels over the network. It is capable of producing reports on end-user response time, utilization of transmission media and traffic statistics, but it does not report on TCU usage.

The sophistication of hardware monitors ranges from microprocessor-based, single-line monitors to large minicomputers tied to data bases. These are capable of monitoring more than 1,000 lines simultaneously.

One of the considerations when implementing a hardware solution for response-time monitoring is cost. While a single-line monitor can be purchased for a few thousand dollars, a system that would monitor all of the users at a large site could easily climb into the quarter-million-dollar range. Many shops are caught between the expense for DASD with a software approach and that of implementing a hardware approach.

> THE cost of a system that would monitor all of the users at a large site could easily climb into the quarter-million-dollar range. Many shops are caught between the expense for DASD with a software approach and that of implementing a hardware approach.

Aside from cost, a major complaint about hardware monitors is their degree of resolution when delineating between host and network components.

Since a hardware monitor is positioned between the TCU and the transmission medium, it sees as one block of time the time the message spends in the host and the TCU. The time the hardware monitor reports as host time actually includes host and all of the time spent in the TCU — such as the bit transit delay, data translation time and link queue wait time.

The inability to determine whether a bottleneck is occurring in the host area or in the TCU area is a serious impediment to problem resolution. To solve this, some companies use software monitors on a selective basis to break out the response time between host and TCU after a hardware monitor has indicated a problem.

An additional objection to hardware monitors is generated by managers who see them as external to network management strategy. Waltrip of The Travelers is one network manager who voices this concern.

"We brought all of the major vendors with a hardware approach to the problem in here and took a good look," he says. "The reason we favor an integrated software approach instead of a hardware approach is that then the management system becomes part of the system, not an appendage to it."

Continued on page S22

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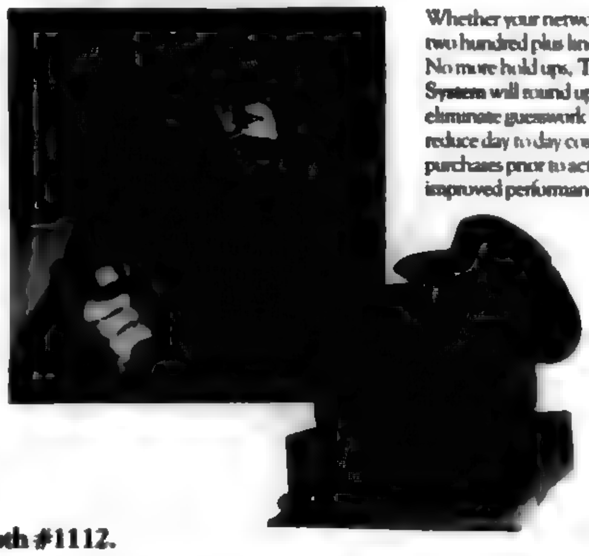

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DIAL-IN READER SERVICE NUMBER 15

Control

FROM PREVIOUS PAGE

The good news about hardware monitors is that the cost is coming down and that they continue to take advantage of new technology. In 1985, Dataswitch Corp. announced a top-of-the-line monitor for 25% to 40% less than competitive products. Within a year, prices among all the leading vendors again approached par.

Wallace T. Finney, vice-president of Emcom Corp. in Dallas, a vendor of the NCS70 network monitoring and control system, says, "We've been able to take advantage of new technologies and of the cost decrease in some of the components. Monitors are easier and cheaper to build, and we've been able to pass savings along to our customers."

Last year, Dynatech Data Systems announced its Prism system, which represented yet another advance. For the first time, each line port on the monitoring unit was controlled by an independent processor. Before this, each four-port board was controlled by a single processor.

This means a single board can now support multiple protocols, and more throughput can be handled by each monitoring port. Other vendors can be expected to match this flexibility and throughput.

Capacity planning

Once the network is operating in a reliable manner and delivering service within expected limits, management concerns turn toward the future.

The network manager is managing a resource that is in a dynamic state. He faces a constant influx of user requests for new features and functions and must evaluate the appropriateness of integrating new technologies into the system while also responding to the increasing number of users accessing the network. Without a method to plan for the future, the network manager will be overwhelmed.

Tom Krpata, network product manager at BGS Systems, Inc. in Waltham, Mass., says, "The old methods of planning, if they can be called that, don't work today. We used to bring a bunch of new users on-line and see what happened. If response time went south, which it usually did, we scrambled and tried to fix it. Today, the work going through these networks is too critical. In the time we're scrambling, the network manager could be fired."

A sound strategy of capacity planning allows the network manager to evaluate the impact of changes to network hardware, software or the number of users before the changes are actually implemented.

> "MONITORS are easier and cheaper to build, and we can pass savings along to our customers."
>
> WALLACE T. FINNEY
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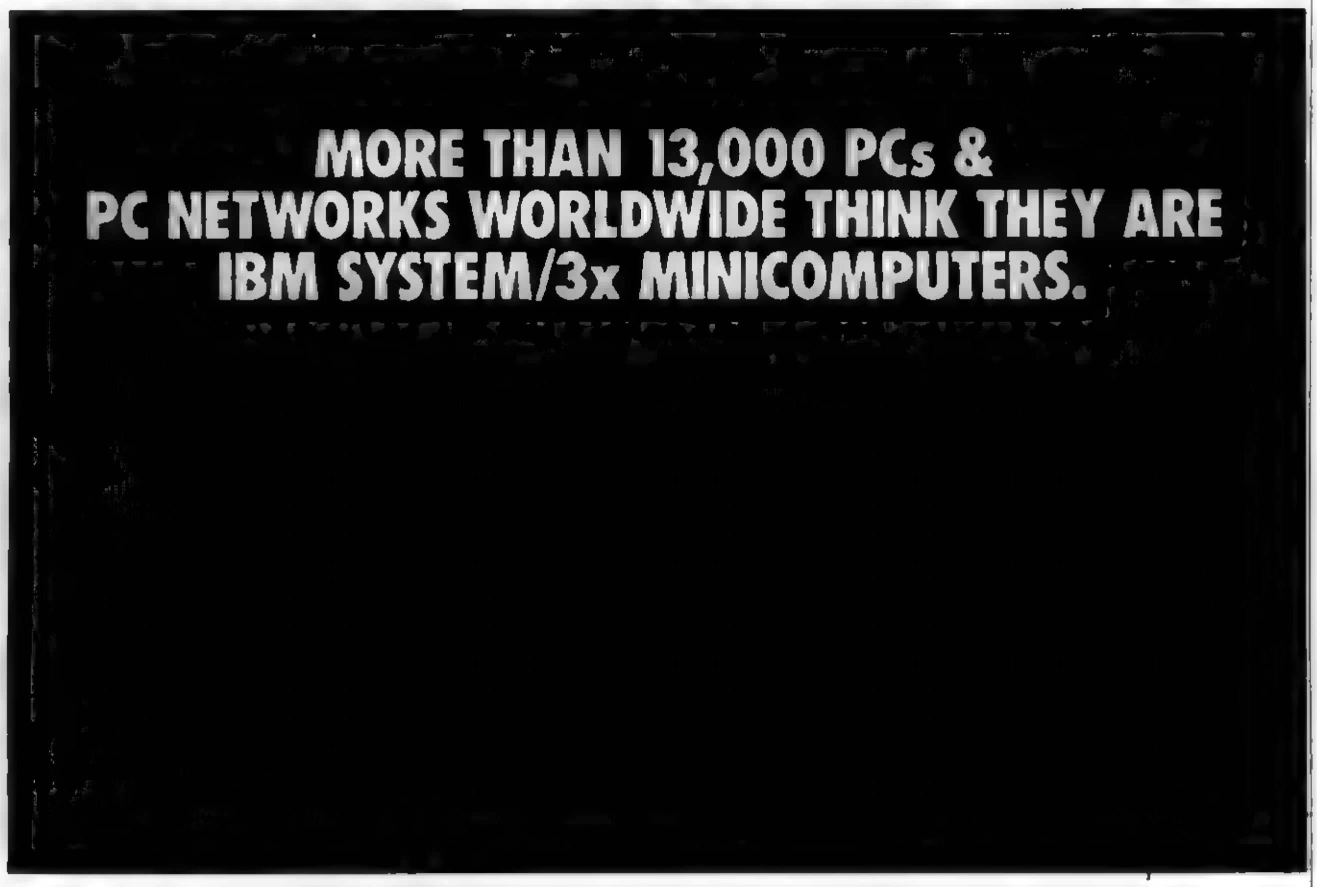
Given the critical nature of the information flowing through today's networks, it is essential that new users are brought online under existing service-level criteria and that existing network users who are sharing network resources with the new users are not adversely impacted.

"We believe in optimizing our fire fighting method by a sound operational and performance management strategy," Centel's Vidlak says, "but what's equally important is fire prevention — a sound network capacity planning strategy."

Network models are usually developed either to provide information on the performance of a network, with less concern given to the geographic design of the transmission media and devices and the costs associated with that design, or else the exact opposite.

Network performance models may be used to answer the following types of questions:

- What will happen to the response time and the message throughput if two more CCNs, with 10 terminals each, are added to a line that already supports



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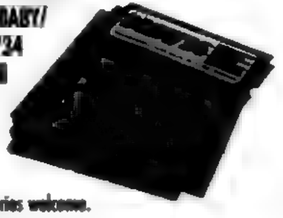

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DIAL-INQ READER SERVICE NUMBER 16

Performance Monitoring Products

			Utilization measurement			Response-time measurement													
COMPANY/PRODUCT	SYSTEM BASE	PROCESSOR BASE	OF INTERMEDIATE NETWORK	AT APPLICATION TRANSACTION LEVEL	REQUIRES DEFINITE-RESPONSE MODE	FOR TCU	FOR LOCAL LINK	FOR INTERNODE LINK	REPORTING MECHANISM	REPORTING GRAPHICS FACILITY	REPORTING GRAPHICS SOFTWARE	HISTORICAL DATA BASE REPORTING	MICS INTERFACE	FULL SCREEN PROMPTS	USER HELP SCREENS	LINK-LEVEL DIAGNOSTICS	SUPPORT FOR NON-IBM PROTOCOLS	SUPPORT FOR VM OPERATING SYSTEM	READER SERVICE NUMBER
Avant-Garde Computer, Inc. (609) 778-7000 *Net/Alert*	Stand-alone	Minicomputer	Yes	Yes	No	No	Yes	Yes	Internal	On-line	Proprietary	Yes	No	Yes	Yes	Yes	Yes	Yes	560
Chicago-Soft Ltd. (312) 525-6400 *Netspy*	Integrated	Mainframe	No	No	Yes	Yes	Yes	Yes	Mainframe	On-line	SAS	No	Yes	Yes	Yes	No	No	No	561
Data Communications Management Sciences (203) 838-7183 *Network Service Manager*	Stand-alone	Minicomputer	No	Yes	No	No	Yes	Yes	Internal	On-line	Proprietary	No	No	No	Yes	Yes	Yes	Yes	562
Dynatech Data Systems (703) 569-9000 *Prism*	Stand-alone	Minicomputer	Yes	Yes	No	No	Yes	Yes	Internal	On-line	Proprietary	Yes	No	Yes	Yes	Yes	Yes	Yes	563
Emcom Corp. (214) 423-7183 *NCS70*	Stand-alone, integrated	Mainframe, PC	Yes	Yes	No	No	Yes	Yes	Mainframe	On-line	Proprietary	Yes	Yes	Yes	Yes	Yes	Yes	Yes	564
IBM (914) 696-1900 *Network Performance Monitor*	Integrated	Mainframe	No	No	Yes	Yes	Yes	Yes	Mainframe	On-line	GDDM	No	No	Yes	Yes	No	No	Yes	565
Response Time Monitor	Stand-alone	N/A	No	No	No	No	No	No	Mainframe	Batch only	GDDM	No	No	Yes	Yes	No	No	Yes	
Intellinet, Inc. (203) 929-5699 *Intellinet 3200*	Stand-alone	Minicomputer	Yes	Yes	No	No	Yes	Yes	Internal, mainframe	On-line	Proprietary, SAS	Yes	Yes	No	Yes	Yes	Yes	Yes	566
Northern Telecom, Inc. (609) 596-[illegible] *PMM/4*	Stand-alone	Minicomputer	No	No	No	No	Yes	Yes	Internal	None	None	No	No	No	No	Yes	Yes	Yes	567
Questronics, Inc. (801) 262-9923 *Analycon*	Stand-alone	PC	No	No	No	No	Yes	No	Internal	On-line	Proprietary	Yes	No	Yes	No	No	Yes	Yes	568
Teleprocessing Products, Inc. (805) 522-8147 [illegible]	Stand-alone	Minicomputer	No	No	No	No	Yes	No	Internal	None	None	No	No	No	No	No	Yes	Yes	569
Tesdata Systems Corp. (703) 478-9320 *Smart System*	Stand-alone	Minicomputer	Yes	Yes	No	No	Yes	Yes	Internal	On-line	Proprietary	Yes	No	Yes	Yes	No	Yes	Yes	570
Uccel Corp. (416) [illegible] *Maxdamon*	Integrated	Mainframe	No	Yes	Yes	Yes*	Yes*	Yes*	Mainframe	On-line	SAS	Yes	Yes	Yes	Yes	No	No	No	571

The companies included in this chart responded to a recent survey conducted by MGT Technology Group. Further product information is available from vendors.

* Available in first quarter 1987

about 100 terminals? Will upgrading the modem on that line counterbalance the additional users?

- Will the manipulation of SNA data flow control parameters allow more service to be squeezed out of a network?
- Some money can be saved by replacing my transcontinental lines with a satellite link, will this have much of an effect on response time?
- A new CICS application is going to be sending full-screen messages to the terminal users. Will the users' service be within the CICS criteria already set up?

A network design and costing model, on the other hand, would be more likely to answer questions like these:

- What is the best way to configure 500 users in a new department that is spread throughout the country?
- What is the most cost-effective manner of implementing multiplexers and remote TCUs in a network?

A model may employ simulation or analytical techniques. The major differences between the two lie in the amount of time they require for execution, their levels of accuracy and their abilities to report on statistical deviations.

Simulation

Simulation techniques are generally more accurate and take longer to execute, and they provide not only average response-time predictions, but allow statistical deviations to be reported as well.

For example, a user could produce a report with a simulation model that would indicate the average response time expected would be six seconds but that 95% of the transactions would have a response time of less than 9.5 seconds.

This information is necessary to setting service-level agreements. Service-level agreements usually designate a guaranteed response time that will be delivered for a certain percentage of the total number of transactions.

The faster execution time of analytic models is important in other kinds of situations, however. If one was modeling large networks with many paths and intermediate TCUs, the execution time for simulation models could run into hours, while an analytic model would run in minutes.

Input to the model is based on performance information gathered in operation and performance management strategies and on configuration information available in network system files, such as the NCP generation file.

Once information from network operations, performance and planning has been gathered, it is desirable to bring it to one central repository. This is preferable, not only for the obvious reasons of organization but for easing the job of analysis as well.

Tasks such as network accounting, chargeback and auditing may require the integration of information as diverse as component failure rates, response times, throughput rates, general system availability and configuration information. A central data base can provide this integration.

Some sites have attempted to design and construct their own network data bases, but most have chosen to use existing commercial performance data bases, such as Morino Associates, Inc.'s Morino Information Control System, Merrill Consultants' MXG and Peregrine from Peregrine Systems, Inc. This route offers the advantage of allowing the integration of network data with information from other areas of the information system so that true information system management can take place.

Personnel

A network is as good as its management strategy, and the management strategy is as good as the people who implement it.

Networks may be the main evidence in the verdict against the idea that a good manager can manage anything.

As vice-president of telecommunications at The Travelers, Waltrip is responsible for an international network consisting of more than 40,000 terminals. And while Waltrip has sound management credentials, his background is in engineering. Does he think that a good manager, without a communications background, can successfully manage a telecommunications group?

"No I do not," he says. "It's one of the worst mistakes management can make. The thing you need most in this role is a

Capacity Planning Models

				Modeling capabilities											
COMPANY/PRODUCT	TECHNOLOGY BASE	PROCESSOR BASE	PRIMARY OBJECTIVE	END-USER RESPONSE TIME	INTERMEDIATE NETWORK RESPONSE TIME	SNA PERFORMANCE PARAMETERS	INPUT PROCESS	INPUT SOURCES (IBM STANDARD/OTHER)	LEAST-COST ROUTING FACILITIES	INTERNAL ROUTE TARIFF TABLES	REPORTING METHODS	REPORTING GRAPHICS SOFTWARE	FULL-SCREEN PROMPTS	USER HELP SCREENS	READER SERVICE NUMBER
Ack Computer Applications (919) 467-7279 *Tapx*	Hybrid	Mainframe	Performance planning, cost analysis	Yes	Yes	No	Manual	Other	Yes	Yes	Average/mean, statistical deviation	None	No	No	572
Aries Group (301) 762-5500 *Aries System*	Simulation	Mainframe	Cost analysis	Yes	No	No	Manual	Other	Yes	Yes	Average/mean, statistical deviation	None	No	No	573
BGS Systems, Inc. (617) 891-0000 *Best-1/SNA*	Analytic	Mainframe	Performance planning	Yes	Yes	Yes	Automated	IBM standard packages	No	No	Average/mean	SAS	Yes	Yes	574
Connection Telecommunications, Inc. (617) 584-8885 *MNDS*	Simulation	PC	Cost analysis	Yes	No	No	Manual	Other	Yes	Yes	Average/mean, statistical deviation	Proprietary	No	No	575
Contel Information Systems, Inc. (516) 829-5900 *Mind*	Simulation	Mainframe, PC	Cost analysis	Yes	Yes	Yes	Manual	IBM standard packages, others	Yes	Yes	Average/mean, statistical deviation	Proprietary	No	No	576
IBM (919) 836-5110 *Snapshot*	Hybrid	Mainframe	Performance analysis, cost analysis	Yes	Yes	Yes	Automated	IBM standard packages, others	Yes	Yes	Average/mean, statistical deviation	GDDM	No	No	577
Tapas	Hybrid	Mainframe	Performance analysis, cost analysis	Yes	Yes	Yes	Automated	IBM standard packages, others	Yes	Yes	Average/mean, statistical deviation	GDDM	No	No	
MGT Technology Group (617) 890-0303 *Analyzer Products*	Simulation	PC	Performance analysis	Yes	Yes	Yes	Manual	IBM standard packages	No	No	Average/mean, statistical deviation	Proprietary	Yes	Yes	578
Network Synergies, Inc. (317) 497-2795 *Star*	Simulation	PC	Performance analysis, cost analysis	Yes	No	No	Manual	Other	Yes	Yes	Average/mean, statistical deviation	Proprietary	No	No	579
Performix Software Corp. (415) 969-3399 *NETPX*	Simulation	PC	Performance analysis	Yes	No	No	Manual	IBM standard packages, others	Yes	No	Average/mean, statistical deviation	Proprietary	No	No	580
Technetronic Inc. (703) 749-1471 *Explicit SNA*	Analytic	PC	Performance analysis	Yes	Yes	Yes	Manual	IBM standard packages	No	No	Average/mean	Proprietary	Yes	Yes	581

The companies included in this chart responded to a recent survey conducted by MGT Technology Group. Further product information is available from vendors.

basic understanding and feeling for systems engineering. You have to have spent a lot of time designing large systems and know how to think systems. Without that understanding, it's very difficult to take a lead in the technology. It's not a management issue so much as it is one of guiding the technology."

Waltrip adds that having competent management is only the first step. Recruiting a staff of 50 or so people with adequate expertise, he says, was no easy chore. Well-qualified people are not easy to find, he says, noting that it took him about two years to get his group fully operational, even though, after 35 years in the field, he is better connected than most network managers.

"It is no secret that network expertise is at a premium," Waltrip says. People supplying the products complain the loudest about the inadequate network staffing at many shops.

Peter McLaughlin, president of Chicago-Soft explains why. "Probably the main objection we all face in this market to purchasing our products is that sites don't have the people to use them. What we have to get across is that our products actually cut back on the need for people to run the network."

Although products that leverage personnel's time alleviate the staffing problem, most people trying to staff networks perceive that the networks are growing faster than the supply of competent workers.

Expert systems

While some people seek deliverance from technology through the workings of even more technology — expert systems and artificial intelligence — most network managers are skeptical about nonhuman solutions.

Many network managers say that the operations of a network are too critical to be entrusted to an expert system. When asked, "Would you use a network expert system?" a typical comment is, "I've been in telecommunications for more than 15 years, and I still don't have all the responses to a situation straightened out in my head. You think I'm going to trust a group of programs to do it right?"

Andrew Levine, senior knowledge engineer at Bachman Corp. in Cambridge, Mass., responds to such apprehensions by saying, "You can implement a network expert system at whatever degree of automation you choose. The network manager should demand that the expert system has the ability to explain and justify its actions before they are carried out.

"So an expert system could operate on the first level of automation: 'Here's the problem, here's my diagnosis and here's what you can do,' " Levine continues. "If the network manager agrees, then the expert system can be instructed to implement the solution. A second level might be: 'Here's the problem, here's what I diagnosed and here's what I'm doing. I will continue unless told otherwise.'

"The highest level could do everything and then just print out a report. But the network manager should realize he's still always in charge," Levine says.

AI and the network will have to make friends, Levine says, because the size and complexity of network systems has grown to a point at which a single person has difficulty understanding its entire scope. Expert systems technology will not only assist the network manager in reconfiguring parts of the network, but will also tell him the global impact of the changes.

Successful implementation of these strategies of operations, performance and planning will allow the network manager to ensure that the network will fulfill its crucial role in the delivery of information throughout the corporation.

Global integration

When all the pieces of the network strategy are pulled together, the network manager will find he is providing a component of the information system in a reliable and consistent manner. But it is still only a component. The end user is not properly served until all components of the entire information system are providing this reliable and consistent service.

Many technicians in other areas of the information system have already realized the need for this sort of global integration. Robert Ashton, president of DB View, Inc. in Waltham, Mass., a leading supplier of IBM's relational data base DB2 products and services, says, "I work with some of the largest corporations in the world, and a number of them are currently dedicating tremendous resources at great cost to make information available through centralized and distributed data bases.

"It's important," Ashton says, "that these companies keep an overall view of the information system during this data base development. Without other components of the information system — like the network — holding up their end of the information delivery system, the most sophisticated data bases are going to sit mute."

It is not enough for a network manager to produce sound management strategies for the network. He must also maintain communications channels with his counterparts in complementary areas of information system management. Only in this way can technological advances combine to produce an authentic "period of brilliance" in information management.

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DIAL-INQ READER SERVICE NUMBER 6

Price Waterhouse boosts micro penetration to 31%

Top management insists on corporate microcomputer standards and enterprisewide training from Day 1

BY JEAN S. BOZMAN

Paper. The process of auditing a Fortune 500 firm generates thousands of pieces of paper. Tax returns, audit trails, working papers — all are the handiwork of the dozens of accountants who must verify a major corporation's financial statements.

Until the advent of the microcomputer barely five years ago, there was no way around all that paperwork and the trouble it took to keep it all organized.

In the 1980s, many of the Big Eight accounting firms — notably Peat, Marwick, Mitchell & Co. and Coopers & Lybrand — have attempted to incorporate microcomputers into their own operations.

But at least one Big Eight firm, Price Waterhouse, realized that incorporating the use of microcomputers into its infrastructure could sharpen the company's competitive edge.

While not the biggest of the Big Eight, this company perhaps has gone the furthest in distributing micro technology throughout its far-flung operations in 96 U.S. offices and 99 countries throughout the world. Price Waterhouse has always viewed itself as a company that gives its clients — which include such multinationals as IBM, Exxon Corp. and Amoco Corp. — a premium service. The firm's motto is, "Expect more from us."

For every desk a micro

After experimenting with Tandy Corp. TRS-80s in 1981 and 1982 and then working to exploit IBM's Personal Computer, Price Waterhouse management came to believe that the technology should be spread throughout the organization.

STAN KAPPIRIS

Price Waterhouse's *Richard McKnight (r) and Donald Allen*

> "WE HAVE to go back to the principle that we are a firm whose main asset is its people. Training on micros is part of an ongoing commitment to keep our staff current. . . . It's worth the cost."
>
> RICHARD MCKNIGHT
> PRICE WATERHOUSE

Price Waterhouse's operations are divided into three divisions: Audit and Accounting, Tax Services and Management Consulting Services (MCS). Donald Smith, an MCS partner, estimates that Price Waterhouse maintains 3,000 personal computers throughout its U.S. operations for its 700 partners and more than 8,500 other employees — roughly one micro for every three professionals. The aim, he says, is to put a PC on every desk by the 1990s.

As Richard McKnight, another MCS partner, observes, "Micros are continuing to grow in their usefulness, and they make the smart person more productive."

To ensure that the micros were well dispersed and well supported, top management standardized the technology, meaning that wherever a Price Waterhouse accounting or tax team travels in the U.S., it can expect to find the same IBM PCs, Personal Computer ATs and Compaq Computer Corp. 286s.

The members of the tax division, as well as MCS staff, use a pair of Apple Computer, Inc. Macintoshes to develop graphics and slides for presentation. The two Macs, alone in an office full of IBM PCs and PC compatibles, survive because of their unique bit-mapped capabilities, which suit them for the development of audiovisual aids. A few laptops are used for field visits, demos and plane trips, but generally people would rather haul the portable Compaqs, which weigh more than 20 pounds each.

As with the hardware, software is standard, too. Some tools are off-the-shelf packages such as Lotus Development Corp.'s 1-2-3; Javelin Software Corp.'s Javelin spreadsheet product; Borland International's Reflex, the Analyst; Cosmos, Inc.'s Revelation; and Ansa Software Co.'s Paradox data base management system. Others are written internally by the consulting and tax divisions.

The Corporate Computer-Assisted Tax Services (CCATS) group, for example, employs dozens of programmers to write micro-based programs for the tax division. MCS often dispatches special teams of programmers to develop a custom micro package for one of Price Waterhouse's corporate clients. Many of these programs contain self-conducted training sessions. One of the firm's standard accounting tools, the Audit Practice Support System, contains a built-in training module for first-time users, complete with menus and prompts.

Accountants' productivity

The best feature of this end-user PC-focused strategy is that it boosts accountant productivity, allowing, for example, tax professionals to build up tax statements for entire divisions in a matter of several hours. In the process, such programs consolidate data, combining many paperwork steps on a single floppy disk.

In addition, this strategy allows Price Waterhouse to move to the forefront of leading-edge technologies. Because the firm purchases a significant number of micro products — and wields some influence over its clients' purchases — it offers vendors an

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Bozman is *Computerworld's* Midwest correspondent.

ideal site for beta testing of new hardware and software. The firm often receives early shipments of new products as well; it was one of the first recipients of Compaq's 386 computers. Similarly, IBM provided Price Waterhouse with a preview of its PC Convertible through a nondisclosure agreement six months before its release.

Two-way communication

A microcomputer steering committee — consisting of Chairman McKnight, Smith, partners John Zembron and Robert Odmark and Thomas Green, director of computer services at Price Waterhouse's National Administrative Center in Tampa, Fla. — meets quarterly in Tampa to discuss microcomputer issues. This committee, in existence since 1983, was formed to help coordinate, set standards for and give feedback on Price Waterhouse's computer strategy and to discuss new products coming into the market.

The members of the microcomputer committee also speak to each other weekly by telephone to respond to emerging issues. Jay Levine, director of Price Waterhouse's Computer-Assisted Tax Service (CATS), says that similar conversations with his counterparts in the UK, Canada and Ireland also take place by telephone. Price Waterhouse's U.S. partnership, although distinct from its foreign operations, depends on overseas offices' providing data about international and multinational clients.

The results of these conversations among micro managers are often printed in the tax division's monthly newsletter. The publication, "CATS Update," includes software reviews, a feature on tips and techniques and hardware updates.

The communication concerning micros is not one-way, however. In fact, feedback from staff and partners alike is expected. "We keep the communications going both ways," says Levine, who is based in New York. "In every regional office there is a point person to whom we send new software. That person is responsible for local distribution of software within that office." The point person is also in charge of directing complaints, problems and feedback on micro matters to Levine and his four assistants — all of whom were rotated from regional offices for a two-year tour at Price Waterhouse's New York office.

The firm's 90 regional offices are routinely polled by end-user support specialists to see if the offices are having any trouble with the micro technology or its accompanying software. If an office runs into difficulty, software support personnel are able to look at the user's micro screen by running Meridien Technology, Inc.'s Carbon Copy package on micros at both ends of a telephone line. This kind of remote diagnostics speeds installation of both off-the-shelf and custom software products at either a client site or another Price Waterhouse office.

Some of the micro software, such as the tax division's Tax Management System (TMS) package, takes into account the necessity of moving client data from a mainframe into the series of local-area networks (LAN) — including networks from Novell Corp., Banyan Systems, Inc., IBM, Sytek, Inc. and Ungermann-Bass, Inc. — at Price Waterhouse. The mainframe data can enter the networks through a variety of entry points.

At A Glance

Price Waterhouse

Founded: London, 1849
Revenue: $645 million (fiscal 1985)
Market share: No. 1 auditor for Fortune 500
Partners: 753 in the U.S.; 17,000 worldwide (99 countries)
Employees: 8,500 in the U.S.; 26,000 worldwide
Services: Accounting, auditing, tax, management consulting, merger and acquisition, actuarial consulting

INFORMATION PROVIDED BY PRICE WATERHOUSE AND THE "PUBLIC ACCOUNTING REPORT"

One convenient entryway is through a tape-to-hard-disk converter at Price Waterhouse's Chicago office. To use it, the client simply ships mainframe data on a standard 12-in. tape to Price Waterhouse for conversion. Another gateway is provided by a series of micro-to-mainframe software links that allow mainframes to share data on-line with high-capacity file servers scattered throughout Price Waterhouse's largest offices in New York, Chicago, Los Angeles and St. Louis.

A more productive staff

Certainly, the increased use of micros helped Price Waterhouse cut down on paperwork. But, as a side effect intended by the company, the micro strategy also made the firm's partners and staff more productive.

"When Price Waterhouse made a formal commitment to spreading micros throughout the practice, managers and partners came up to me and asked to take a Compaq home with them on the weekend," notes Steve Owens, a senior consultant with Price Waterhouse's consulting division in Chicago. "Some of them said, 'I've got a million things to do in the office, so this is one less thing I have to do there.'

"A lot of partners take a very active interest in micros," Owens says. "We're not forcing the technology on people, but most of the partners who wanted to learn have learned."

Richard Highberger, a partner in Price Waterhouse's tax division and manager of CCATS in Chicago, finds the company's micros very useful. "The first thing I do

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when I get to the office is turn my machine on," he says. "Then I read administrative memos from other managers in the company and write memos back to them.

"I very rarely make changes to a program or report on hard copy any more," Highberger says. "I do all my editing onscreen."

Distributed technology

Micros figure prominently in day-to-day work at Price Waterhouse. In the Chicago office alone, more than 200 micros are available for 350 staff members. Dozens of software packages are also available to anyone who needs them. If the equipment or software is not on an employee's desk, he can check it out from what acts as a lending library at the office.

Judy Solochek acts as microcomputer coordinator for the Chicago office. "We log the equipment in and out, just like a lending library," Solochek says. "People call me if they want to reserve equipment and then it's assigned out on a priority basis."

Solochek uses Borland International's Reflex micro DBMS package to track all micros lent to the staff and all software distributed from the Chicago office's cache of micro supplies.

For off-site visits, auditors often make the lending library their first stop. They must check out portable Compaq micros and blank floppy disks from this central point and are accountable for hardware and software in their possession.

Such supervision of micros fits in neatly with Price Waterhouse's MIS directives, which require both widespread distribution and oversight of microcomputer technology. "It's unreasonable to think that we can mandate the end user's choice of software and hardware," McKnight says. "But we try to provide the right kind of software to our accountants and tax professionals so they can turn their attention outward to our clients — not inward, worrying about how to do work on their micros."

Software that complies

Many times, the right kind of software is on the shelf — 1-2-3, Carbon Copy, Reflex and other packages. But some of Price Waterhouse's challenges are unique, explains McKnight, who is also national director of professional software development. And that is where a software staff numbering in the hundreds comes in.

Levine's New York-based CATS group, Highberger's CCATS group in Chicago and McKnight's group in Tampa are all charged with writing software solutions that cannot be bought in any retail outlet. For example, CCATS developed the TMS package, which helps tax professionals create financial statements that call attention to irreconcilable balance sheets.

"TMS gives tax professionals the ability to perform the basic tax accounting necessary for compliance with federal regulations," Highberger says. "We've set TMS up so that it looks like a spreadsheet. We use our attached local-area network disk servers to provide the data base that builds these spreadsheets."

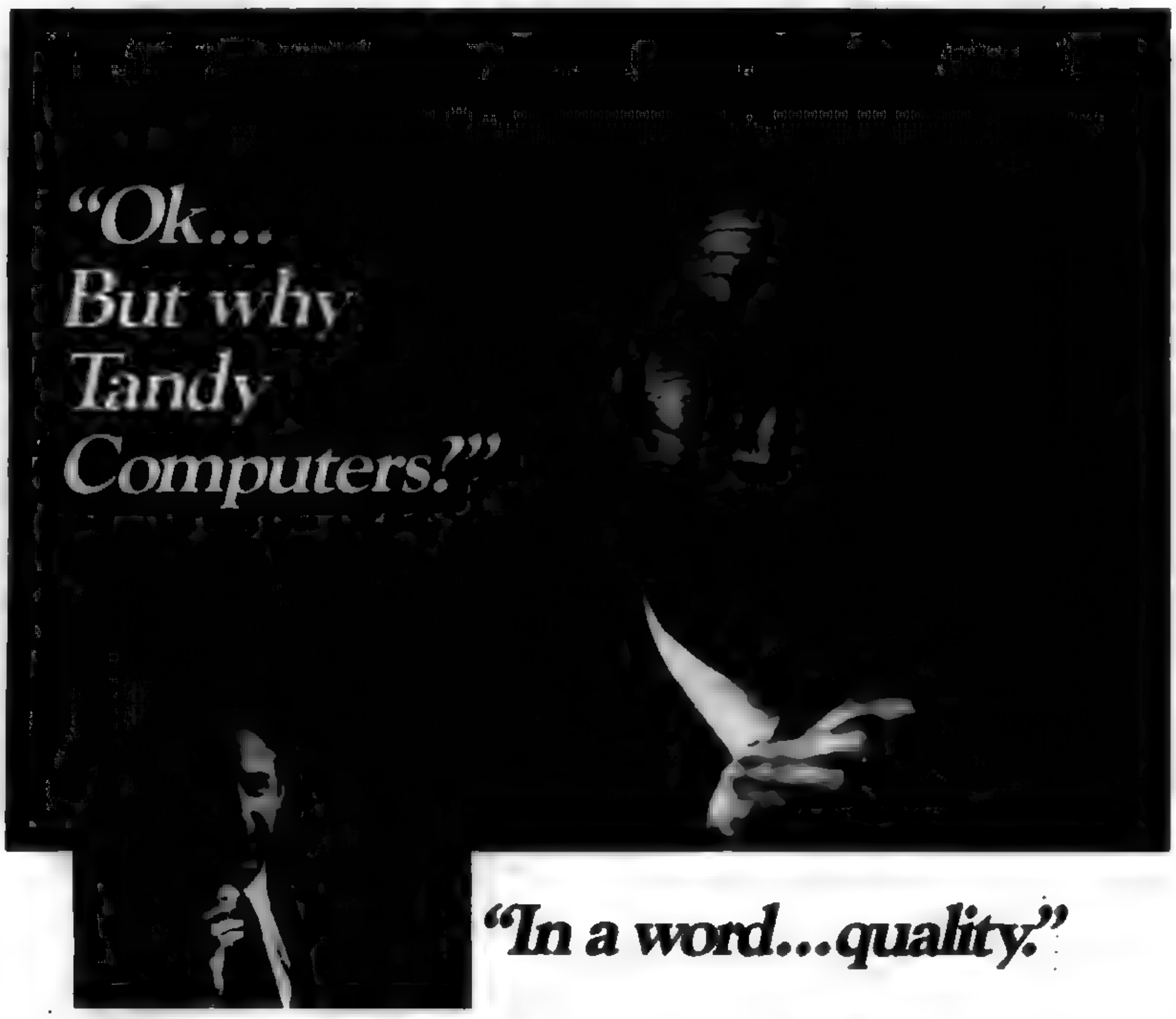
Best of all, the system is designed to be user-friendly. TMS makes use of eight colors on a PC AT to highlight the cursor position and to point out figures that do not reconcile. Pop-up windows show the work sheet calculations that support each set of revenue or earnings figures.

"It's designed so that a tax professional can come in and use the power of the machine without becoming a programmer first," Highberger explains. "TMS uses prompts and menus, and it's all laid out logically, in the same way that a tax professional does his work on paper."

Until now, most microcomputer software development at Price Waterhouse has been done in Microsoft Corp. MS-DOS, IBM PC-DOS and in Basic. But McKnight, for one, is seriously considering adding Unix and the C language to that list. The development machine would not be an IBM PC, but rather a Digital Equipment Corp. Microvax minicomputer.

"Up to now, every micro operating system we've used has given us the functionality we needed," he says. "But now we're finding that speed in our software development is a requirement, too." Using C, experienced Unix developers can develop source code quickly and then do the small job of recompiling the code to get it to run under the IBM machine's operating system.

MIS remains a distant backdrop for all microcomputer software development, McKnight notes, but it was not



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always that way for Price Waterhouse end users. Before micros came along in numbers, Price Waterhouse's staff used Tampa's computing center as a time-sharing resource for compute-intensive calculations. Now MIS is free from supporting many of these end-user applications and can turn its attention to mainframe- and mini-based corporate administrative software.

Training from the start

Software like TMS is standard working equipment for Price Waterhouse accountants. Training in both micro hardware and software is mandatory and reaches to all segments of the company's operations.

"All professionals starting out with the firm are introduced to micros," Owens says.

"Everyone receives some training in Lotus 1-2-3, for example. Typically, our training is done in-house by Price Waterhouse people. Initial training in micros takes three weeks, but it continues throughout a person's career at the firm."

Depending on the employee's division and rank at Price Waterhouse, each staff member at the firm can learn the micro methodologies in a number of ways. Some may travel to Price Waterhouse's National Administrative Center, which houses the firm's MIS operations. Others are rotated through various home offices to accumulate special training related to their field — including the use of micros.

Each summer, Price Waterhouse sponsors a series of two-week training sessions at a conference center in Reston, Va. The program, called Tax/Select, is mandatory for the 1,200 Price Waterhouse personnel below the level of senior management in the company's tax division.

While microcomputer courses are just part of the summer-session course offerings, each staff member must take some micro courses during his tenure at Price Waterhouse. Senior managers and partners attend other in-service educational sessions at a four-day Tax Management Group Seminar held each October by the tax division in a major U.S. city.

Weighing the expense

The expense of such widespread training is great, amounting to hundreds of thousands of dollars for hardware alone. Yet, Price Waterhouse managers say, the results are worth the expense and the trouble of coordinating the microcomputer strategy.

"It's worth the cost," McKnight maintains. "We have to go back to the fundamental principle that we are a firm whose main asset is its people. Training on micros is part of an ongoing commitment to keep our staff current and literate on the state of their profession."

In Tampa, Price Waterhouse's computer center relies on a new IBM 3090 Model 150 and a DEC VAX 8500 as its primary production machines. The 3090 recently replaced a pair of older IBM 4381s. A number of other computers are also used, including systems from Honeywell, Inc., Hewlett-Packard Co. and Prime Computer, Inc. Many of these incompatible machines are maintained primarily to support accounting activities at client sites that use computers of similar architectures, Price Waterhouse managers say.

The data center is staffed by nearly 100 people — a large fraction of the Tampa office's total staff of 250 people. One day, MCS's Owens says, microcomputers will be manipulating most corporate data locally — either on a floppy diskette, an attached

SOFTWARE like TMS is standard working equipment for Price Waterhouse accountants. Training in both micro hardware and software is mandatory and reaches to all segments of the company's operations.

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hard disk or a file server on the LAN. But while PCs are widespread at Price Waterhouse, a lot of data still resides at the Tampa DP center.

As for software, MIS uses Software AG of North America, Inc.'s Adabase and Natural and IBM's IMS data base manager on the IBM mainframe.

According to CATS' Levine, computer managers are using these DBMS packages in conjunction with the IBM 3090 to build a corporate data base of tax facts that can be accessed by Price Waterhouse's tax professionals throughout the country via a dial-up time-sharing service. This codification of more than 4,500 tax facts is often based on electronic mail memos from tax managers, each dealing with a unique point of the current federal tax code.

The years spent ironing out the micro strategy have also rubbed off on Price Waterhouse's client practice, Smith says. "We try to identify how we can apply the new microcomputer technology to our consulting practice," he explains. "We have the opportunity to go into large companies and see how large systems are actually used at the worker level. The interesting thing about micros is that they're really being used as the worker's mainframe."

Push to downsizing

Price Waterhouse consultants show clients how, by spending money up front for micro hardware and software, they save in the long run. Smith pushes clients to explore downsizing — moving traditional mainframe applications down onto microcomputers. "For less than $30,000, a client could reap the benefits of millions of dollars in savings for mainframe hardware and software," Smith says.

"Through peer-to-peer processing, the PCs talk to one another, moving data back and forth," says Jarrad Bunch, an MCS manager, who spoke to Price Waterhouse clients at a recent Chicago-area seminar. "The mainframe further processes the data and sends back an appropriate response. This kind of application is not for everyone, but it does take us closer to the day when the mainframe is a file server and all workstations are intelligent."

CCATS' Highberger advocates the use of hard disks on all types of PCs at the firm to speed performance and also to allow users to capture data more effectively. The addition of hard disks to the microcomputers — along with the presence of high-capacity disk drives of 100M bytes or more on the corporate network — allow client corporations to ship mainframe data close to the Price Waterhouse consultant or auditor for later analysis on micro spreadsheets.

Price Waterhouse encourages its clients to move to micros for accounting applications. The firm sponsors seminars in regional offices and holds an annual seminar for clients.

When a client makes the move to microcomputers, Price Waterhouse finds its own auditing and accounting job made that much easier. All data for a particular audit can then be easily kept in a file of floppy disks, and the data the client inputs will easily feed into the Price Waterhouse accountant's set of software packages.

This is the area in which Price Waterhouse's consulting business and its traditional accounting services merge. Along with its in-house software, Price Waterhouse often develops custom software packages for its clients, offering to break off special development teams from its staff of programmers and charge clients for the professional time involved. MCS's Owens puts it this way: "I can develop a new system in three months that is cheaper, faster and more functional than many of the mainframe packages available to a Price Waterhouse client today."

"THE INTERESTING thing about micros is that they're really being used as the worker's mainframe."

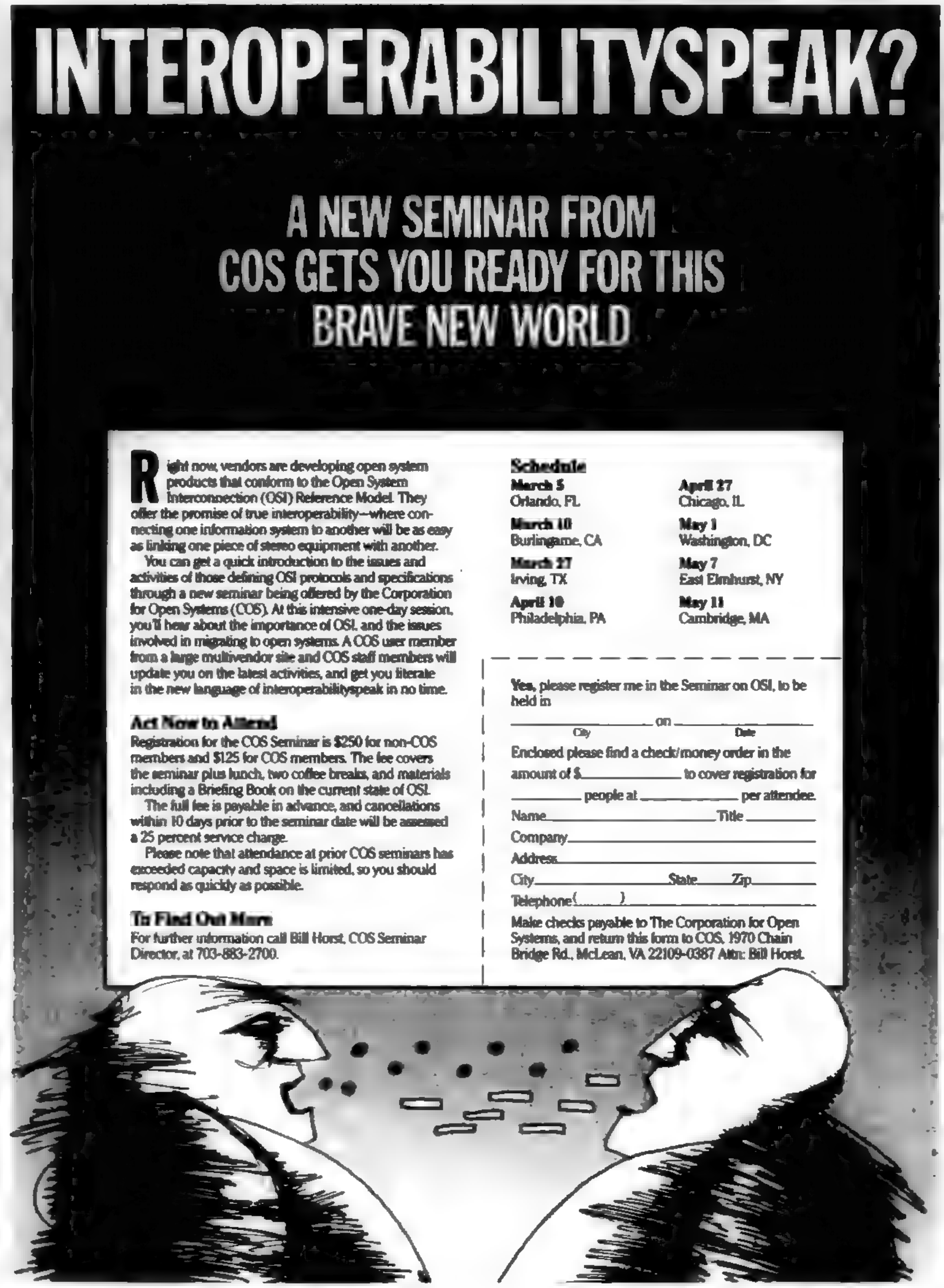
DONALD SMITH
PRICE WATERHOUSE

Riding the crest of technology

As for Price Waterhouse's own staff — about 10,000 in the U.S. alone — micros will become a standard tool of their trade, if they have not already. Price Waterhouse maintains two offices that do nothing but evaluate leading-edge technology, McKnight says. The Technology Assessment Centers, located in Palo Alto, Calif., and in London, are evaluating breakthroughs in such areas as artificial intelligence and voice recognition. When these technologies mature, they will allow individual micro users to do jobs that used to require several people and a mainframe.

"We think the coming crest of technology is going to have the greatest impact on professional services such as our own," McKnight says. "We think that the technology we'll be able to bring on-line in the next three to five years will significantly affect the kind of services we provide, and that means doing the job better and, often, with fewer people."

Fewer people at Price Waterhouse does not mean staff cutbacks are anticipated; rather, management expects the firm to grow through the use of micros. McKnight explains, "When we expand the amount of work we're doing, we won't do it with fewer people. Rather, the people we have will be more experienced, because we're allowing the computer to carry the burden of the calculations."



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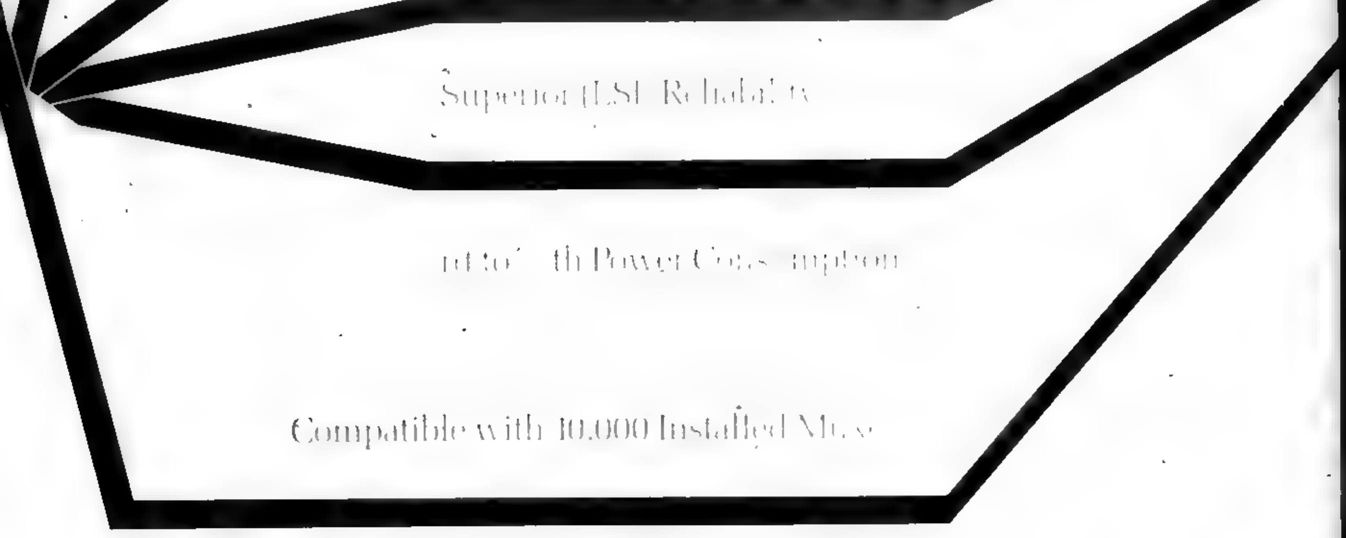
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Jeffry Beeler

Product delay hurts MIS, too

Whenever a vendor announces a major product that later proves to be seriously flawed, industry watchers invariably wonder how the unforeseen setback will affect the company's short- and long-term fortunes. Seldom, however, do the same pundits devote a comparable degree of attention to the question of whether such hitches are likely to make life difficult for the product's intended users.

Yet any technological bug that delays a system's deliveries or detracts from its potential performance holds at least as many implications for buyers as it does for sellers. Few members of user organizations feel the impact of product-design foul-ups as keenly as MIS executives, who sometimes find themselves victimized by the goofs in ways that may not be immediately apparent to anyone else.

Consider, for example, the case of Darlene Litcher, information systems chief at the Oakland, Calif., office of the Department of Energy (DOE). Like most other users of Hewlett-Packard Co. equipment, Litcher holds HP in extremely high regard and is hard-pressed to find any major faults with the firm's products.

As one of the largest users of the vendor's business systems, the DOE's Oakland site recently began thinking about what processor model it should migrate to when it outgrows the largest of HP's existing 16-bit minicomputers. Not everyone in the organization reached exactly the same conclusion, however.

Litcher's bosses proposed the idea of investigating system providers other than HP. But Litcher, a die-hard HP devotee, strongly urged the DOE to stick with its current processor supplier. At the same time, she also began formulating long-

Continued on page 73

Avon Products' expansion demands corporate MIS strategy to link units

BY ALAN ALPER
CW STAFF

NEW YORK — To MIS employees at Avon Products, Inc., the corporate motto, "Avon calling," is taking on a new meaning.

Diversification into health care services and mail-order fashion has caused Avon, once known exclusively for beauty products, to create a corporate information system. The system, currently in the prototype stage, will serve as a repository for critical corporate data — including competitive intelligence — to help managers guide the diversified consumer products firm in its sundry ventures.

"We wanted management to be able to make better informed and faster decisions," explains Rainer F. Paul, who in January 1986 was named Avon's vice-president for corporate management information services, the century-old firm's first corporate MIS executive. "What it boils down to is competitive advantage. If they get better information, faster, there must be some advantage."

After three years of planning and preparation, Avon is installing a system to handle information on finance, human resources, administration and, perhaps most important, the competitive environment. Assembling a corporate system, Avon executives reasoned, would eliminate redundant data collection, provide a clearer picture of corporate performance and help management shift from an administrative to a leadership role at the $3 billion concern.

The effort was not justified by cost savings to offset the declining revenue and profitability in recent years, Paul says. "It was time savings that was the justification," he adds.

However, the infrastructure will help Avon share data processing expertise throughout

Continued on page 73

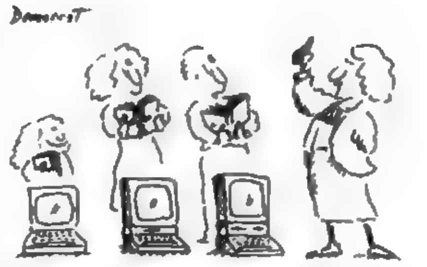
UPDATE

Creative cures for PC phobia

BY JOSH BRACKETT
SPECIAL TO CW

Many employees look forward to learning to use a personal computer with the same eagerness they might reserve for their first solo sky dive. And most training professionals are acutely aware of that fact. Only a treasured few users adopt micros with the zealousness of the Buckaroo Banzais and Indiana Joneses of today's adventure films. Indeed, most current users did not incorporate PCs into their work routines because they found them particularly exciting or easy to use. On the contrary, they learned to use microcomputers in order to become more productive, despite the sometimes humdrum learning process.

Uninspired employees who are expected to use PCs, therefore, are going to need help, especially in getting started. This is where creative micro training techniques come in. *Computerworld* surveyed PC trainers to discover the methods they use to get reticent users excited about learning to use microcomputers.



Continued on page 65

Co-op put to work

Firms attempt to keep industry talent in area

BY ALAN J. RYAN
CW STAFF

DALLAS — When companies in the Southwest found they were having a tough time filling high-technology positions, they decided to band together.

The result was the Southwest High-Technology Cooperative, a group composed of staffing managers and human-resource executives from some 40 organizations in the Dallas-Fort Worth area, including American Airlines and Electronic Data Systems Corp.

Formed in 1985, the group's aim is to keep data processing professionals, engineers and telecommunications specialists in the Southwest, an area that was losing workers to other parts of the country, according to Richard Bell, a staffing manager at accounting firm Arthur Young in Dallas.

"In reality, [cooperative members] all compete against each other for the same talent," but now they help each other at the same time, Bell says.

Cooperative members often refer prospective employees to other members. "A good candidate with some specialized experience may interview with a member company that doesn't have an immediate opening or doesn't require those particular capabilities," Bell observes. "With the applicant's permission, the recruiters can contact member firms whose needs match the individual's experi-

Continued on page 71

MANAGEMENT MEMO

Freshmen cool on programming; Bay Area turnover to rise

College freshmen's interest in computer careers has dropped, due in part to end-user computing and the computer industry slump, according to an annual survey by the University of California at Los Angeles and the American Council on Education.

The percentage of freshmen interested in a career as a programmer or systems analyst last year was 3.5%, down from 4.4% in 1985 and a peak of 8.8% in 1982, according to a survey of 290,000 students from 552 colleges.

More students realize they can use computers without being a programmer or analyst, while others are wary of the industry downturn, according to Kenneth C. Green, associate director of the university's Higher Education Research Institute.

"They also know computer science is one of the most difficult programs because they've had some exposure [to it]," Green said.

The results suggest a shortage of highly skilled computer professionals in three or four years, he predicted.

■

San Francisco-area employers feel their low rate of data processing staff turnover will catch up with East Coast rates, according to a consulting firm.

A turnover rate of 7% to 8% for the area stems from mergers and reorganizations by some of the area's large financial institutions and retailers, as well as the weak Silicon Valley economy, according to Edward Perlin Associates, Inc. in New York.

Employers who took part in a roundtable discussion held by Perlin Associates say they believe the rate will climb back to the 16% to 17% level of the Boston and New York areas as the local economy stabilizes, the firm reported.

■

Fortune 500 companies' spending for computers this year will pick up from 1986, although spending on mainframes will show little or no growth, according to a survey.

More than 45% of the 60 Fortune 500 firms surveyed plan to increase spending on computers this year, according to the Sierra Group in Tempe, Ariz.

MANAGERS ON THE MOVE

Frederick H. Hudoff has been appointed president of **Martin Marietta Data Systems, Inc.**, a division of Martin Marietta Corp., in Greenbelt, Md. Previously, Hudoff, 54, was the company's vice-president in charge of the air-traffic control division, where he oversaw a contract for integration of the Federal Aviation Administration's air-traffic control system.

Hudoff succeeds **Patrick J. Zilvitis**, who has resigned to pursue other interests, the company said.

Brian N. Etheridge, 46, former deputy program manager and technical director of the air-traffic control organization, will replace Hudoff as the vice-president in charge of the division.

■

Hoffman-La Roche, Inc. of Nutley, N.J., has appointed **William S. Passas** director of information systems, with responsibility for expanding and upgrading the company's data processing system.

Prior to joining the company, Passas was vice-president of AFIA Information Systems.

■

Gesco Corp. of Fresno, Calif., a provider of financial information processing services to savings institutions, has appointed **Leyden L. Hahn** executive vice-president of systems development.

Hahn will oversee Gesco's systems development and applications enhancement, including development of an integrated systems architecture. Previously, Hahn served with the company as first vice-president of systems development and worked for Baldwin Data Services and Adolph Coors Co.

■

Contel Corp. has appointed **Dale M. Cunningham** to the new position of vice-president, information technology integration.

Cunningham, who reports to **Ken Bottonari**, vice-president, management information systems, is responsible for evaluating the company's information technology requirements and designing a system to satisfy them.

He came to Contel, a provider of telecommunications and information processing products and services, from Harris Corp., where he was director of telecommunications and applications, corporate information management.

■

Independence Information Systems, a subsidiary of Independence Bancorp in Perkasie, Pa., has named **Patricia L. Bleasdale** administrative vice-president and director of management information systems. Bleasdale was systems manager at Norwich-Eaton Pharmaceuticals, a subsidiary of Proctor & Gamble Co.

■

Jack Williams has been appointed director of corporate management information systems at **Electronic Associates, Inc.** in West Long Branch, N.J. Williams, originally a systems programmer at the company, previously served as its manager of systems administration and operations.

■

Roy A. Felty has been named director of management information systems by **Datamedia Corp.** in Nashua, N.H. Prior to joining Datamedia, Felty served as director of MIS and telecommunications at Popular Services, Inc. in Garfield, N.J., and as regional MIS director for the former Sperry Corp. in London.

■

GTE Electrical Products of Danvers, Mass., has appointed **John E. Jones** manager of human-resource data systems. Jones, who started at the company as a programmer analyst, previously served as supervisor of the data processing information center.

■

Larry Buresh has been named vice-president of information services at **Frank's Nursery & Crafts, Inc.** in Detroit. Formerly, Buresh served as vice-president of information systems at Ben Franklin Stores.

■

David P. Weber has been appointed manager of the Computing Services Department at the U.S. Department of Energy's **Argonne National Laboratory**. Previously, Weber served as manager of the Accident Analysis Section of the Reactor Analysis and Safety Division at Argonne.

■

Gregory S. Staszko has been named a partner in management advisory services of **Deloitte Haskins & Sells** in Cincinnati. Staszko was formerly a director of systems implementation services for KMG Main Hurdman.

■

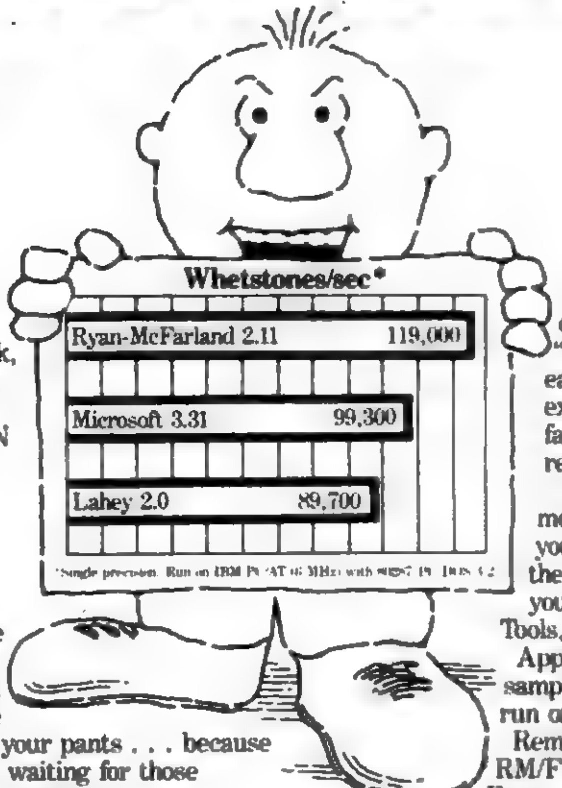
Booz, Allen & Hamilton, Inc. in Chicago has named **James M. Stierwalt** a vice-president. Stierwalt is leading a multimillion-dollar effort by the Chicago-based Railroad Retirement Board to design a retirement claims processing system.

■

Zurich Insurance Co.'s U.S. branch, based in Schaumburg, Ill., has promoted **Ken Palese**, former manager of the development and education center, to assistant vice-president and director of data services support.

The company also named **Terry H. Towle**, who was previously a business systems analyst, as assistant manager of the data service commercial policy processing area.

KILLER FORTRAN.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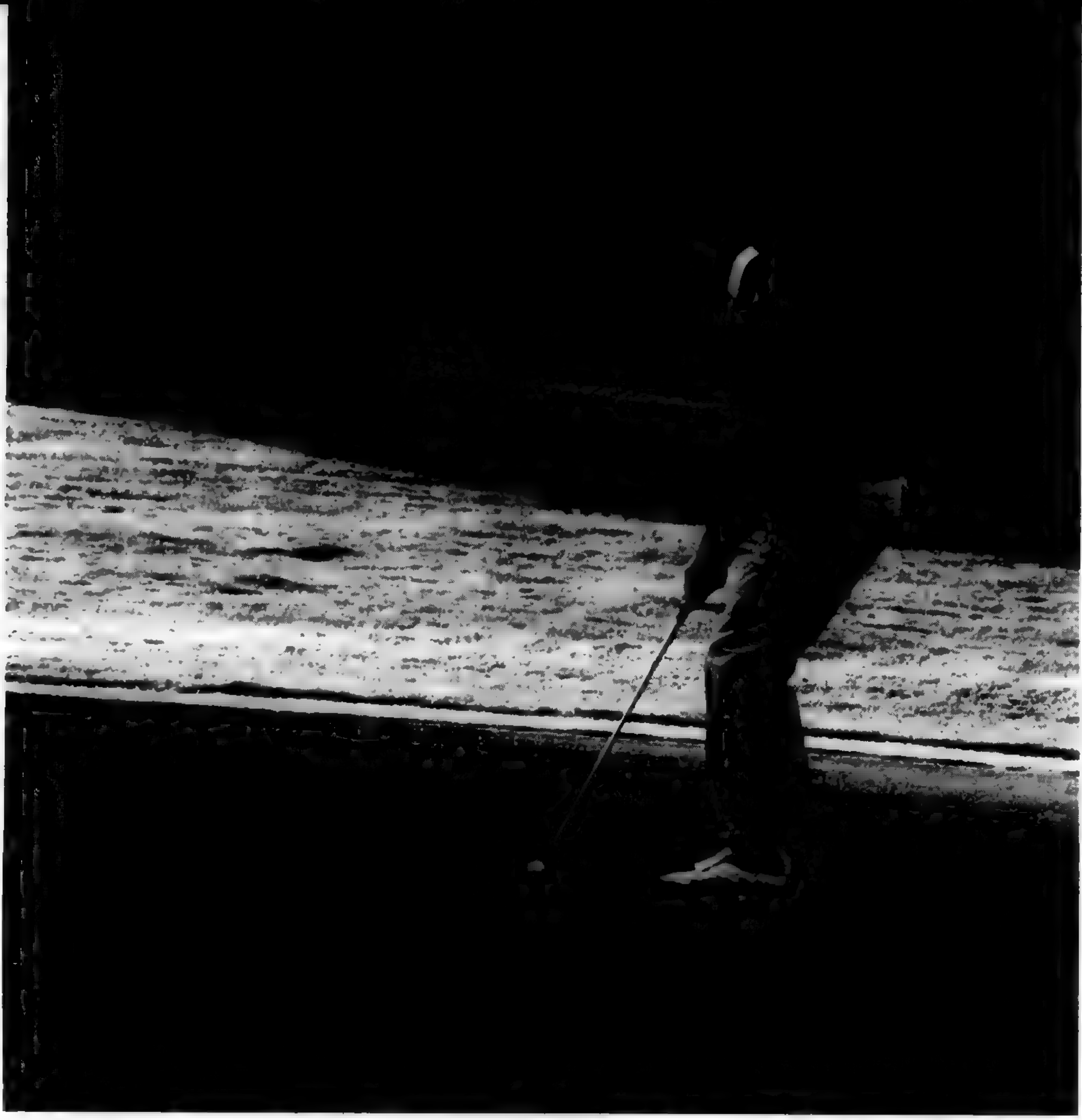

Bob Ashworth
VP General Manager
Information Technologies Division
McKesson Corporation
Age: 44
Budget: $65 million
Golfer

With micros, networking and telecommunications becoming more important every day, the influence of Information Services is extending well beyond its traditional boundaries. And with it, the influence of IS professionals. Bob Ashworth and thousands of other aggressive computer professionals like him are clearly on the fast track in America's larger corporations, controlling more than $120 billion every year.

Bob started with McKesson, the world's largest distributor of pharmaceutical products, as a project manager in applications development. His biggest single responsibility: the implementation of McKesson's proprietary Economost micro-based inventory/ordering system for druggists, which has often been credited with the company's fast rise to leadership in the highly competitive pharmaceutical distribution industry. With Economost running smoothly, Bob's attention is primarily devoted to serving the corporation at large. That means providing decision support for those who need it, guiding the company in its acquisition of PCs (600 to date), and assessing the potential applications and value of a corporate LAN.

In his spare time, Bob's an avid golfer, a snow skier, water skier and a jogger.

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Creative

FROM PAGE 61

Although there is no standard taxonomy, most trainers sort microcomputer learners into three broad categories:

- Beginners, many of whom have never touched a computer. This category often includes executives, who are usually more interested in the PC's role in their organizations than in putting their own hands on keyboards.
- Intermediates, who have learned one or more of the popular word processing, spreadsheet, data base or graphics software packages and perhaps something about the disk operating system.
- Advanced students, who are working independently at a near-professional level on large, complex applicatons.

Each group requires a different training approach. Most trainers agree that PC instruction is a cumulative process, with beginners requiring more human interaction and refined technique than intermediate students. And, as the intermediates advance, these users determine what they need to know and learn to teach themselves, eventually requiring only a minimal amount of instructor interaction.

Starting out

Beginners often face their first PC semiparalyzed with fear and embarrassed by their lack of technical savvy. In this situation, they need, more than anything else, patient guidance.

One trainer fighting the fear battle is Al Kirkpatrick of Southern Company Services, Inc. in Atlanta. He manages DP training for the energy holding company, which employs 31,000. "We do everything we can to make PC training a little more fun and a little more human," Kirkpatrick says. "We try to personalize it. We have computer fairs, open houses in the information center and serve popcorn, and we even let them bring their Cokes into the room." To Kirkpatrick, these tactics encourage users to relax and not be so awed by the technology.

The human touch is valuable, agrees Betty Corbin of Seidman & Seidman, a public accounting firm in Houston. She manages the PC training the firm provides for its clients. "At the beginning of class, I think it's important to spend a little while on introductions to find out where people stand and what they want to do with the PC," she says. Not only is this information useful in gauging students' needs, Corbin says, but it also helps the students assess their own needs, often for the first time.

Corbin tells of a student in one Ashton-Tate Dbase class who claimed, "I don't know anything about this computer, I took the intro class a year ago, I can't remember where anything is, and I think I'm going to take early retirement on Friday." He did.

To dispel the defensive attitudes and downright fear some of her users feel toward the personal computer, Margaret Luellen of Computer Literacy Workshops, a training company in Bellaire, Texas, gives beginners a brief look at the insides of a computer. "They're happy to see that a disk drive looks like a stereo turntable," she says.

Robin Grumman, who supervises micro training at Chase Manhattan Bank, N.A. in New York, goes even further to put beginners at ease. In her department's classes, people who have never touched a computer pick up a screwdriver and disassemble one to find the chip. "Sometimes we put a bag of potato chips inside the computer for them to find," she says.

To keep the class's attention when training gets under way, Grumman's trainers sometimes appoint a student as assistant instructor and have him enter commands for the instructor. "It's a very good tool for keeping the students involved because they start wondering, 'What is this guy going to do?' ".

After using tricks of the trade to pique the beginner's interest, the trainer can help keep that interest alive by creating a physical environment conducive to learning. Kirkpatrick is a firm believer in a dedicated classroom designed and outfitted especially for micro training. In his class, the students face opposite walls when they are working at their keyboards and must turn 90 degrees away from the computer, toward the instructor, when he is talking to discourage students from fiddling with their keyboards.

Al Kirkpatrick

In addition to the seating setup, Kirkpatrick arranges for all student hard disks to be loaded with the same set of programs and work files so as to soothe the beginner's "I'm going to break it" jitters.

While these tools and tactics help teach students the basics, most trainers see their main task to be relating micro training as closely as possible to the learner's job.

Providing job-specific PC training is crucial to Gary Baker, manager of training and development at the Cleveland Clinic Foundation, a large hospital complex in Cleveland. Baker's trainers are collecting a library of real medical registry applications, developed by users in the same organization, to be studied by learners as models.

At Chase Manhattan Bank, Grumman sets up case-study method programs in which bankers doing similar jobs learn computing and banking concepts in the same course.

Executive beginners

A curious bird often found in the beginner flock is the executive. Most trainers will agree that this type of learner will be more comfortable in a class made up of peers than in one that might include line managers, secretaries and accountants. Indeed, micro training for managers and executives tends to be less task-oriented and more conceptual, as befits those who may not want to use a PC themselves but who need to plan for and purchase systems as well as supervise others in the PC's use.

According to Computer Literacy Workshops' Luellen, "What managers and executives want to know is that the business judgment that got them where they are today also applies to computers: 'Yes, you can understand this.' 'Yes, you can make good business decisions as you do in your own industry.' For them, it's a more theoretical approach. They get very impatient with the hands-on aspects," she says, especially those who have never learned to type.

Moving on

Once microcomputer users have learned enough to be dangerous — that is, they are eager to do more but are unsure how to proceed — training has to change to accommodate them. Luellen says these intermediate users want direct problem-solving techniques. " 'How do I do this? What's a faster way of accomplishing that?' We tend to work with people who are busy and quick learners as well. They want to get in, learn something and get out," she explains.

Intermediate-level classes often present the instructor with a difficult mix of talent and experience. Therefore, a combination of classroom training, self-study media and one-on-one consulting is ideal. Kirkpatrick calls it the Burger King approach: "Have it your way."

Self-study tools — books, videotapes and computer-based training (CBT) — are sometimes more appropriate for this type of learner than a classroom situation, especially for those people on tight schedules or in remote locations. Seidman & Seidman's Corbin and others recommend books on the popular software packages published by Que Corp. in Indianapolis, Sybex Computer Books in Berkeley, Calif., and The Cobb Group, Inc. in Louisville, Ky.

Marta DelGiudice, who supervises microcomputer training for The Prudential Insurance Company of America in Roseland, N.J., offers her students several CBT packages, including The Instructor and Professor DOS, sold by Individual Software, Inc. in Foster City, Calif., and the Do More series, published by Houghton Mifflin Co. in New York.

Also employing CBT is Ellen Hayes of the U.S. Postal Service Data Center in San Mateo, Calif., who likes IBM's program, Exploring the IBM PC. It has, she says, "graphics, sound effects, information [that is] very nicely organized." Hayes also uses the Lotus Development Corp. 1-2-3 tutorial to convey to her students the idea of a spreadsheet.

Interactive CBT videodisks

To combat the training challenge that users in remote locations create, Jane Curtis, director of field development at Massachusetts Mutual Insurance Co. in Springfield, Mass., put interactive videodisk CBT systems developed by Interactive Training Systems, Inc. in Cambridge, Mass., into 95 branch agency offices. The packages are used to train employees in sales as well as microcomputer skills.

Curtis says, "I think it's a tremendous tool. Take this Lotus 1-2-3 CBT package. When we put it out there, I had a call from one of our general agents who is not particularly comfortable with a computer but knows that he has to be. He said that he went in on a Saturday afternoon and spent a couple of hours going through the Lotus 1-2-3 training pro-

Continued on page 66

Micro training via memory-resident tools

Hard-disk personal computers, new software tools and a fresh MIS perspective on instruction make possible the birth of a new micro training tool — memory-resident job aids.

Do not confuse this aid with a traditional manual that has been typed into a system, however, because such a file would only be a long electronic memo that really was meant to stand alone on paper. Memory-resident job aids do include on-line manuals, but the concept is entirely different.

These new tools can be envisioned as an information data base wrapped around application software or resident within a personal computer's memory. Their purpose is to give users with varying expertise an easy and immediate way of answering their questions on PC use and accelerating their learning.

Gloria Gery

According to Gloria Gery, a management training consultant based in West Hartford, Conn., these new job aids "help PC users when they are in doubt or when they want to explore more of the system." Gery, who helps managers determine their best training options, compares PC-resident tools to "training wheels that the learner can lift or bring down, based on how confident he or she is."

These aids take a variety of shapes. "Some are very structured with menus and nested menus," Gery says. Others are free-form, so users must make inquiries, such as, "How do I stop printing at the end of a page?"

In this type of system, Gery says, the product is designed to scan through the items listed in the data base so that when it hits the intersection of Stop, Printing and Page End, it lists the procedure for the user — simiilar to doing a literature search in a Nexis-type data base. In effect, these aids are an extension of traditional computer-based training but are embedded in the software.

While Gery has seen these systems developed independently by several user companies and vendors alike, Human Access Language (HAL), developed by GNP Development Corp. and acquired in January 1986 by Lotus Development Corp., is probably the best known example. "HAL allows you to have everything you need around [1-2-3] without being a part of the software. It is a wraparound," Gery says.

Lotus may have created HAL as a wraparound because of its large installed base, but Gery sees potential for aids that are embedded into the software package itself.

JANET FIDERIO

Creative

FROM PAGE 65

gram. He'd never used Lotus. Then he went to his computer and felt comfortable enough to begin to build a spreadsheet. Now that's with absolutely nobody else there."

Hand-holding

In addition to self-study media like CBT, Corbin advocates working individually with intermediate-level users on problems. "The idea is not to come in and do it for them," she says. "It's to come in and hold their hand while they do it, be sure they're pointed in the right direction. I think some people really slight that particular kind of function. Maybe they're shortsighted. I know lots of companies where you can call up and get someone to come and do the whole application for you, but you can't call up and get someone to come and hold your hand while *you* do it.

"It kind of does trainers good to do that kind of support because it helps you know whether your training is hitting the spot or not," Corbin continues. "Sometimes you get a little isolated from what your students want to know."

The attuned PC instructor will know an advanced student by the questions he asks. It is this user who is most likely to use his PC and software expertise to address his business needs. The trainer should be ready to help him find answers to those targeted, specific questions.

In fact, Naomi Karten, a Randolph, Mass.-based consultant to company information centers, insists that micro training move beyond packages to principles and applications. Otherwise, she says, "You end up with a lot of users who are very skilled in keyboard acrobatics but don't quite know how to approach business problems. They pull out the spreadsheet because the spreadsheet is what they know. That's the solution, no matter what the problem is. The next step beyond the product orientation is a greater emphasis on a business analysis sort of training."

The kind of training Karten favors focuses on specific issues the advanced user faces: What is the nature of the problem? Is it an application better suited to a mainframe or a micro environment? What are the data requirements? Is it something the users should do themselves? Or should it go to the central DP organization — which, of course, users usually want to stay away from if at all possible? What kind of checks and balances should the application have? How do the users test it?

Tips for designing PC training classes

Trainers surveyed follow these general guidelines when instructing the beginner, intermediate and advanced personal computer user. Most stress, however, that teaching keyboard acrobatics is not the ultimate objective; users should also learn how PCs can further business goals.

Beginning students need:

- Patience, reassurance.
- Humor; the human touch.
- Hands-on experience; no textbooks.
- Classroom format.

Intermediate students need:

- One-on-one consulting.
- Direct problem-solving techniques.
- Self-study media such as computer-based training.
- Courses on specific software packages.

Advanced students need:

- Advice on fine-tuning software use.
- Explanation of little-known functions of software.
- Student-initiated instruction; find out what the user wants to learn next.

CW CHART: MITCHELL J HAYES; ILLUSTRATIONS: CHRIS DEMAREST

Chase Manhattan Bank's Grumman presides over advanced training, helping students find answers to these questions. "I get nervous when we start to have training for the advanced user that's too much like training for my systems people," she says. "We don't want to create a lot of nerds. But what we're starting to learn is that there's a new prototype person evolving in both communities. There are some applications programmers that are moving over to end user, and there are end users who are becoming department gurus."

Not all PC users will get to the guru stage, nor should they, Grumman says. But a few will reach the point where they need a kind of training far different from that required by beginners, intermediates or even average advanced students. In fact, many PC trainers may feel that they have exhausted their resources when it comes to newly expert users. They will find, as Grumman has, that these former beginners now "know how to organize a hard disk. They know how to use Sidekick and Sideways. They know how to operate the laser-jet printer."

But trainers should not give up trying to meet the "superadvanced" user's training needs. At the very least, Grumman points out, "Our response to that need has to be very careful listening."

Brackett is a free-lance writer based in Rockport, Mass.

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Advances in Marketing Analysis: Research Applications and Decision Support Systems. Philadelphia, Feb. 8-13 — Contact: Registrar, Office of Executive Education, The Wharton School, University of Pennsylvania, 200 Vance Hall, Philadelphia, Pa. 19104. Also being held May 3-8 in Philadelphia.

Prototyping: Implementation Strategies. Ottawa, Feb. 9-10 — Contact: Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held March 16-17 in Roanoke, Va., March 23-24 in Los Angeles and April 13-14 in Grand Rapids, Mich.

Fourth and Fifth Generation Data Management Software. Boston, Feb. 9-10 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held March 2-3 in Chicago.

Developing and Using The Information Systems Architecture. Phoenix, Feb. 9-10 — Contact: The Dooley Group, Suite 109, 50 9th Ave. S., Hopkins, Minn. 55343.

Project Management Software. New York, Feb. 9-11 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held March 23-25 in Chicago.

How to Design & Improve a Cost Information & Control System. Los Angeles, Feb. 9-11 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held Feb. 18-20 in Boston, Feb. 25-27 in Chicago, March 9-11 in New York, March 16-18 in Washington, D.C., and March 23-25 in Dallas.

Key Issues in Managing Information Systems. St. Petersburg, Fla., Feb. 9-12 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

International Operational Data Security Workshop. Los Angeles, Feb. 9-12 — Contact: Information Security Associates, Inc., 350 Fairfield Ave., Stamford, Conn. 06902. Also being held in Stamford, Conn.; Houston; Toronto; Orlando, Fla.; Minneapolis; Sydney, Australia, and Singapore.

Communications Networks '87. Washington, D.C., Feb. 9-12 — Contact: CW/Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

A Manager's View of Expert Systems Building. Atlanta, Feb. 10-11 — Contact: Department of Continuing Education, Georgia Institute of Technology, Atlanta, Ga. 30332. Also being held April 9-10 in Atlanta.

Computer Aided Publishing '87. Washington, D.C., Feb. 10-12 — Contact: Computer Aided Publishing, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

Systems Design & Integration Conference. San Jose, Calif., Feb. 10-12 — Contact: Electronic Conventions Management, 8110 Airport Blvd., Los Angeles, Calif. 90045.

Real-Time Operating Systems: A Hands-On Workshop. Feb. 10-13, Toronto — Contact: Integrated Computer Systems, P.O. Box 3614, 5800 Hannum Ave., Culver City, Calif. 90231. Also being held March 3-6 in Washington, D.C., March 17-20 in Palo Alto, Calif., March 31-April 3 in Boston and April 21-24 in Los Angeles.

Creating Box Structured Information Systems: A New Approach for Information Systems Analysis and Design. Orlando, Fla., Feb. 11-13 — Contact: Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

1987 Bank Data Security Technical Symposium. Orlando, Fla., Feb. 11-13 — Contact: Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

AM/FM International Regional Conference on Automated Mapping/Facilities Management. Orlando, Fla., Feb. 11-13 — Contact: Barbara Emery, AM/FM International, #820, 8775 E. Orchard Road, Englewood, Colo. 80111.

South Florida Data Base Users Group. Ft. Lauderdale, Fla., Feb. 12 — Contact: 4780 N. State Road 7, Ft. Lauderdale, Fla. 33319.

FEBRUARY 15-21

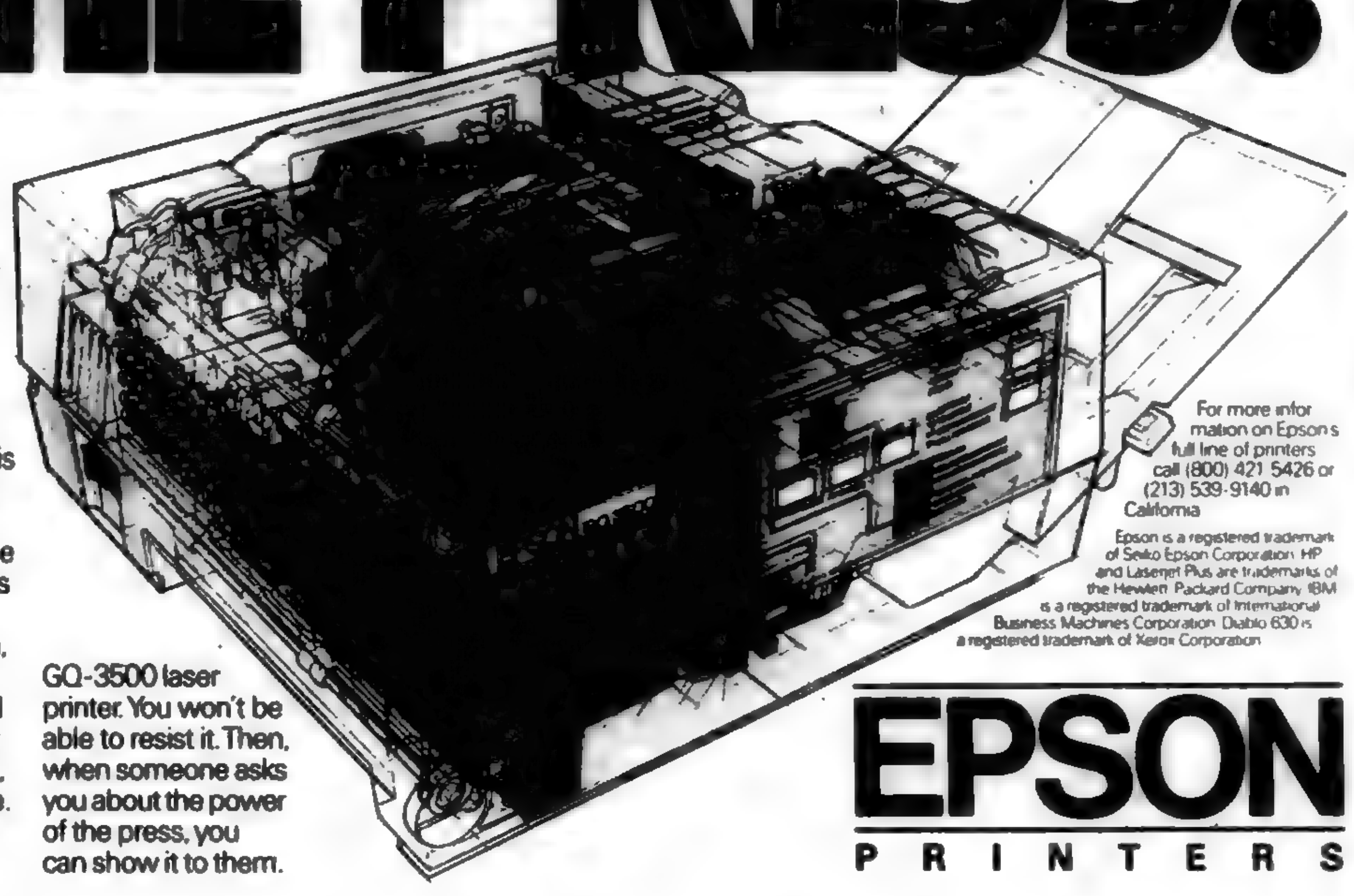
Electronic Imaging '87. Anaheim, Calif., Feb. 16-19 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

15th Annual Association for Computing Machinery Computer Science Conference. St. Louis, Feb. 16-19 — Contact: Department of Computer Science, University of Pittsburgh, P.O. Box 13526, Pittsburgh, Pa. 15243.

Electronic Data Interchange. Alexandria, Va., Feb. 18 — Contact: American Trucking Association Management Systems Committee, 2200 Mill Road, Alexandria, Va. Also being held April 30 in Kansas City, Mo., and May 20 in Chicago.

Resource Planning for Central File Conversion. New Orleans, Feb. 18-20 — Contact:

Continued on page 69



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Continued from page 67

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Expo-IV (for Pick-based system users). Atlantic City, Feb. 18-20 — Contact: Expo-TMS, 22951 La Cadena, Laguna Hills, Calif. 92653.

Interactive Instruction Delivery. Kissimmee, Fla., Feb. 18-20 — Contact: Society for Applied Learning Technology, 50 Culpeper St., Warrenton, Va. 22186.

Electronic Data Interchange. Arlington, Va., Feb. 19-20 — Contact: TDCC, Suite 712, 1101 17th St. N.W., Washington, D.C. 20036. Also being held March 26-27 in Washington, D.C.

FEBRUARY 22-28

Electronic Printing Systems/Directions in Digital Imaging Conference. Miami, Feb. 22-26 — Contact: Electronic Printing Systems, Directions in Digital Imaging, Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

1987 User Group Conference. Marina del Rey, Calif., Feb. 22-25 — Contact: Trax Software, Inc., 10801 National Blvd., Los Angeles, Calif. 90064.

Automating Systems Analysis and Design. St. Paul, Minn., Feb. 23-25 — Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held in Des Moines, Iowa.; Lansing, Mich.; Austin, Texas; Toronto; and Boston.

Exchange Carriers Standards Association Technical Subcommittee T1Q1. Orlando, Fla., Feb. 23-27 — Contact: Radisson Plaza Hotel Orlando, 60 S. Ivanhoe Blvd., Orlando, Fla. 32804.

IBM: Mastering the Transition 1987-1992. New York, Feb. 24-25 — Contact: The Yankee Group, Seminar Division, 200 Portland St., Boston, Mass. 02114.

Computer Aided Software Engineering Symposium. Atlanta, Feb. 24-26 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Third Annual CHAMPS Users' Group Meeting. Crystal River, Fla., Feb. 25-27 — Contact: SCI Software, 1255 N.Vantage Point Drive, Crystal River, Fla. 32629.

Introduction to Performance/Capacity Management. Phoenix, Feb. 25-27 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

Phoenix Conference on Computers and Communications. Scottsdale, Ariz., Feb. 25-27 — Contact: Arizona State University, College of Engineering and Applied Sciences, Center for Professional Development, Tempe, Ariz. 85287.

ICIA '87/Commtex International. Atlanta, Feb. 25-28 — Contact: International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

MARCH 1-7

Second International Conference on CD ROM. Seattle, March 2-3 — Contact: Microsoft Corp., Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

Seventh Annual Computer Operations Conference. New Orleans, March 2-5 — Contact: Association for Computer Operations Management, Suite 201, 11501 Brookhurst, Garden Grove, Calif. 92640.

Eighth Annual Conference on EDP Performance/Capacity Management. Phoenix, March 2-6 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

Corporate Electronic Publishing Systems Show and Conference. Chicago, March 3-5 — Contact: Cahners Exposition Group, 999 Summer St., Stamford, Conn. 06905.

DEXPO Europe '87. London, March 3-5 — Contact: Expoconsul International, 3 Independence Way, Princeton, N.J. 08540.

Securicom '87. Paris, March 4-6 — Contact: Securicom-Sedep, 8 rue de la Michodiere, 75002 Paris, France.

Data Communications Network Management. Boston, March 5-6 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held April 30-May 1 in Seattle.

Taxation of Intellectual Property. Chicago, March 5-6 — Contact: Deborah Gordon Public Relations, Inc., 320 N. Michigan Ave., Chicago, Ill. 60601.

MARCH 8-14

Spring 1987 Conference of the North American Honeywell Users Association. Charleston, S.C., March 8-13 — Contact: NAHU, Inc., P.O. Box 2037, Willingboro, N.J. 08046.

Continued on page 71

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Continued from page 69

CICS/VS Internal Structures & Control Flows. Atlanta, March 9 — Contact: American Data Group, Inc., 1770 Indian Trail Road, Norcross, Ga. 30093. Also being held May 11 in Philadelphia.

Automated Manufacturing: Computers, Communications and Controls in the Factory. St. Petersburg Beach, Fla., March 9-10 — Contact: Yvonne Chism, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

CAD/CAM, CAE Executive Workshops '87. Cambridge, Mass., March 9-10 — Contact: Cynthia Wolfram, Daratech, Inc., 16 Myrtle Ave., Cambridge, Mass. 02138.

Electronic Banking: The Challenges of Tomorrow's Bank Within Yesterday's Legal Framework. Brussels, March 9-10 — Contact: Conference Office Brussels, 19 rue de l'Orme, B-1040 Brussels.

11th Annual BRS User Meeting. Kansas City, Mo., March 9-10 — Contact: BRS Information Technologies, 1200 Route 7, Latham, N.Y. 12110.

Computer Technology and the Law: Protecting Your Rights. Arlington, Va., March 9-11 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Federal Office Systems Expo (FOSE). Washington, D.C., March 9-12 — Contact: National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

Effective Management Skills for the MIS Manager. Cambridge, Mass., March 9-12 — Contact: American Management Association, 135 West 50th St., New York, N.Y. 10020.

Open Network Architecture: Computer III Status Report. Arlington, Va., March 10-11 — Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

Corpcon East. New York, March 10-12 — Contact: Corpcon, P.O. Box 3727, Santa Monica, Calif. 90403. Also being held April 28-30 in Chicago and Sept. 21-23 in Los Angeles.

Optical Information Systems. Long Beach, Calif., March 11-13 — Contact: Meckler Publishing, 11 Ferry Lane W., Westport, Conn. 06880.

MARCH 15-21

Software Quality Assurance. Los Angeles, March 16-17 — Contact: U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903. Also being held March 23-24 in Washington, D.C., March 30-31 in Chicago and April 6-7 in New York.

Job co-op

CONTINUED FROM PAGE 61

ence," he adds.

When workers are laid off by members of the cooperative, they are considered for open posts at other member firms.

MTech Corp., a subsidiary of MCorp. that provides data processing services to the financial industry, gets approximately one referral a week from other members of the cooperative, according to Tommy Tompkins, a company staffing specialist.

Bell says he receives and makes referrals every week, and half of the people his organization has hired in the last two years have come through the cooperative. That can benefit the company's bankroll, he says. "I know that our cost per hire has gone down drastically in the last two years," Bell notes.

The cooperative's most visible activity is its occasional Southwest High-Tech Career Fair. At one held last week at Infomart in Dallas, about 450 job candidates attended the first day and another 300 sent resumes to be distributed.

Fairs were held twice last year, at which some 25 employers met with 1,400 to 1,500 job seekers each time. About one in 14 job hunters were offered positions, and most accepted one, Bell says. Two fairs are planned this year.

The career fairs also cut employers' hiring costs, according to Kathy Bernardo, senior technical recruiter for American Airlines.

"It is extremely cost-effective," she says. "Because of the large number of candidates interviewed, we enjoy a considerable savings-per-hire vs. beating the bushes for good employees."

'Super' ad

The average cost per hire for MTech, through the referral service and the job fairs, amounts to about $150 to $200 per worker, Tomkins says. "It's super. If I were to run an ad that would generate any response, that would be at least an $800 ad. We're looking at more than half the cost reduction."

Bell acknowledges that, with some of the data processing professionals who were laid off by oil companies about a year ago still looking for jobs, employers face a buyer's market in the area. "There are more people in the market than openings," he says. The soft economy has also caused a slight decline in pay scales in the area and a drying up of opportunities for entry-level workers, since companies can hire experienced people for lower-level jobs, he notes.

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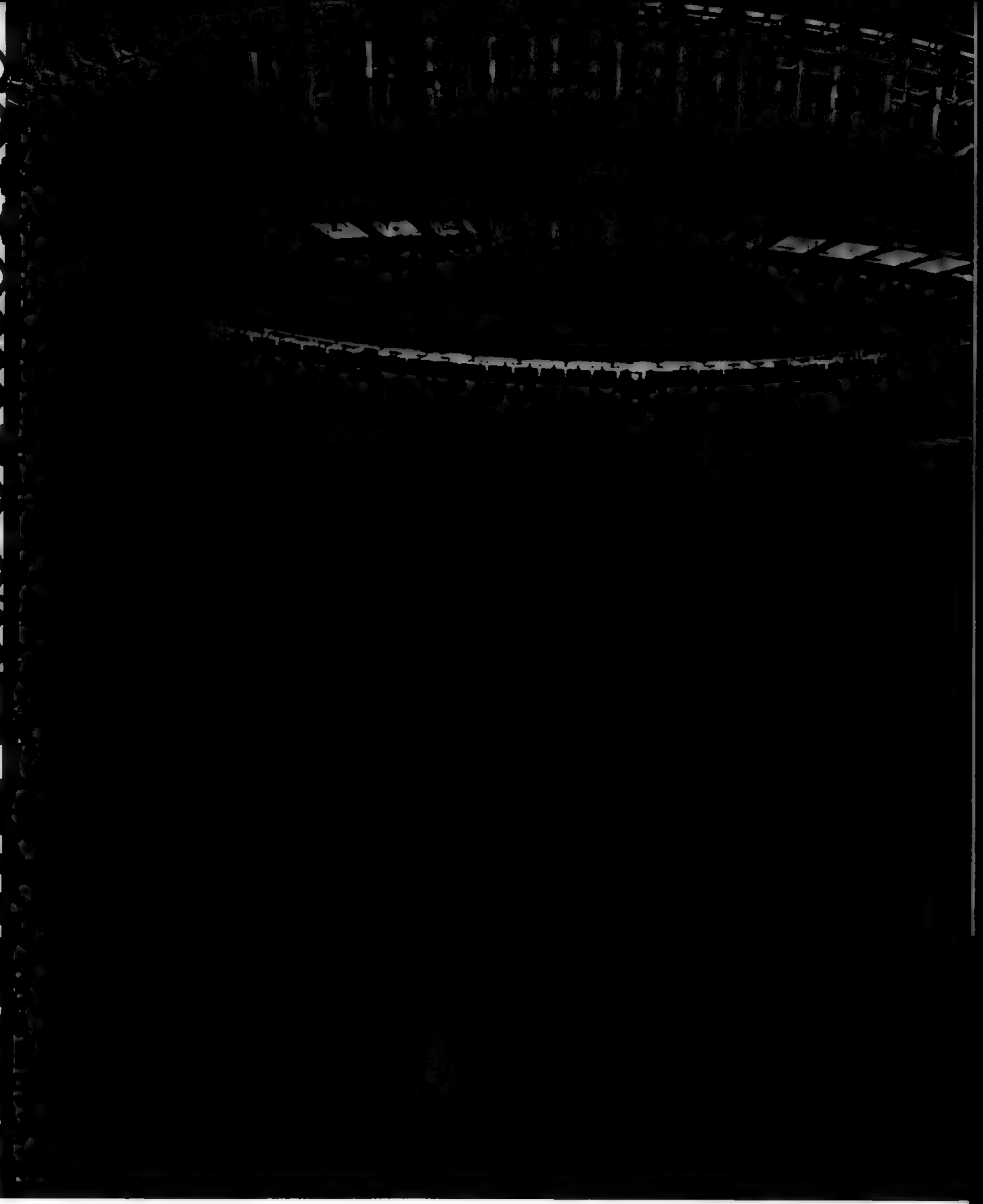

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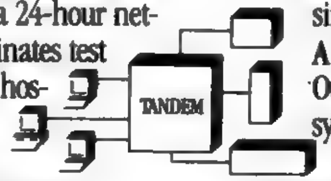

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Avon

CONTINUED FROM PAGE 61

the company and negotiate volume purchases, which will lower costs and enhance service from vendors, Paul says.

Coming at a time when many large corporations are decentralizing their data processing operations, Avon's corporate information system might seem out of step with the times.

However, Eric Knutsen, vice-president of consulting at the Gartner Group, Inc., a Stamford, Conn., market research and consulting firm, contends that better managed corporations are carefully balancing centralized with decentralized data processing. "Today, we're seeing a hybrid approach," Knutsen says. "With information technology growing in strategic importance, there is a need for a corporate group to channel the investment in proper ways.".

Moreover, with the evolution of computing and communications standards such as IBM's Systems Network Architecture and Structured Query Language, a corporate MIS structure at a diversified corporation like Avon can ensure technological conformity among divisions. "That will be important 15 years down the road when data processing standards become like plumbing or electrical engineering," Knutsen says. "It will go a long way toward preventing a Tower of Babel."

Avon is creating its corporate system using twin Digital Equipment Corp. VAX 8200s in a cluster. The firm has opted to create a corporate data base using Oracle Corp.'s Oracle data base management system and is selecting a graphics and statistical analysis package.

The company hopes to eventually run some 70 applications on the system, spanning every phase of its operations, Paul says. Between 20 and 30 applications are expected to be running during the next nine to 12 months, starting with ones that use the competitive data base, he says.

"We just finished piloting the first piece — the competitive data base," Paul observes. "Over a two-year horizon, we expect to install everything; at least those things that are envisioned as of today."

Hopes for corporatewide net

Eventually, Avon hopes to create a corporatewide data network linking its three operating divisions. "Initially, the pieces will be input into the system manually, but within the next three or four months, we hope to be able to do it automatically," Paul says.

The corporate information system will be a major convenience to Avon executive John Cox, group vice-president of communications. "I once had to find out how many employees we have in Connecticut. Since Avon Beauty Products has an office in Connecticut, as does our Mediplex health care services company, there was no one place to look for that information," he recalls.

The corporate system will not only help create efficiencies but also provide Avon's executives with better decision-making tools. "It's like driving a car," Paul says. "You'd rather be steering the car by looking ahead, rather than using the rearview mirror to see what you missed."

Product delay

CONTINUED FROM PAGE 61

range plans for the eventual acquisition of a Model 930, the first commercial product of the vendor's Spectrum development project.

In continuing to advocate HP products in the face of mild management skepticism, Litcher consciously took a bit of a risk and put her professional prestige on the line. HP's solid reputation and her own extensive experience in dealing with its representatives gave her confidence in the soundness of her position.

Then, misfortune struck. Last September, HP announced, to the dismay of its user base, a six-month delay in the start of customer shipments of the long-awaited 930. The culprit, company officials said, was an unexpected problem with the system's I/O software.

Confidence unshaken

Although the postponement was disappointing, it did nothing to shake Litcher's faith in HP's competence or in the correctness of her earlier decision.

But in the eyes of her superiors, the misstep intensified doubts about HP's ability to compete in the superminicomputer sector and raised questions about the DOE's wisdom in retaining the firm as its CPU vendor.

Just as important, HP's unwelcome move somewhat damaged Litcher's hard-earned credibility with her management. Because she backed a player that later stumbled conspicuously, "the sweet faith that my boss had in my decisions has been partly eroded," she said.

'Move to a Spectrum system'

"As long as HP continues to do the job for me, I'll be faithful to them and will feel okay about my recommendation that we move eventually to a Spectrum system," Litcher said.

"But when you're looking at the issue as an outsider and not as a member of the computing profession, your perceptions may be very different" she added.

For MIS executives, the moral of Litcher's tale is simple: When vendors publicly promise to do something and then fail to deliver, the people who wind up with a black eye are often the ones who deserve it least.

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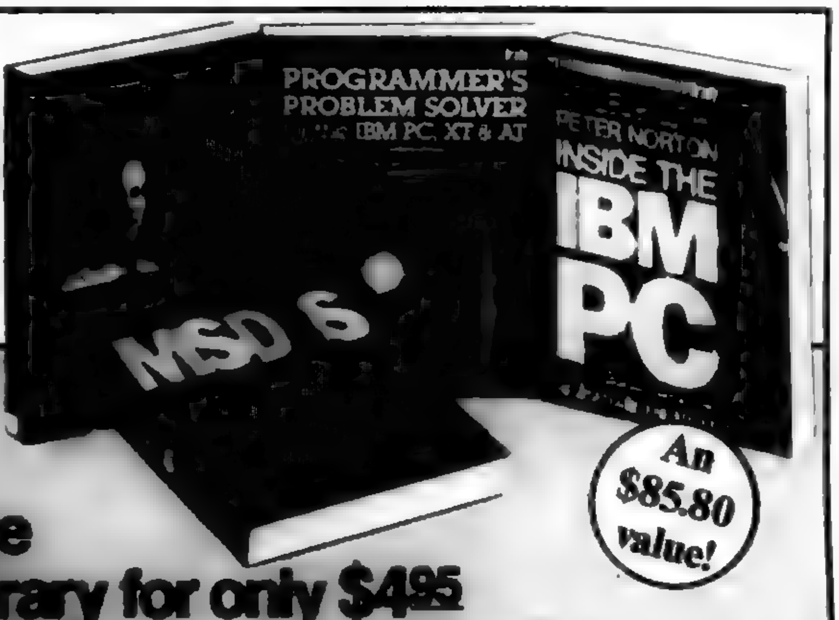
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Clinton Wilder

"Slump" no longer fits

The computer industry slump is over.

That declaration, as the industry dips its foot into 1987, is not as bold as it sounds — with an appropriate explanation. The statement is not meant to suggest that all computer vendors have seen the end of their travails that began, in most relevant cases, about two years ago. In fact, it is meant to suggest just the opposite.

Consider this a humble proposal to abolish, as of Feb. 2, the word "slump" as applied to this industry. The same goes for all of its variations — "downturn," "sluggishness," "doldrums" and the bon mot chosen by IBM Chairman John Akers in a speech to security analysts last summer — "diceyness."

Looking at the recently announced fourth-quarter results from a wide range of companies, including IBM, Wang Laboratories, Inc., Data General Corp., Prime Computer, Inc. and Altos Computer Systems, Inc., it is clear that many vendors' market problems can no longer be characterized as cyclical.

What bears this out even more is the dazzling success of so many others — the micro software Big Three, Digital Equipment Corp., Sun Microsystems, Inc. and Computer Associates International, Inc; and, in the fourth quarter, Amdahl Corp. While the industry is certainly affected by what E. F. Hutton & Co.'s Michael Geran now calls "an era of depressed demand," that phenomenon is dramatically affecting some players much more than others.

What should arouse the suspicions of every computer user and industry follower is the eerie similarity of the countless 1987 outlook opinions to their counterparts exactly one year ago. We hear constantly that IBM, and/or the industry, should see a solid pickup by the third and fourth quarters thanks to new products and the long-awaited uptick in U.S. capital spending. It

Continued on page 84

Comdisco profits dive 66%

But Cray, Apollo post strong growth rates

BY CLINTON WILDER
CW STAFF

Because of a $22.2 million loss from its risk-arbitrage activities, independent computer leasing market leader Comdisco, Inc. reported one of its worst quarters in recent years as profits dropped by 66% in the first quarter ended Dec. 31.

Pretax income from Comdisco's leasing, equipment brokering and other core businesses, however, rose 40% from year-earlier levels. Total revenue increased 8% to $238.9 million.

For the quarter, the Rosemont, Ill.-based firm reported earnings of $8 million, or 20 cents per share. In the first quarter of fiscal 1986, Comdisco earned $23.5 million, or 57 cents per share.

The expected loss from Comdisco Equities, Inc. [CW, Jan. 12], was attributed to the plunge in risk-arbitrage stocks that followed the Securities and Exchange Commission's insider trading charges against financier Ivan Boesky in November. The loss has not changed Comdisco's commitment to participate in risk arbitrage, however.

"The market disruption which resulted in a loss will, in the long term, lead to a more competitive market," Comdisco Chairman Kenneth Pontikes said. "Once the market stabilizes, Comdisco Equities will resume a strong earnings trend." He added that thus far in the second quarter, the unit's results have improved substantially.

Other major vendors reporting financial results recently included Cray Research, Inc., which continued its strong growth rates; Altos Computer Systems, Inc., which saw profits drop slightly on a modest sales increase; and Daisy Systems Corp., which continued its recent string of quarters in the red with a $4.4 million pretax operating loss.

Cray. The Minneapolis-based supercomputer leader said

Continued on page 83

Symantec buys firm

BY PEGGY WATT
CW STAFF

CUPERTINO, Calif. — Data base developer Symantec Corp. recently announced the acquisition of Breakthrough Software Corp., developer of Time Line Graphics and Time Line, a project management package.

Breakthrough and its 30 employees will operate as a semiautonomous divison with separate development and support teams and will still publish products under its own name at the firm's Novato, Calif., site, Symantec Chairman Vern Raburn said. Financial terms of the acquisition were not disclosed.

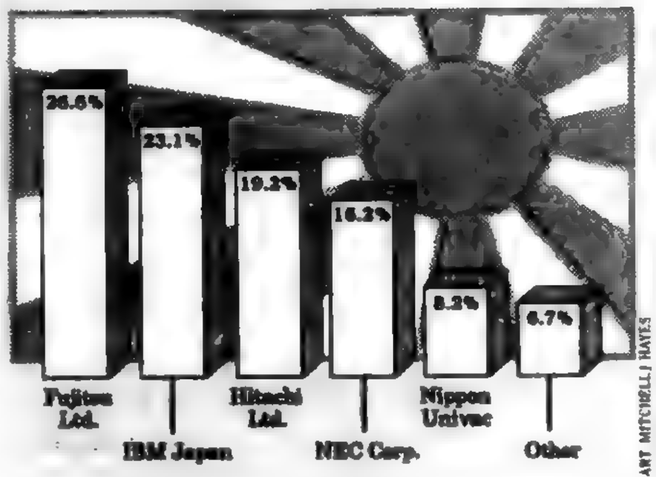
Symantec said it hopes to

Continued on page 82

Data View

Japanese computer market, 1986

IBM Japan holds a solid #2 Market share



INFORMATION PROVIDED BY NIKKEI COMPUTER MAGAZINE, TOKYO

CW CHART MITCHELL J. HAYES

Small rise in sales for Lotus

BY ALAN J. RYAN
CW STAFF

CAMBRIDGE, Mass. — Although Lotus Development Corp. reported a 14% increase in sales last week for its fourth quarter, analysts attributed much of the growth to nonoperations areas.

For its fourth quarter, ended Dec. 31, Lotus recorded sales of $81.8 million, a 14% increase from the previous year's fourth-quarter sales of $71.8 million. Income rose 37%, from $11.4 million in the like quarter in 1985 to $15.6 million. Earnings per share rose 50% from 70 cents in the fourth quarter of 1985 to $1.05 per share in the most recent quarter.

"I thought that the results indicated strong results, but I don't view them as being exceptionally strong," said analyst Tom Galvin of Shearson Lehman Bros., Inc. in New York.

Galvin said Lotus's tax rate on a year-to-year basis during the December quarter was down. He also pointed out that Lotus had a 10% reduction in shares outstanding as a result of its stock buyback program.

"While the sales increase was respectable, had they not shipped initial products of Manuscript and HAL, I figure sales would only have been up 10%," Galvin maintained. He said the 10% rate is below the average in the industry and below that of

Continued on page 83

New year brings guarded optimism for chip manufacturers

BY JAMES A. MARTIN
CW STAFF

Following the doom and gloom that the U.S. semiconductor industry has faced in recent years, a guarded optimism is beginning to emerge.

After a prolonged period in which the industry experienced large operating losses, cutbacks, layoffs and increasing competitive threats from overseas, chip manufacturers are determined to put the worst behind them, convinced that they have seen rock bottom and there is nowhere to go now but up.

In January, the Semiconductor Industry Association reported that new orders for semiconductors in the final 1986 quarter increased 8.8% and actual shipments jumped 14.7%. Analysts attributed this upturn to improvements in the microcomputer and minicomputer markets, both of which are expected to gain additional momentum this year.

"We don't believe the U.S. semiconductor industry is going to lose much more this year," says Andrew Rappaport, president of The Technology Research Group, a Boston-based industry consulting firm. "The U.S. market share declined sharply in 1985 and 1986, and by now it's lost about all it can."

U.S. vendors' worldwide market share dropped about 3.3% in 1986 from 1985, while Japan gained 2.3% and other Asian countries, 2.5%. The European market declined 1.5%, according to a study by The Technology Research Group.

U.S. share drops

In terms of U.S. dollars, the U.S. market share in 1986 was 32%, a drop from 38% in 1985, the study shows. The Japanese market totaled roughly 40%, up from 35.4%.

When corrected for exchange-rate differences, which dramatically increased with the fall of the dollar last year against the Japanese yen, the gap between the countries' market shares was not as dramatic — the U.S. had 34.4% of the 1986 market, while Japan had 37.7%.

Overall, industry growth is expected to reach about 10% this year. "It won't be much more dramatic than that, because the industry is still grappling with enough excess manufacturing capacity and a difficult pricing environment," according to Edward C. White Jr., chip analyst for E. F. Hutton & Co. "I don't see that turning around un-

Continued on page 79

User sues Zenith for faulty systems

BY ROSEMARY HAMILTON
CW STAFF

LOUISVILLE, Ky. — A user has filed suit against Zenith Data Systems, claiming that the microcomputers and a local-area network (LAN) provided by the vendor repeatedly crashed and prevented the plaintiff from doing business for a five-month period.

Capital Planning Services, Inc., a small financial services firm based here, is seeking $621,000 in damages for fraud, breach of contract and deceptive trade practices.

A spokesman for Zenith Data Systems said that the attorneys are "conducting a thorough investigation and reviewing the merits of the case" and declined further comment.

Repeated crashes

According to Beach Craigmyle, the attorney representing Capital Planning Services, the Zenith system, which included six Z-151 personal computers and a 3Com Corp. Etherseries LAN, repeatedly crashed from the time Capital Planning Services purchased it in mid-1985.

Representatives from the Zenith-owned Heath Co. computer store in Louisville, from which Capital Planning Services purchased all the equipment, were unable to solve the problems, Craigmyle said.

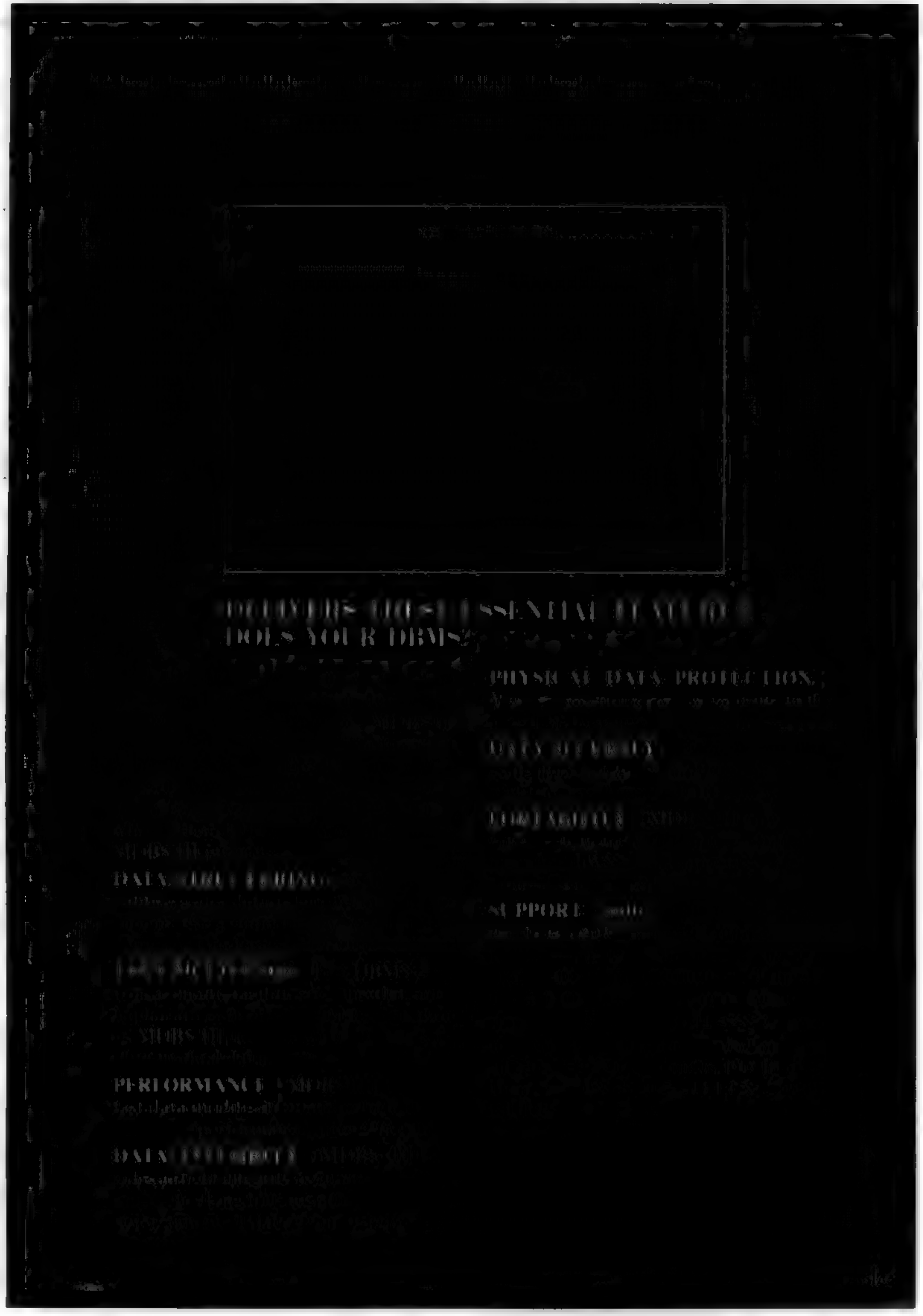
As a result, Capital Planning Services employees were often unable to access information needed to service their clients' accounts, he added.

Incompatibility

Craigmyle further claimed the Zenith Data Systems microcomputer was incompatible with the 3Com networking software.

In October 1985, Capital Planning Services replaced the Zenith microcomputer that had acted as the system's file server with an IBM Personal Computer XT.

There have been no further system crashes since that time, according to Craigmyle.



Ailing Phaser seeks suitor

BY JAMES A. MARTIN
CW STAFF

SAN FRANCISCO — Phaser Systems, Inc., a small micro-to-mainframe communications vendor currently reorganizing under Chapter 11 bankruptcy protection, recently confirmed that it is looking to sell all or part of the company.

"We are looking for a partnership, and we're discussing this with various companies," said John Mullen, president and the only founder still with the company.

"We're strong in research and development, but we're trying to expand our horizons, and there are many microcomputer-based data base manufacturers who need strong links to mainframe data bases to sell their products more effectively to corporate accounts," Mullen claimed.

Modest income

Phaser Systems was founded in 1980, went public in 1983 and has lost money each year since. Fiscal 1983 losses were $1.4 million; the company lost $3 million in 1984 and $1.4 million in 1985. Phaser management expects to post modest income for fiscal 1986, which ended Jan. 31.

Although Mullen would not identify any potential suitors, he pointed out the company had marketing agreements with Index Technology Corp. in Cambridge, Mass., and Micro Focus, Inc. in Palo Alto, Calif.

> "WE'RE strong in research and development, but we're trying to expand our horizons."
>
> JOHN MULLEN
> PHASER SYSTEMS, INC.

Phaser is also negotiating a joint marketing agreement with Autodesk, Inc., in Sausalito, Calif., but Mullen said the firms were not discussing an acquisition.

Phaser's micro-to-mainframe product is VDAM, which the company claims was the first link that works as an IBM mainframe VTAM application.

The competition in that area has become more heated in recent years, and Phaser might find it difficult to find a strong suitor as a result, according to Merv Adrian, chairman of the micro-to-mainframe special interest group of the New York Personal Computer Users Group.

"If I were in the market for that kind of technology, I would be looking for successful companies," Adrian said. "If they had something new or better, I can see why some companies would be interested. But as it is, they are only one of several right now offering that solution, so I can't see why anyone would spend what is probably even a bargain-basement price on that company."

VDAM has 200 installations and site licenses, including national concerns such as the U. S. Postal Service, according to Mullen. Phaser's other product, Micro/SPF, a programming tool, has sold some 20,000 copies, he added.

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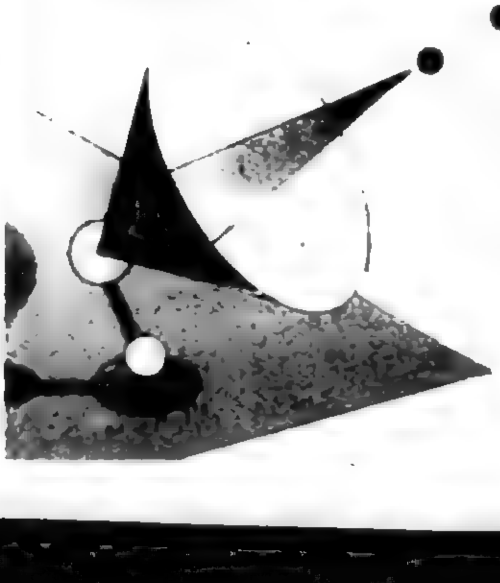

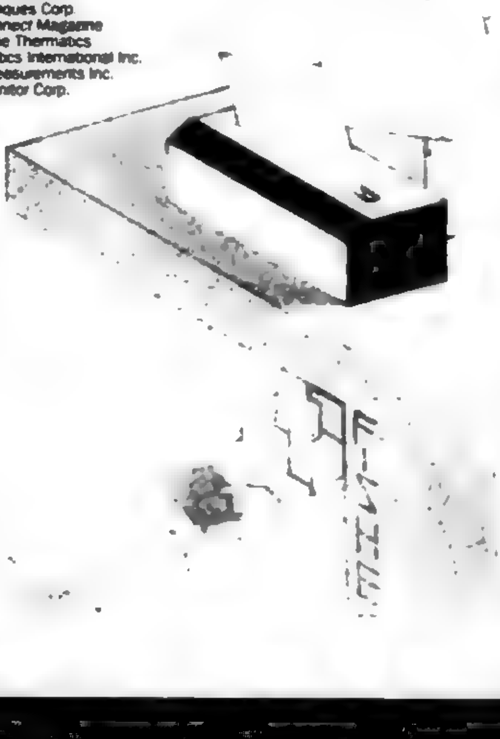

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Chips

FROM PAGE 75

til later in the year."

Despite the hope on the horizon, much talk has recently centered on the agreement between Fairchild Semiconductor Corp., Silicon Valley's first major chip company, and Japan's Fujitsu Ltd. Under the terms of the agreement, Fujitsu would gain majority control of Fairchild, which now sells mainly bipolar gate-array chip technologies for use in U.S. military weapons.

While the Department of Justice and Department of Treasury have voiced concerns that this alliance could inadvertently provide the Japanese with U.S. strategic technologies, Silicon Valley was initially worried that the merger could portend a rash of Japanese takeovers of weakened American semiconductor companies.

> "THE semiconductor industry used to be this monolithic business. Now, companies in different product areas are seeing widely different results."
>
> DREW PECK
> GARTNER SECURITIES

Last fall, closely guarded meetings held in California were attended by representatives from many U.S. chip manufacturers who discussed what options they might have to fight the Fairchild-Fujitsu liaison. No meetings have been held since, mainly because these companies found there were few realistic options at hand.

"There doesn't seem to be much action we can take, other than enforcing the antichip-dumping laws we already have," says Robert Noyce, vice-chairman of Intel Corp. "Beyond that, the damage is done, and anything else is closing the barn door after the horse is gone."

Because the U.S. government is strongly opposed to the Fairchild/Fujitsu marriage, and because most Japanese chip companies are struggling with the effects of the strong yen, it is unlikely similar mergers will occur in the near future, according to Drew Peck, semiconductor analyst for Gartner Securities, Inc.

U.S.-Japan partnerships

Instead, Peck says he believes there could be more partnerships in 1987 between American and Japanese companies similar to the Motorola, Inc./Toshiba Corp. joint-venture agreement. National Semiconductor Corp., for example, has already developed overseas partnerships with NMB Semiconductors in Japan and Thomson Semiconductors in France.

"We don't intend to go the way of Fairchild," National Semiconductor spokesman Gray Allen says. "Our approach is to work closely with other companies so we can both use our resources for maximum benefit."

"The semiconductor industry used to be this monolithic business where if the business was good, you were doing good," Peck says. "But now, there are a lot of companies in different product areas that are seeing widely different results."

Bright spots lighten chip industry's gloom

In less complicated times, the success or failure of a particular semiconductor company could be closely associated with the overall performance of the industry. No longer.

As more companies begin to tailor their chips and stay within the boundaries of niche markets, analysts are seeing more of a variety in quarterly earnings and income statements.

"Specialized companies can grow faster in the short term because of their size," says Edward C. White Jr., an analyst with E. F. Hutton & Co. "In 1987, a lot of the growth and momentum we're likely to see will come from emerging companies serving specialized niche markets."

Analysts and company officials point out that although gains were made in the second half of 1986, those improvements were not enough to compensate for losses during the first half. As a result, many chip companies reported revenue increases from the fall quarter, but only a handful could claim a rise in profits as well.

One company poised for growth this year appears to be Chips & Technologies, Inc. in Milpitas, Calif. As the inexpensive IBM Personal Computer-clone market is expected to take off this year, so is Chips & Technologies, which supplies many low-cost vendors with PC AT chip sets. The company reported net income of $3.1 million for the quarter ended Dec. 31, compared with the loss it reported a year earlier. Revenue was up 23%.

On the other hand, Intel Corp., one of the industry's most visible companies, recently reported its sixth consecutive quarterly deficit.

Although revenue was up 12% in its fourth quarter ended Dec. 27, the company posted a quarterly loss of $16.4 million and a fiscal-year deficit of $173.2 million.

With many cost-cutting moves and high hopes for its 80386 microprocessor, Intel could begin to see some turnaround this year, according to analysts.

The final 1986 quarter was a disappointment for several other chip companies as well. Advanced Micro Devices, Inc. in Sunnyvale, Calif., a very large-scale integration chip manufacturer, reported a $17.7 million net loss for its third quarter ended Dec. 28.

Although LSI Logic Corp. in Milpitas, Calif., had record revenue in its fourth quarter, net income was down 55% from the same quarter of 1985 and down 62% for the fiscal year.

In addition, Monolithic Memories, Inc. in Santa Clara, Calif., experienced a 21% increase in revenue at year's end, but it was not enough to offset earlier losses. Monolithic posted a net income of $1.3 million for its first 1987 quarter, but it was entirely attributed to a tax credit. Likewise, Cypress Semiconductor Corp. reported a net income of $3.9 million, roughly half of which resulted from an extraordinary tax credit.

There was better news to be heard from some other larger semiconductor companies. Texas Instruments, Inc. returned to profitability in fiscal 1986, citing cost reductions in data systems and semiconductor groups as the main factor.

Motorola, Inc. said it had record sales and earnings in 1986, chiefly as a result of its semiconductor sector. Sales increased 9%, new orders were up 42% and a product backlog was 3% lower than the previous fiscal year, the company stated.

JAMES A. MARTIN

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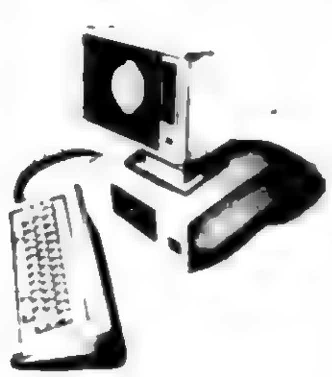

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STC continues profitability, settles three-year SEC probe

BY ALAN ALPER
CW STAFF

NEW YORK — Storage Technology Corp. (STC) reported its fifth consecutive profitable quarter last week and announced the settlement of a 3-year-old Securities and Exchange Commission (SEC) probe into its accounting practices.

Financial analysts have been fairly pleased by the firm's return to profitability and healthy order rates in 1986. STC's net earnings have benefited from interest income and the removal of commitments to service its debt while under Chapter 11 protection, according to one analyst who asked not to be identified.

The SEC settled a lawsuit that charged STC with accounting irregularities from 1982 through 1985. Under a consent decree signed last week, STC neither confirmed nor denied any wrongdoing but resolved a lawsuit filed earlier last week as a technicality in U.S. District Court for the District of Columbia. The lawsuit filing and its settlement were announced simultaneously.

In its complaint, the SEC also charged STC with overstating revenue and net income in certain periods from 1982 to 1985. In particular, STC is said to have accounted for a major transaction completed in the third quarter of 1983 as revenue in the previous quarter. In addition, the SEC maintained STC did not keep accurate books or maintain appropriate internal accounting controls from 1982 through 1984.

'Mop-up phase'

In an interview last week, STC Chairman Ryal R. Poppa said STC is entering "the mop-up phase" of its emergence from Chapter 11 bankruptcy protection. He said that within 45 to 60 days, the firm expects to resolve pending suits filed by shareholders and technology partners, negotiate a settlement with the Internal Revenue Service regarding past tax liability [CW, Jan. 12] and negotiate a $50 million line of credit.

Poppa said the firm expects to remain profitable throughout this year.

STC's earnings for the fourth quarter were $8.3 million, or 24 cents a share, on revenue of $184.3 million. One year earlier, the firm posted profits of $2.2 million, or 6 cents a share, on revenue of $168.6 million.

For the year, STC earned $36.2 million, or $1.03 a share, on revenue of $696 million. In 1985, the IBM-compatible disk drive maker lost $57.4 million on revenue of $673 million.

Paradyne cuts spending, jobs

BY JAMES A. MARTIN
CW STAFF

LARGO, Fla. — Two months after a similar move, Paradyne Corp. recently eliminated another 260 jobs in hopes of reducing 1987 spending by $9 million. The layoffs reduced the troubled data communications vendor's work force by about 7%.

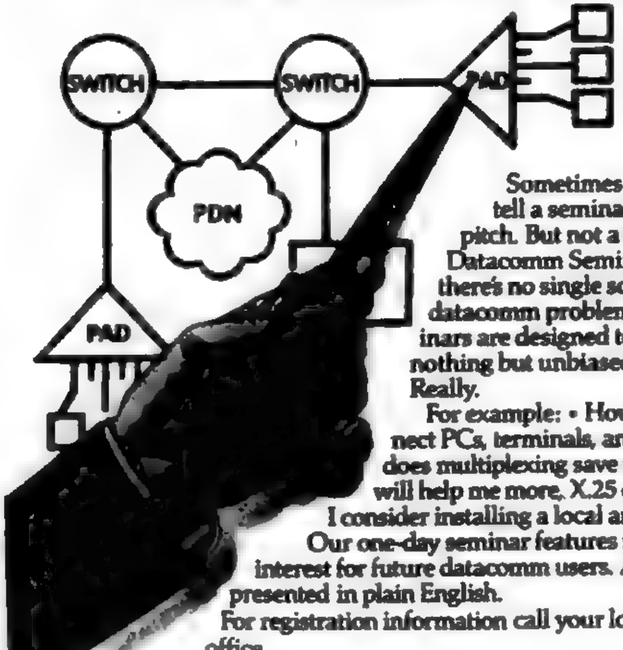
Included in the latest round of cost-cutting measures were freezes in senior-executive compensation packages and consolidation of some job functions.

In addition, the company said it is anticipating a fourth-quarter loss when it reports results this month.

The latest staff reductions followed a year of cost-cutting measures that the company had hoped would help turn its misfortunes around. In November, Paradyne cut 280 jobs.

Last spring, Paradyne closed its Puerto Rico plant, which employed 165 workers. Paradyne also required at that time that all U.S. nonhourly employees take one unpaid furlough day each month for the rest of the year. In July 1985, 150 jobs were eliminated.

The federal trial on the longstanding charges against Paradyne for allegedly defrauding the U.S. Social Security Administration is scheduled to begin March 2 in Tampa, Fla.



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ACTIVE ISSUES

Kathy Porteus

To buy or not to buy

Explosive. Dazzling. Roaring. Frenzied.

In recent weeks, we have read such descriptions of January's stock market surge that has, among other things, sent news commentators groping for new adjectives. But for individuals still sitting on cash, each account of soaring stock prices raises the question of whether to buy now, despite such a move in the market, or wait for a correction that will produce more attractive buying opportunities.

"While we believe that stock prices of well-managed technology companies will outperform the market this year," says Bill Welty, director of research at Hambrecht & Quist, Inc., "this isn't Peter Pan and Tinker Bell. It won't be sustained just on belief."

Welty says he is a little nervous in the short term about technology issues, which in the first three weeks of the year outperformed the rest of the market by as much as 100%. Hambrecht & Quist's list of selected stocks, for example, was up almost 30% during this period.

Such nervousness is justified, according to John LeFrere of Delta Capital Management. LeFrere observes that computer industry conditions have not fundamentally improved. Therefore, he suspects many technology stocks are ahead of themselves after January's run-up in prices. "You can't tell me that this business is fabulous when IBM is coming on the news saying 'Yuk!' " he says.

Nevertheless, LeFrere still sees overlooked opportunities among technology stocks. He suggests that individuals consider medium- to low-technology stocks such as AM International, Inc. (AM — 7¼). Compared with better known high-technology firms, LeFrere says, these companies are more predictable and less susceptible to macro or emotional risks.

In the current market, LeFrere also favors investing in the most beaten-down technology stocks-that trade below $1.00, such as Corvus Systems, Inc. (CRVS — 21/32). LeFrere says Corvus participates in the promising local-area network market, has sales of $60 million and still has $3 million in cash. "Corvus has no bankruptcy problems, yet there are bankruptcy situations now trading between $3.00 and $4.00," LeFrere adds.

William Easterbrook of Kidder, Peabody & Co. in San Francisco remains bullish about the rally in technology stocks. "The rally can be sustained, as indicated by the breadth of technology stocks which have moved," he says. According to Easterbrook, there may be a slight pullback in the market, but at such time he would simply buy more stocks.

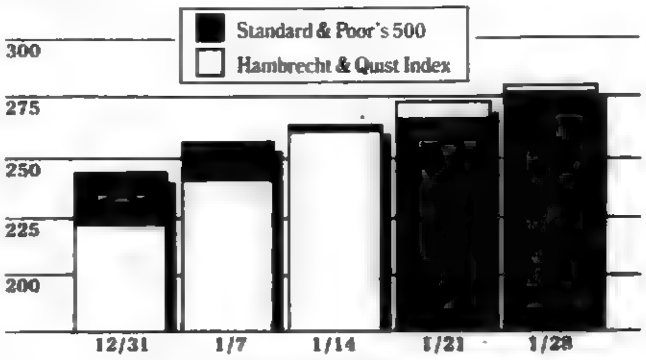
Easterbrook says he believes Wall Street's enthusiasm for technology reflects the growing conviction among investors that sometime this year there will be increased domestic demand in the computer industry. "As a result," Easterbrook says, "I wouldn't be surprised if the rally extended down to lower quality stocks."

Easterbrook favors stocks of smaller technology companies with good earnings momentum and stocks with large market capitalization that are "clearly survivors." He recommends IBM (IBM — 127¼), Unisys Corp. (UIS — 95⅞), Seagate Technology Corp. (SGAT — 27¼), Xidex Corp. (XIDX — 12½) and Micropolis Corp. (MLIS — 27¾). Other technology stocks on Kidder Peabody's recommended list include Hewlett-Packard Co. (HP — 48⅜), HBO & Co. (HBOC — 8⅞), Intel Corp. (INTC — 28⅝), LSI

Continued on page 83

High tech outpaces bull market

Hambrecht & Quist, Inc. technology index vs. Standard & Poor's Corp. 500



Monthly percentage increases:
Hambrecht & Quist Index 25%
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Symantec

FROM PAGE 75

learn some marketing tips from Breakthrough, which has successfully reached the corporate market that Symantec's natural language data base, Q&A, has not reached, according to Raburn.

"We want to spend some time learning why Breakthrough has been successful in some areas that Q&A hasn't broken into," he said.

Symantec decided last year that an acquisition was its best way to grow. Q&A still commands only a small part of the crowded data base market, with an estimated 32,000 copies sold, according to Raburn. Adding Breakthrough nearly doubles Symantec's size.

"We believe project management software is a very lucrative segment of the market," Raburn said. He added that he expects Q&A and Time Line to become more interactive.

"Time Line is targeted at a manager who needs to get things done, and that job is also done by people who use Q&A," said Andrew Layman, president of 3-year-old Breakthrough. The companies became acquainted when Breakthrough did some joint marketing last year with Turner Hall Publishing, a wholly owned subsidiary of Symantec.

Turner Hall is also broadening Symantec's product offerings with an agreement to publish The Spreadsheet Analyst, written by the Cambridge Software Collaborative. Synex International in Vancouver, B.C., recently bought the Cambridge Software Collaborative and brought The Spreadsheet Analyst to Turner Hall to publish. The Spreadsheet Analyst audits Lotus Development Corp.'s 1-2-3, Symphony and file-compatible spreadsheets for mathematical errors or inconsistencies.

Comdisco

FROM PAGE 75

fourth-quarter profit nearly doubled to $23.3 million, or 75 cents per share. Sales increased 63% to $138.2 million.

For the year, revenue climbed 57% to $596.7 million and profits grew 65% to $124.8 million, or $3.99 per share. Cray Chairman John Rollwagen said the company installed 35 Cray supercomputers in 1986, 29 of which were purchased. Five were leased and one was installed at Cray Research.

In 1985, the company installed 28 systems, including 23 purchases, four leases and one company installation.

Rollwagen added that 46 Crays are currently on order, more than half of which will be installed in 1987.

Altos Computer Systems. The San Jose, Calif., supermicro vendor said profits for the second quarter dipped to $2.5 million, or 18 cents a share, from $2.6 million, or 19 cents a share, in the year-earlier period. Sales increased 12% to $40.4 million.

Altos President Dave Jackson announced two executive changes during the quarter. Sam Spadafora, previously vice-president of U.S. sales at the former Burroughs Corp.'s recently divested Memorex unit, has joined Altos as vice-president of national sales. Veteran Altos executive Kapil Nanda has been named to the new position of senior vice-president, product and business development.

Apollo Computer, Inc. Significantly accelerating its gradual recovery from a losing 1985, the Chelmsford, Mass., engineering workstation firm ended 1986 with its strongest earnings performance since the second quarter of 1985.

1986 fourth-quarter earnings

Apollo, Storage Technology are on the rebound; Comdisco, Altos, Lotus slow down

Company	*Net Income Oct.-Dec. (millions of dollars)*	*Percent Change from 1985*	*Revenue Oct.-Dec (millions of dollars)*	*Percent Change from 1985*
Apollo	5.3	+623	120.9	+71
Altos	2.5	−4	40.4	+12
Comdisco	8.03[1]	-66	238.9	+8
Cray Research	23.3	+94	138.2	+63
Daisy	(1.29)	—	25.4	−31
General Datacomm Industries, Inc.	1.4	−5[2]	52.3	+27
Lotus	15.6	+37	81.8	+14
Northern Telecom	125.9	+50	1,314.0	+11
Storage Technology Corp.	8.3	+273	100.5	+22
Teknowledge, Inc.	0.5[3]	+4 1	5.5	+73

Parentheses indicate loss

[1] Includes $22 2 million loss from subsidiary Comdisco Equities, Inc.

[2] 1985 results included $3.4 million extraordinary gain.

[3] Includes $244,000 extraordinary credit.

CW CHART

Revenue grew by 71% to $120.9 million, while profits increased more than sevenfold from a dismal year-earlier quarter to $5.3 million, or 15 cents per share. The quarter's profits made up more than half of Apollo's 1986 net income of $9.3 million, or 27 cents per share.

Nonetheless, 1986 profits still lagged far behind the company's glory days of 1983 and 1984, when the firm earned $13.1 million and $23.9 million, respectively.

Revenue for the year increased by 33% to $391.7 million. In 1985, Apollo lost $1.5 million or, four cents per share, mainly because of a disastrous $18.5 million loss in the third quarter of that year.

Vice-President and Treasurer John Newton said the fourth-quarter growth was primarily driven by Apollo's existing customer base, although the company added 150 new accounts during the .period for an approximate total of 1,900 customers.

Daisy Systems. The troubled Mountain View, Calif., maker of computer-aided design systems for the electronics industry reported a net loss of $1.3 million, or seven cents per share, for the quarter, compared with a profit of $6.3 million, or 35 cents per share, one year earlier.

Revenue dropped 31% to $25.3 million from $36.6 million in the year-earlier period.

"It is still premature to project when the company will return to profitability," Daisy President Harvey Jones said.

Nixdorf Computer Corp. The West German minicomputer maker said revenue increased by 15% in 1986. For the second straight year, Nixdorf's results were hurt by the strength of the deutsche mark, as sales increased 21% before the difference in currencies was calculated.

Nixdorf said its domestic sales in West Germany grew by 21%, while international sales, affected by the currency differential, rose only 9%.

Northern Telecom, Inc. A strong fourth quarter helped the private branch exchange and telecommunications equipment maker overcome a weak first half and end 1986 with nominal increases in sales and earnings.

In the fourth quarter, higher sales and margins on central office switches fueled a 50% rise in earnings to $125.9 million, or $1.07 per share. Revenue climbed 11% to $1.31 billion.

For the year, profits were up 5% to $286.6 million, or $2.45 per share. Sales grew 3% to $4.38 billion.

The company said its revenue in 1986 from central-office switches rose 3%, from integrated business systems and terminals 1%, and revenue from transmission declined 1%. Northern Telecom Chairman Edmund Fitzgerald said the company's goal is to restore 15% annual growth rates.

Emulex Corp. Extremely weak retail sales and write-downs associated with the peripherals vendor's decision to not focus on the retail channel drove second-quarter profits down 76% to $379.00, or three cents per share. Revenue was essentially flat at $25.6 million.

In early December, Emulex decided to retreat from retail sales of its Persyst line of IBM Personal Computer enhancement products, sales of which were running $2.5 million below plan, the company said.

Emulex took a $500,000 inventory write-down charge, as well as other one-time charges associated with the move.

To buy

FROM PAGE 82

Logic Corp. (LLSI — 15/18) and Monolithic Memories, Inc. (MMIC — 16⅝).

However, Hambrecht & Quist's Welty recommends that latecomers to the rally wait for a correction in the market before jumping in. "There is more to come, but not right now," he says.

During 1987, according to Welty, the power behind continued stellar stock performances in technology will likely come from microprocessor-oriented companies.

As examples, he cites Apple Computer, Inc. (AAPL — 49¾), Stratus Computer, Inc. (STRA — 27¾), Lotus Development Corp. (LOTS — 63), VM Software, Inc. (VMSI — 32½), Mentor Graphics Corp. (MENT — 24¼), SHL Systemhouse (SHKIS — 16¾), Seagate and Intel.

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ATRIUM

Lotus sales

FROM PAGE 75

other leading software companies.

Analyst Brian Mutert of Robertson, Colman & Stephens in San Francisco said the fourth-quarter sales increase was higher than his firm had estimated, but "the reason was primarily the strength in the base business." Mutert added that while Lotus's international business was extraordinarily strong, the domestic business "lacked that growth."

Lotus President and Chief Executive Officer Jim Manzi noted that international sales, including U.S. exports, grew by 70% and represented 24% of Lotus's revenue for 1986.

Lotus recorded a 25% increase in sales and a 27% increase in earnings for its fiscal year ended Dec. 31. Sales for the year were $282.9 million, compared with 1985 sales of $225.5 million. Income rose to $48.3 million in 1986.

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No more slump

CONTINUED FROM PAGE 75

sounds good, it makes logical sense and it leaves plenty of room for qualification when it doesn't pan out.

With all due apologies to George Orwell, a large host of computer executives would love to go back to 1984 and live it over again. That was the year when everyone was riding high; IBM dreamed of sales of $100 billion in the foreseeable future, and Apple Computer, Inc. still wowed them during the halftime of the Super Bowl. The National Computer Conference was a certified major event, market research firms like Future Computing, Inc. (remember them?) were going gangbusters with high growth forecasts, and everyone in the MIS world, it seemed, was buying a lot of computers.

Who could have seen what was to come? With IBM leading the way, vendors expanded capacity, built factories and added employees on the expectation that it would all continue. When signs began to emerge in early 1985 that it would not last, the industry found an explanation: It had hit a slump.

However, that word, emblazoned in bold black letters on the cover of *Business Week* in June of that year, no longer seems like the right explanation in February 1987.

Companies like Wang and Data General must still prove to customers and observers that their prolonged financial malaise is in fact an aberration, rather than a sign that each company can simply not adapt to recent changes in the marketplace. If they succeed, it will be because they develop the right products and market them effectively.

It will not be because of an upturn in capital spending; at this point, it's a good bet that such an upturn would probably flow right into the corporate coffers of DEC.

Troubles run deep

So for vendors that are still struggling, the problems run far deeper than awaiting an industry upturn. If IBM says it is hurt by decreased capital spending, could it be because a used 3081 — or a couple of VAXs — do not require as much capital as a new 3090? Once buyers get used to the idea of relatively comparable performance at a lower price, it will become hard to justify the purchase of big-ticket computers, no matter what a future boom economy does to MIS budgets.

For computer firms battling declining growth or losses, "slump" clearly is no longer the appropriate explanation. For firms that have bounced back smartly from their 1985 rock bottoms, like Apple and Apollo, a slump no longer exists.

You can choose "maturity," "shakeout," "consolidation" or many other words to describe the state of the computer industry in 1987. But from a semantic standpoint, the industry "slump" is over.

NICKELS & DIMES

Ungermann-Bass, Inc. announced revenue of $32.3 million for the quarter ended Dec. 31, compared with $22.5 million in the like period a year ago.

Profits were $2 million, or 11 cents per share, compared with $1.6 million, or 10 cents per share, in the previous year.

Revenue for the year was $110.9 million, compared with $72.2 million in the previous year. Net income was approximately break-even, resulting in no earnings per share, as compared with $3.7 million, or 22 cents per share, in 1985.

Dataproducts Corp. reported net income for the third quarter ended Dec. 27 of $2.1 million, or 10 cents per share, compared with net income of $1 million, or 5 cents per share, for the like period a year ago. Revenue for the quarter was $84.4 million, compared with $90.6 million in the year-earlier period.

Comshare, Inc. reported net income for the second quarter ended Dec. 31 of $656,000, or 24 cents per share, compared with $721,000, or 25 cents per share, last year. Revenue was $17.4 million, compared with $18.2 million for the same period a year ago.

Genicom Corp. announced revenue for the fourth quarter ended Dec. 28 of $43.1 million, compared with $31.8 million one year ago. Profits were $2.5 million, or 22 cents per share, up 140% from $1 million, or 12 cents per share, earned a year ago.

For the year, revenue was $157.5 million, compared with $126.5 million the previous year. Net income for the year was $8.6 million, or 83 cents per share, compared with $1.8 million, or 20 cents per share, reported the previous year.

Western Digital Corp. reported a record profit of $11.8 million, or 50 cents per share, for the second quarter of fiscal 1987 ended Dec. 27, a 134% increase from $5 million, or 23 cents per share, in the second quarter a year ago.

Revenue was $109.8 million, 57% higher than revenue of $70 million reported in the second quarter last year.

Massachusetts Computer Corp. announced revenue for the second quarter ended Dec. 27 of $17.2 million, compared with $13.6 million one year ago. Profits were $1.1 million, or 7 cents per share, compared with $449,000, or 3 cents per share, in the like quarter a year ago.

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For nearly two decades, Land Grant has been involved with high tech in a variety of capacities. He is president of Land Grant & Company — a business devoted to export consulting and profitable concepts in global trade for high technology producers.

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Land discusses how CW International Marketing Services helped his client, Phoenix Technology: *"Locating qualified candidates was one of our first steps in helping Phoenix select the right distributors. Within 10 days, we had the names of the best distributors in The United Kingdom, West Germany and France."*

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In fact, selected international market information is so scarce, Land is currently writing a guide entitled the *High-Tech Exporter's Sourcebook.* And he plans to continue relying on CW International Marketing Services for distributor contacts. He explains, *"The real added value of CW is its people and expertise in-place around the world."* He adds, *"Because CW Communications is a network of international offices, CW International Marketing Services has worldwide contacts and marketing information unavailable elsewhere."*

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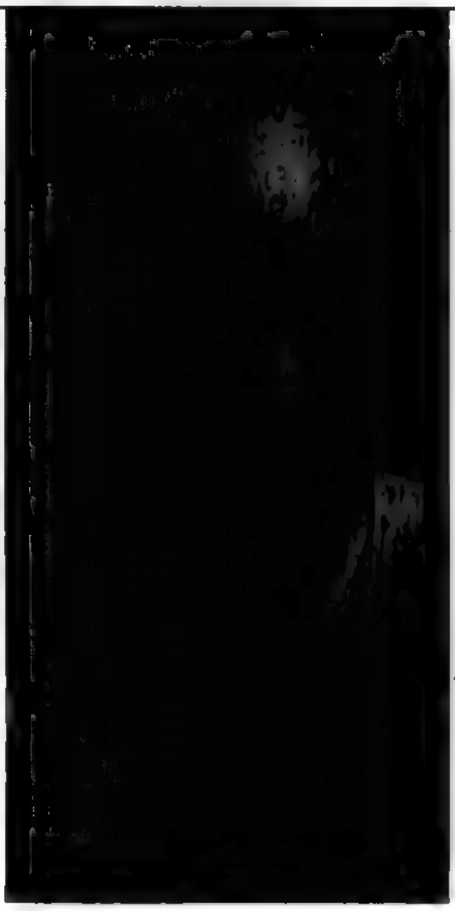

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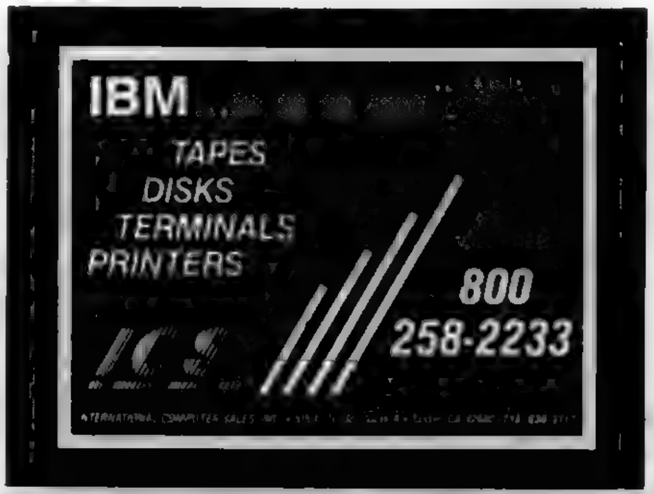

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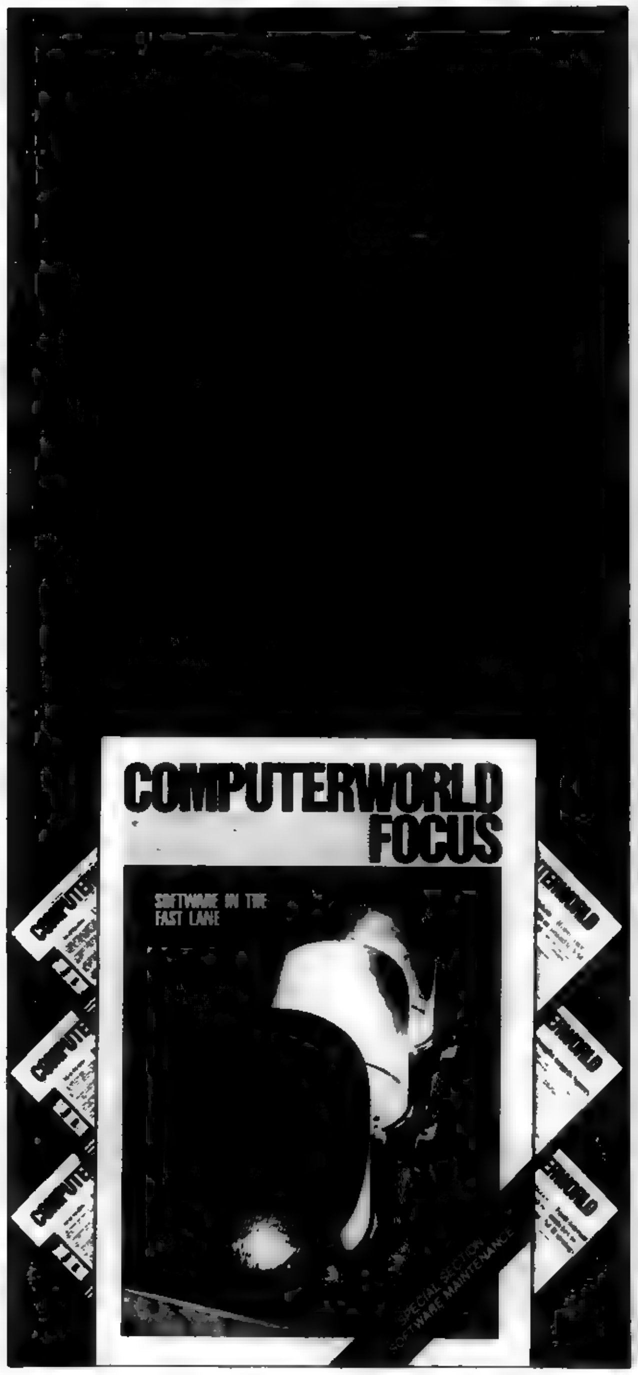
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SOFTWARE PERFORMANCE ANALYST. Participate in computation characterization of subsystems of computer oper system, modeling & designing methodology to characterize performance. Write programs to model & simulate features. M.S. in Computer Science req. No exp req. Must have taken courses in: Computer Architecture, Oper Systems, incl multiprogramming O.S., Performance Eval of Computer Systems, incl modeling of computer systems, & Design & Analysis of Algorithms. 40 hr/wk, 8-5. $36,400/yr. Send resume to: Job Service of Florida, 3421 Lawton Rd., Orlando, FL 32803. Job Order #FL5111554

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C Developers

Senior Systems Developer (C Compiler) will work on code generation and optimization for the SAS/C™ compiler and library for IBM® mainframes. A bachelor's degree in computer science, mathematics, or a physical science is required. In-depth knowledge of the C language, IBM 370 object code, and compiler optimization techniques (both machine-independent and machine-specific) is required. Experience with compiler front-ends or mathematical programming in IBM 370 assembler language is a plus.

Senior Systems Developer (C Compiler and Library) will work on the SAS/C™ compiler and library for IBM mainframes. A bachelor's degree in computer science, mathematics, or a physical science is required. Knowledge of the C language, C library, and IBM 370 assembler language is required. In-depth knowledge of at least two of the following areas is also required: MVS or MVS/XA system, I/O and TSO interfaces, 3270 data stream, CICS, and VSAM. Experience in writing software interfaces at the assembler level, working with operating systems other than MVS and MVS/XA, and experience with language implementations on IBM mainframes is desirable.

Systems Developer will work on the Lattice® C compiler and library for 68000 architecture machines. Duties include working on enhancements to 68000 code generators, designing and writing 68000 run-time library routines in both C and assembler, and porting the compiler to additional 68000 architecture machines. Applicants must have a bachelor's degree in computer science or a related field, or equivalent experience; and three to five years' programming experience, including one year of C and one year of 68000 assembler (on any 68000 architecture machine). Knowledge of Amiga,™ Atari,™ Macintosh,™ or other 68000 operating systems is useful.

MVS

Systems Developer will develop and maintain the SAS System supervisor components for the IBM MVS environment that interfaces to communications terminals such as IBM 3278, 3279, 3287, and 3268. Applicants must have knowledge of one or more of the following: SNA protocols, the ACF/VTAM access method, 3270 data streams, MVS/XA supervisor services, or IBM 370 assembler language. Experience with developing and supporting large software systems, VTAM/NCP service aids, the C language, and the SAS System is a significant asset. A bachelor's degree in computer science or equivalent work experience is required.

Systems Developer will analyze the performance of the SAS System under MVS. Specific responsibilities include identifying any performance problem areas, suggesting ways to improve system performance, and helping implement the changes. Candidates must be able to develop a comprehensive performance management program including creating test suites for performance comparisons between releases. Knowledge of data and storage management techniques and algorithms is required. Applicants should have a minimum of three years' systems programming experience. Technical proficiency in IBM 370 assembler and one other high-level language (C preferred), and a bachelor's degree (computer science preferred), or equivalent experience, are required.

CMS

Systems Developer will work in the area of performance analysis for the SAS System under CMS. Responsibilities include implementing a methodology to perform the analysis, and designing prototypes to ensure the quality and efficiency of the SAS System under CMS. Applicants must have a bachelor's degree in computer science or equivalent work experience, experience in VM/CMS performance analysis, and/or experience with large applications systems. Proficiency in IBM 370 assembler language is required. Knowledge of C, PL/I, and FORTRAN is helpful, and knowledge of SAS software is a plus. A minimum of three years' programming experience is required.

Systems Developer will design and implement the SAS System full-screen interface under CMS, and will participate in implementing the SAS I/O subsystem under CMS. Applicants must have a bachelor's degree in computer science or equivalent work experience, and a working knowledge of VM/CMS and IBM 370 assembler language. Knowledge of C, PL/I, and FORTRAN is helpful, and knowledge of SAS software is a plus. A minimum of three years' programming experience is required.

DOS/VSE

Systems Developer (IBM 370 Assembler) will be responsible for writing, maintaining, and debugging the SAS System interface code for the DOS/VSE environment, and diagnosing and fixing problems encountered when porting SAS software to the DOS/VSE environment. Applicants must have a bachelor's degree in computer science, mathematics, or a physical science, or equivalent work experience. Excellent knowledge of IBM 370 assembler language, and of system interfaces on at least one IBM mainframe operating system is required. Knowledge of at least one high-level language (C preferred) is also required. DOS/VSE experience and assembler-level debugging experience are desired.

VMS™

Systems Developer will assist in developing the SAS System on the VAX.™ Applicants must have experience in I/O interfacing, including graphics and full-screen, disk and tape drives and devices. Requirements include in-depth knowledge of VMS™ internals, working knowledge of RMS/QIO and data base internals, a minimum of three years' experience as a VMS systems programmer, and a bachelor's degree in computer science or equivalent work experience.

PRIMOS®

Systems Developer will be responsible for porting the SAS System to the Prime 50 series machine and for developing machine (host) interfaces, which include memory management interfaces, I/O interfaces (disk, tape, terminal, and other devices), and interfaces to other low level operating system functions. This person must have a bachelor's degree in computer science or equivalent work experience, and in-depth knowledge of PRIMOS internals. Knowledge of the C language and the SAS System is desired.

AOS/VS

Systems Developer will be responsible for porting the SAS System to the Data General ECLIPSE® MV series under the AOS/VS operating system and for developing machine (host) interfaces, which include memory management interfaces, I/O interfaces (disk, tape, terminal, and other devices), and interfaces to other low level operating system functions. This person must have a bachelor's degree in computer science or equivalent work experience, and in-depth knowledge of AOS/VS internals. Knowledge of the C language and the SAS System is desired.

PC DOS

Senior Systems Developer will adapt existing code, and/or write new code, to provide full-screen windowing support for a C debugger on the IBM PC, and interface debugger to selected existing windowing packages. Applicants must have a bachelor's degree, preferably in computer science or a related field, five years' programming experience with at least one year's experience in assembler language and one year's experience in IBM PC programming; and in-depth knowledge of IBM PC full-screen interfaces and windowing at the assembler language level.

Systems Support

Associate Systems Programmer will be responsible for installing, testing, distributing, maintaining, modifying, tuning, and diagnosing systems software (AEGIS and DOMAIN/IX), as well as designing and implementing software tools for Apollo computers. Applicants must have a bachelor's degree in computer science or a related field, or equivalent experience. At least one to three years' systems administration experience is required, including ACL planning and implementation, managing Network Servers (such as NETMAIN, PRSVR, SNA Gateways) and Network Diagnostics (such as PROBENET and NETSTAT). In addition, applicants must have knowledge of the Apollo architecture and operating system internals. Experience with data communications hardware and software, the UNIX® operating system, the SAS System, and C programming is a plus.

Language Processing

Associate Systems Developer will be responsible for the research and development of natural language processing and speech recognition products and their integration into the SAS System. Applicants must have a bachelor's degree in computer science or mathematical sciences and at least two years' related work experience. An advanced degree in computational linguistics or computer science is preferred. Experience with LISP and/or the C language is required, and knowledge of IBM PC assembler language and SAS software is desired.

Systems Developer will be responsible for the research and development of natural language processing and speech recognition products and their integration into the SAS System. Applicants must have an advanced degree in computer science or computational linguistics, and four years' related work experience. Technical proficiency in LISP and/or the C language is required, and a working knowledge of SAS software is desired. Experience in writing a natural language product and supporting large software systems is desired.

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The candidate should have a University degree in a quantitative discipline, with a total of 10 years experience in the above areas including 3-5 years involvement in Hydrocarbon Marketing and 3-5 years project management experience in a consulting environment relating to the implementation of computer systems.

2. PERSONNEL CONSULTANT / ADVISOR

A Consultant with extensive experience in the personnel area, preferably in an oil company's corporate environment to work closely with users and provide consultancy in the areas of development of computerised corporate personnel management systems.

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THE HUMAN RESOURCES DIVISION MANAGER
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SALES OFFICES

Publisher/President/Lee Vidmer

VP/Sales/Edward P. Marecki
Manager/Marketing & Sales Operations/Kathy Doyle
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Framingham MA 01701 9171
(617) 879-0700

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National Recruitment Sales Manager/Al DeMille
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CW INTERNATIONAL MARKETING SERVICES
Managing Director Frank Cutitta
COMPUTERWORLD 375 Cochituate Road Box 9171
Framingham, MA 01701 9171
(617) 879-0700

FOREIGN EDITORIAL/SALES OFFICES

Argentina: Ruben Argento, CW Communications S/A, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-5583. Telex: (390) 22644 (BAZAN AR).

Asia: Euan Barty, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong, Phone: (011) 852 5 861 3238 Telex: (780) 72827 (COMWOR HX).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 4395133. Telex: (790) AA74752 (COMWOR).

Austria: Manfred Weiss, CW Publikationen Velagsgesellschaft m.b.H., Josefstadter Strasse 74, A-1080 Wien, Austria. Phone: (011) 43 222486 5910. Telex: (847) 115 542 (SCH/A)

Brazil: Ney Kruel, Computerworld do Brazil, Rua Alcindo Guanabara, 25-11 andar, 20 031 Rio de Janeiro, RJ Brazil. Phone: (011) 55 21 240 8225. Telex: (391) 21 30838.

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Steven Yamada, Tokyo Representative Corp., Sanshin Kogyo Jimbocho 3F, Chiyoda-ku, Tokyo 101, Japan. Phone: (011) 81 3 230-4117/4118. Telex: (781) J26860 (reps for all CWCI publications except Computerworld Japan).

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Taiwan: Leona Wang, ACE Media Agency Co. Ltd., P.O. Box 26-578 Taipei, Taiwan, R.O.C. Phone: (011) 02 751 3636. Telex: (785) 14142 (ACE GROUP) (Representative for all CWCI publications).

London: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WC1 8UT, United Kingdom. Phone: (011) 44 1 831 9252 Telex: (851) [illegible]

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ADVERTISERS INDEX

AFIPS	69
AGS	22.26
Alloy Computer Products	S 18
Artificial Intelligence	57
Atrium Info Group	83
AT&T	S 2-3.15
Banyan Systems	S Cover 4
Bell Atlantic	79
BI Moyle Associates	14
Business Recovery Systems	79
California Software Products	S 22
CETDS	52
CGI	103
Chen & Associates	22
Chicago Soft	10
Chipcom	S 14
Communication Networks '87	77
Computer Corp of America	5
Computer Tech Group	14
Corp for Open Systems	58
Cullinet	34
CW Focus [illegible]	S 20
CW April Focus	85
CW Circulation	60
CW Corporate	64
CW DIAL INQ Reader Service	S Cover 2
CW Testimonial	S 12.81.84.98
CWIMS Australia	S 15
CWIMS Netherlands	46
CWIMS Switzerland	80
Data Design	18
Data General Corp.	S Cover 3
DataSouth	44
DBMI	13
DEC	32-33
Drexel Burnham	39
Duquesne	S 6.35
Electronic Form Systems	50-51
Epson America	66-67
Federal Communications	10
Flagstaff Engineering	56
General Datacomm (insert)	60/61
Hewlett-Packard	S 8-9
Honeywell Information Systems	S 16-17
Integral Systems	23
Interface Group	71
JDS Microprocessing	82
Language Technology	28-29
Lotus Development Corp	36-37
McCormack & Dodge	27
Macmillan Book Club	73
Micro Data Base Systems	76
Micom Interlan	38.80
Microsoft	40-41
Mike Murach & Associates	9
Mitrol	19
MSA	104
Multi-Tech Systems	43
NEC	62
On-Line Software International	24-25.42
Oracle Corp.	11.31
Proteon,Inc	S 10
Questronics	S 21
Radio Shack	56
Rapid Systems Development	83
Reaka Inc.	54
Relational Technology	48
Retrieval Tech	46
Ryan McFarland	63
SAS Institute	30.49
Scientific Computer	78
Soft Technology & Research (STAR)	45
Sorbus	70
SPSS Inc.	12
Storage Technology	20-21
Stratus Computer	55
Syncsort	3
Tandem	72
Televideo	74
Telex	68
Tymnet	47
Uccel	59
VM Software	7
Westinghouse	S 11

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UPCOMING SPOTLIGHT SECTIONS

Issue Date	Topic	Ad Closing Date
March 2	PC Storage Devices	February 13
March 16	Graphics	February 27
March 30	Modems	March 13
April 6	Desktop Publishing Systems	March 20
April 13	T1 Equipment/ Multiplexers	March 27
April 20	Workstations	April 3
April 27	DEC-Compatible Equipment	April 10
May 4	Printers	April 17
May 11	Manufacturing Software	April 24
May 18	UPS	May 1
May 25	PCs — IBM & Compatibles	May 8
June 1	Field Service	May 15
June 8	LANs	May 22
June 15	DBMS	May 29
June 22	Add-in Boards	June 5
June 29	Accounting Software	June 12

Emulex gets injunction reprieve

BY ALAN ALPER
CW STAFF

WASHINGTON, D.C. — Emulex Corp. will, at least temporarily, resume the development and marketing of a series of products for the Digital Equipment Corp. market that it was enjoined from selling just two weeks ago.

The Costa Mesa, Calif.-based firm, which is among the largest suppliers of DEC-compatible hardware, last week got a stay of a paragraph, pending appeal, in the earlier preliminary injunction that prevented it from marketing certain products that are compatible with a DEC storage architecture. The stay was granted by the U.S. Court of Appeals. An appeal date has not been set.

The action came just two weeks after a U.S. District Court judge in Concord, N.H., upheld a preliminary injunction sought by DEC in a case involving Emulex's alleged use of misappropriated DEC technology. The disputed paragraph in the preliminary injunction prohibited Emulex from designing, developing, manufacturing and marketing any product that benefits from allegedly stolen technology [CW, Jan. 19].

While the preliminary injunction did not prevent Emulex from shipping any of its current products, the ruling did threaten to prevent the firm from shipping its new and highly touted SMDI storage subsystem later in the quarter.

"The ruling . . . means that we can once again resume the legitimate development and marketing of new products which were interrupted as a result of our compliance with the preliminary injunction," noted Emulex President Steve Frankel in a prepared statement.

The appeals court last November overturned a preliminary injuction ordered by the district court seven months earlier. A January district court ruling adopted more specific language in granting the preliminary injunction.

In its ruling last week, the appeals court said "it appears that [Emulex] will prevail with respect to the merits of its appeal because the district court order failed to comply with the mandate of this court issued Nov. 12, 1986, in which this court required the district court's reasons for entering an order beyond the reach of paragraphs one, three and four. Such reasons do not appear in the district court's decision now before us."

Reagan initiates relaxed export controls

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Reagan administration, in a major policy reversal, last week suggested it will relax the export controls on high-technology equipment, such as computers, in order to help U.S. vendors become more competitive in the world economy.

The still-sketchy proposal was mentioned by President Reagan in his State of the Union address to Congress. The message featured a plan for improving U.S. business competitiveness that includes many of the trade, export and education policies that the U.S. computer industry has long advocated.

"We think the president's proposals are in the right direction, and the administration seems very open to working with us to get more of our objectives included," said Charlotte LeGates, spokeswoman for the Computer and Business Equipment Manufacturers Association (CBEMA).

A recent report by the National Academy of Sciences said that overzealous export controls cost the U.S. economy an estimated $9.3 billion in 1985.

"For a number of years, our companies have realized that many export controls are costing us billions of dollars without really increasing U.S. national security," said Vico E. Henriques, CBEMA's president.

Reagan said he directed his Cabinet to review the export controls program and produce recommendations by early March.

He said the recommendations should be aimed at decontrolling technologies that offer no serious threat to U.S. security; eliminating unilateral controls for items that have widespread foreign availability; reducing the time necessary for obtaining an export license by at least one-third; and faster resolution of disputes about what items should be controlled.

Jim LeMunyon, senior manager of government relations for the American Electronics Association, said he is optimistic that the initiative will lead to a major overhaul of the program and a shorter list of controlled items.

"We should do a better job of controlling the things that are really critical rather than wasting our time on things that are already available around the world," LeMunyon said.

Export controls

Export controls are regulations that restrict or prohibit the export of high-technology products in order to prevent them from being used for military purposes in Soviet bloc countries.

In the past, the administration's export controls program, has been dominated by the security interests of the U.S. Department of Defense.

Computer and electronics vendors are particularly upset about re-export controls that require Western customers to seek U.S. permission to resell controlled U.S. products to buyers in unapproved countries.

The vendors argue that the paperwork delays encourage foreigners to buy components and finished products from non-U.S. companies, which are not subject to re-export controls.

CBEMA officials observed that Reagan did not propose any relaxation of re-export controls, but they said the administration is willing to consider it.

Novell to buy CXI

Firm's products link micros to mainframes

BY CLINTON WILDER
CW STAFF

PROVO, Utah — Marking the trend of diversification among growing data communications vendors, Novell, Inc. last week announced its intent to acquire micro-to-mainframe link developer CXI, Inc. for approximately $32 million in Novell stock.

Privately held CXI, based in Palo Alto, Calif., makes the PCOX family of products that link IBM Personal Computers to IBM 3270 terminal networks and to the IBM System/34, 36 and 38. The buyout is the most aggressive move to date by a leading local-area network (LAN) vendor into the micro-to-mainframe market.

"Novell has plenty of cash, and it's a smart move to diversify away from LANs," said Laura Peck, a communications industry analyst with L. F. Rothschild, Unterberg Towbin. "In the long term, players in the communications market will have to offer many solutions, not just LANs."

> "NOVELL has plenty of cash, and it's a smart move to diversify away from LANs."
>
> LAURA PECK
> L. F. ROTHSCHILD,
> UNTERBERG TOWBIN

The announcement follows several major communications industry acquisitions within the past year, including the recent purchase of Centram Systems West, Inc. by Novell's LAN archrival, 3Com Corp. [CW, Jan. 26]. Other deals have included Digital Communications Associates, Inc.'s purchases of Forte Communications, Inc. and Cohesive Network, Inc.; the acquisition of Phoenix Technology, Inc. by Bridge Communications, Inc.; and Novell's buyout of Santa Clara Systems, Inc.

Novell has been selling CXI's LAN gateway products under a distribution agreement signed in the fourth quarter of 1986. CXI, which sells primarily through OEMs and distributors, currently sells its coaxial connection products through a private-label agreement with AST Research, Inc. and a marketing agreement with Zenith Data Systems.

"The Novell and CXI product lines fit like a glove; there is no overlap," said Charles Morel, CXI's founder, chairman and chief executive officer. "We believe that LAN gateways will become the connectivity option of choice for micro-to-mainframe links."

CXI, which employs 78 people, will become a wholly owned subsidiary of Novell. The acquisition, subject to board and shareholder approval, is expected to be completed by the end of this month.

Douglas Whitman, an analyst with Alex Brown & Sons, said consolidation within the data communications market will continue.

"As companies grow as rapidly as Novell has, they will need a wide variety of products," Whitman said.

HP plans spring test of first Spectrum units

BY JEFFRY BEELER
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. issued a cautiously optimistic progress report last week on its latest efforts to ready the first commercial byproduct of its Spectrum development project.

HP's Young

Beta-test shipments for HP 3000 Model 930 will begin "probably somewhere in the April time frame," HP Executive Vice-President Dean Morton said privately, following an analysts' meeting. However, Morton was unable to name any of the beta-test candidates. The production system is scheduled to ship in the middle of the year.

HP President John Young deflected questions about whether the vendor has finally remedied the operating system and I/O software ills that recently delayed shipments of its 3000 Model 930 business processor.

Asked if the target date might slip again, Young downplayed the possibility but stopped short of flatly discounting it. "I don't want to speculate about events that we have no reason to believe will ever occur," he said.

Young's occasional cautiousness somewhat tempered HP's otherwise encouraging assessment of the 930's current status and near-term prospects. The vendor has compiled a list of six to 12 prospective participants in the upcoming beta-test program, Morton said in an interview.

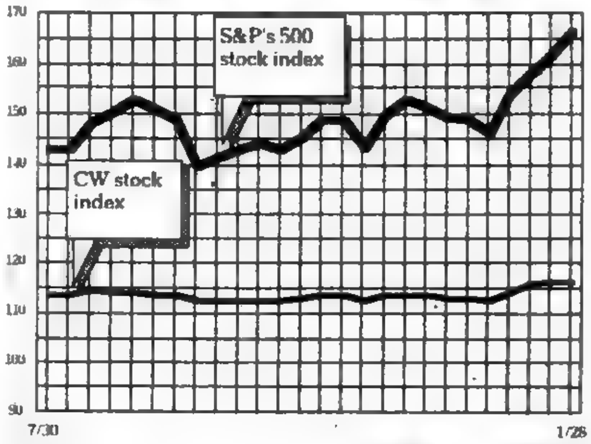
Morton also said in his prepared remarks that HP passed a major milestone in January in its attempts to fix the software bugs that forced the firm to postpone the system's first shipments last September.

But, he added a word of caution by saying that some of the 930's much-discussed woes remain unresolved. "I don't want to minimize the amount of work that remains to be done," Morton said. "As with any complex development process, it's difficult to predict results with certainty."

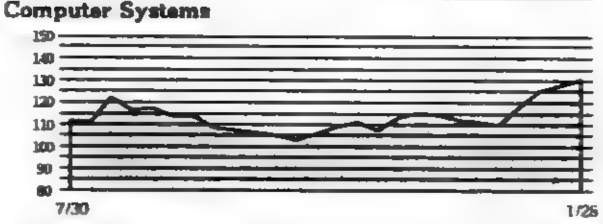
Expanding slightly on Morton's remarks, HP Senior Vice-President for Business Systems Doug Chance described the milestone as a recent victory in HP's longstanding battle to minimize the processor's I/O path lengths, which have contributed to the delays. "We've reduced the path lengths by two-thirds," Chance said after the meeting in response to questions.

But in correcting one design flaw, HP inadvertently introduced or uncovered some others, which the vendor is now working hard to overcome, he added. Additional development headaches also apparently lie ahead. In particular, Young said, HP still faces the time-consuming task of integrating the 930's data base management and networking facilities.

STOCK TRADING INDEX



Indexes	*Last Week*	*This Week*
Computer Systems	127.5	**130.2**
Supplies & Accessories	148.5	**152.1**
Software & DP Services	119.2	**118.3**
Semiconductors	90.4	**89.8**
Peripherals & Subsystems	117.0	**116.3**
Leasing Companies	107.3	**106.3**
Composite Index	114.9	**114.9**
S&P 500 Index	160.2	**163.7**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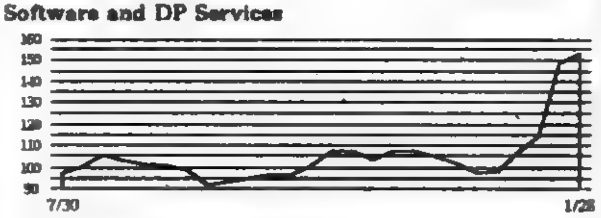
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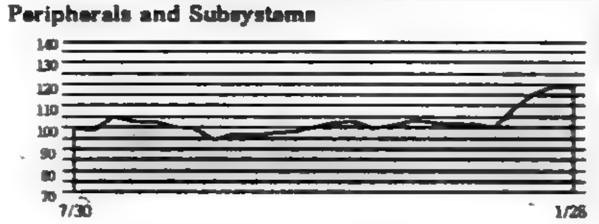
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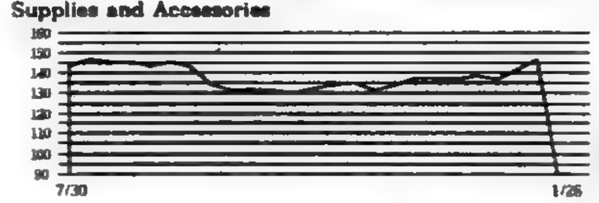
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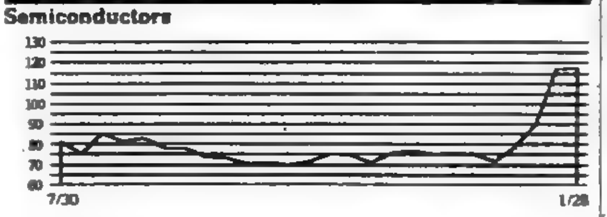
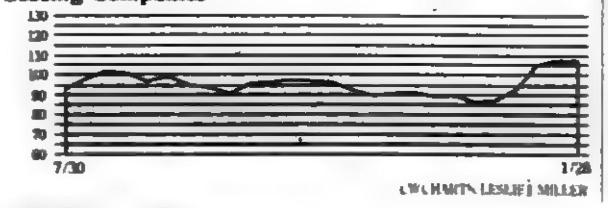

Semiconductors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EXCH		52 WEEK RANGE (1)		PRICE CLOSE JAN 28 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	3	4.50	0.1	2.7
O	ALTOS COMPUTER SYS	19	10	14.00	+0.0	+0.0
A	AMDAHL CORP	32	14	28.50	+0.5	+1.8
O	APOLLO COMPUTER INC	22	9	20.88	+1.5	+7.7
O	APPLE COMPUTER INC	56	22	52.75	+3.8	+7.7
N	AT&T	28	21	26.00	0.8	2.8
O	CPT CORP	7	3	3.63	0.4	9.4
N	COMPAQ COMPUTER CORP	26	12	24.88	+1.4	+5.9
A	COMPUTER CONSOLES INC	12	6	10.25	+0.6	+6.5
O	CONCURRENT COMP CORP	25	11	15.00	+0.8	+5.3
N	CONTROL DATA CORP	30	19	29.00	+1.5	+5.5
O	CONVERGENT TECH	14	4	9.00	+0.6	+7.5
N	CRAY RESH INC	116	62	115.13	+9.3	+8.7
O	DAISY SYS CORP	20	8	9.75	+0.4	+4.0
N	DATA GEN CORP	48	25	34.38	3.9	10.1
N	DATAPOINT CORP	9	4	5.25	+0.0	+0.0
N	DIGITAL EQUIP CORP	150	75	146.38	+6.4	+4.6
N	FLOATING POINT SYS INC	46	11	12.13	0.1	1.0
N	GOULD INC	31	15	18.50	0.9	4.5
N	HARRIS CORP	37	26	35.38	+0.4	+1.1
N	HEWLETT PACKARD CO	54	36	49.00	3.4	6.4
N	HONEYWELL INC	84	58	64.25	+0.8	+1.2
N	IBM	162	116	129.38	+6.6	+5.4
O	IPL SYS INC	4	1	2.25	+0.3	+12.5
N	ITT CORP	61	37	59.13	+1.4	+2.4
N	MACOM INC	19	12	13.38	0.1	0.9
N	MATSUSHITA ELEC INDL LTD	136	64	124.75	2.0	1.6
O	MENTOR GRAPHICS CORP	26	11	25.75	+3.3	+14.4
N	NBI INC	14	8	10.25	0.1	1.2
N	NCR CORP	60	40	57.63	+0.9	+1.5
N	PRIME COMPUTER INC	28	16	22.38	+1.3	+5.9
O	STRATUS COMPUTER	34	17	29.25	0.5	1.7
O	SYMBOLICS INC	15	4	3.88	0.4	8.8
O	TANDEM COMPUTERS INC	59	22	57.50	+8.3	+16.8
N	TANDY CORP	50	31	48.38	+1.4	+2.9
N	TEXAS INSTRS INC	148	103	141.75	+7.4	5.5
A	ULTIMATE CORP	35	13	24.25	+0.4	+1.6
N	UNISYS	101	58	96.00	+0.1	+0.1
A	WANG LABS INC B	22	11	13.63	0.3	1.8
A	WANG LABS INC C	22	11	13.88	+0.0	+0.0
N	XEROX CORP	72	49	67.75	+0.8	+1.1

Supplies & Accessories

EXCH		52 WEEK RANGE (1)		PRICE CLOSE JAN 28 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	28.13	+0.9	3.2
N	BARRY WRIGHT CORP	25	14	16.00	0.1	0.8
A	DUPLEX PRODS INC	23	18	19.63	+0.6	+3.3
N	ENNIS BUSINESS FORMS INC	31	22	29.75	0.5	1.7
N	3M CO	140	86	131.25	+1.9	+1.4
N	MOORE LTD	28	19	23.00	+0.5	+2.2
O	STANDARD REGISTER CO	50	32	43.00	+3.5	+8.9
N	WALLACE COMPUTER SVCS	50	37	47.25	+1.3	2.7

Software & DP Services

EXCH		52 WEEK RANGE (1)		PRICE CLOSE JAN 28 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	4.25	0.3	5.6
N	ADVANCED SYS INC	20	12	18.63	+0.0	+0.0
N	AGS COMPUTERS INC	35	17	33.25	+0.4	1.1
O	AMERICAN MGMT SYS INC	31	12	26.50	+0.3	1.0
O	AMERICAN SOFTWARE INC	23	9	21.00	+1.6	+8.4
N	ANACOMP INC	7	3	4.38	0.3	5.4
O	ANALYSTS INTL CORP	10	4	9.88	+0.0	+0.0
O	ASHTON TATE	30	10	26.25	1.1	4.1
O	ASK COMPUTER SYS INC	15	9	13.00	0.1	1.0
O	ASTRADYNE COMP IND	3	1	1.56	+0.0	+0.0
N	AUTOMATIC DATA PROC	47	29	44.50	0.8	1.7
O	BOOLE & BABBAGE INC	8	4	7.75	0.3	3.1
O	COMPUTER ASSOC INTL INC	25	17	16.50	0.0	+0.0
O	COMPUTER HORIZONS CORP	14	10	12.88	0.1	1.0
O	COMPUTER NETWORK TECH	10	4	4.06	0.5	11.0
N	COMPUTER SCIENCES CORP	53	30	50.00	0.5	1.0
O	COMPUTER TASK GROUP INC	19	11	13.38	+0.6	+4.9
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	16	10	13.50	+1.5	+12.5
N	CULLINET SOFTWARE INC	17	6	8.25	0.1	1.5
O	CYCARE SYS INC	17	7	9.63	0.1	1.3
O	DUQUESNE SYS INC	33	15	40.50	+2.0	+5.2
N	GENERAL ELEC CO	104	69	101.00	+3.9	+4.0
N	GENERAL MTRS CORP	50	24	29.88	0.4	1.2
O	HOGAN SYS INC	15	7	13.88	0.6	4.3
O	INFORMATION SCIENCES INC	4	1	1.13	0.3	18.2
O	INFOTRON SYS CORP	19	7	7.75	0.3	3.1
O	KEANE INC	16	5	6.25	+0.3	+4.2
N	LOGICON INC	38	22	27.25	1.0	3.5
O	LOTUS DEV CORP	69	20	65.75	+1.8	+2.7
O	MANAGEMENT SCI AMER	18	11	17.50	+0.9	+5.3
O	MCI COMM CORP	13	6	6.25	0.5	7.4
O	MICOM SYS INC	23	10	15.75	0.3	1.6
O	MICRO PRO INTL CORP	4	2	3.00	0.1	4.0
O	MICROSOFT CORP	78	26	71.50	+3.8	+5.5
O	NATIONAL DATA CORP	26	16	23.50	+0.8	+3.3
O	ON LINE SOFTWARE INT	19	10	18.75	0.5	2.7
O	ORACLE SYS CORP	30	13	27.50	0.5	1.8
N	PANSOPHIC SYS INC	39	25	38.00	+2.3	+6.3
O	POLICY MGMT SYS CORP	30	15	29.00	+0.5	+1.8
O	PROGRAMMING & SYS INC	11	8	9.00	0.4	4.0
O	REYNOLDS & REYNOLDS CO	42	27	30.75	2.0	6.1
O	SCIENTIFIC COMPUTERS INC	7	4	7.13	0.1	1.7
O	SEI CORP	28	15	23.00	+1.0	+4.5
O	SHARED MED SYS CORP	49	30	44.75	2.5	5.3
O	SOFTWARE AG SYSTEMS INC	22	10	12.38	0.8	5.7
O	SOFTWARE PUBG CORP	11	5	9.50	1.0	9.5
A	STERLING SOFTWARE INC	21	10	12.13	1.0	7.6
N	SUNGARD DATA SYSTEMS	17	10	16.50	+0.1	+0.8
N	UCCEL CORP	33	15	30.00	0.3	0.8
N	URS CORP	18	11	18.00	+0.1	+0.7
O	VM SOFTWARE INC	36	12	33.00	+3.5	+11.9

Semiconductors

EXCH		52 WEEK RANGE (1)		PRICE CLOSE JAN 28 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	34	13	17.63	+0.1	0.7
N	ANALOG DEVICES INC	25	14	18.63	+0.3	+1.4
O	ANALOGIC CORP	15	10	10.63	0.1	1.2
N	APPLIED MAGNETICS CORP	21	13	20.00	+0.9	+4.6
O	AVANTEK INC	23	14	15.50	1.3	7.5
O	HADCO CORP	6	3	4.00	0.5	11.1
O	INTEL CORP	32	16	29.25	+1.8	+6.4
O	MICRO MASK INC	7	2	4.50	0.1	2.7
N	MOTOROLA INC	50	34	45.63	+1.9	+4.3
N	NATIONAL SEMICONDUCTOR	16	8	14.00	+0.4	+2.8
N	TERADYNE INC	30	16	16.88	1.0	5.6

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Peripherals & Subsystems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE JAN 28 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	4	[illegible]	[illegible]	[illegible]
A	ANDERSON JACOBSON INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	AST RESH INC	28	[illegible]	[illegible]	[illegible]	[illegible]
O	AUTOTROL CORP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	AVANT GARDE COMPUTING	[illegible]	3	[illegible]	[illegible]	[illegible]
O	BANCTEC INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	BOLT BERANEK & NEWMAN	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A	CETEC CORP	[illegible]	5	[illegible]	[illegible]	[illegible]
A	COGNITRONICS CORP	6	[illegible]	[illegible]	[illegible]	[illegible]
N	COMPUGRAPHIC CORP	[illegible]	16	[illegible]	[illegible]	[illegible]
N	COMPUTERVISION CORP	20	10	[illegible]	[illegible]	[illegible]
N	CONRAC CORP	18	12	14.25	[illegible]	[illegible]
A	DATAPRODUCTS CORP	18	11	[illegible]	[illegible]	[illegible]
A	DATARAM CORP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	DATA SWITCH CORP	[illegible]	5	[illegible]	[illegible]	[illegible]
O	DATUM INC	[illegible]	4	5.75	[illegible]	[illegible]
N	DECISION INDS CORP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	ENDATA INC	6	4	[illegible]	[illegible]	[illegible]
O	EMC CORP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	EVANS & SUTHERLAND	33	20	[illegible]	[illegible]	[illegible]
N	FLOATING POINT SYS INC	[illegible]	11	[illegible]	[illegible]	[illegible]
O	GANDALF TECHNOLOGIES	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	GENERAL DATACOMM IND	15	8	[illegible]	[illegible]	[illegible]
N	HAZELTINE CORP	30	16	[illegible]	[illegible]	[illegible]
O	ICOT CORP	13	8	[illegible]	[illegible]	[illegible]
O	INFORMATION INTL INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	INTECOM INC	[illegible]	3	[illegible]	[illegible]	[illegible]
O	INTERLEAF INC	[illegible]	8	10.25	[illegible]	[illegible]
O	MEGADATA CORP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A	MSI DATA CORP	14	10	[illegible]	[illegible]	[illegible]
N	NASHUA CORP	28	16	[illegible]	[illegible]	[illegible]
O	NETWORK SYS CORP	19	10	[illegible]	[illegible]	[illegible]
N	NORTH AMERN PHILIPS CORP	48	35	[illegible]	[illegible]	[illegible]
N	NORTHERN TELECOM LTD	39	25	36.25	[illegible]	[illegible]
O	NOVELL INC	[illegible]	14	[illegible]	[illegible]	[illegible]
N	PARADYNE CORP	11	4	[illegible]	[illegible]	[illegible]
A	PENRIL CORP	[illegible]	3	[illegible]	[illegible]	[illegible]
N	PLESSEY PLC	36	[illegible]	[illegible]	[illegible]	[illegible]
O	PRINTRONIX INC	15	10	[illegible]	[illegible]	[illegible]
O	QMS INC	[illegible]	10	[illegible]	[illegible]	[illegible]
O	RAMTEK CORP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	RECOGNITION EQUIP INC	20	[illegible]	[illegible]	[illegible]	[illegible]
O	SCAN TRON CORP	14	[illegible]	[illegible]	[illegible]	[illegible]
N	SCIENTIFIC ATLANTA INC	15	[illegible]	[illegible]	[illegible]	[illegible]
O	SEAGATE TECHNOLOGY	30	8	[illegible]	[illegible]	[illegible]
N	STORAGE TECHNOLOGY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	SUN MICROSYSTEM INC	[illegible]	11	[illegible]	[illegible]	[illegible]
A	T BAR INC	8	5	[illegible]	[illegible]	[illegible]
A	TAB PRODS CO	16	[illegible]	[illegible]	[illegible]	[illegible]
O	TANDON CORP	8	[illegible]	[illegible]	[illegible]	[illegible]
A	TEC INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	TEKTRONIX INC	40	[illegible]	[illegible]	[illegible]	[illegible]
O	TELEVIDEO SYS INC	4	[illegible]	[illegible]	[illegible]	[illegible]
N	TELEX CORP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	TIMEPLEX INC	34	[illegible]	[illegible]	[illegible]	[illegible]
N	TITAN CORP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	VISUAL TECHNOLOGY INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	WYSE TECH	24	11	[illegible]	[illegible]	[illegible]

Leasing Companies

EXCH		52 WEEK RANGE (1)		PRICE CLOSE JAN 28 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	25	15	[illegible]	[illegible]	[illegible]
N	CONTINENTAL INFO SYS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	FINALCO GROUP INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	PHOENIX AMER INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SELECTERM INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	U S LEASING	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Hot stock for a day

Market jumps as HP reports sales, reaching 52-week high

Investors reacted strongly last week to Hewlett-Packard, a traditional blue chip stock that has not seen that much good news in the past year.

When HP Chief Executive John Young announced last Tuesday that orders for the firm's computer products were up 14% in the last two months of 1986, HP became the New York Stock Exchange's most active issue that day with a volume of 3.9 million shares.

Although the stock rose only ⅛ on that day, it continued to climb later in the week and closed at 50⅞ on Thursday, nearing its 52-week high of 54¼. Investors are apparently encouraged by HP's reported strong rise in orders overseas, which is a critical component of HP's success.

Computer stocks experienced a broad-based decline toward the end of the week. On Thursday, IBM, DEC, Cray Research, NCR and Unisys all declined in a rare down day for the market.

Even Microsoft fell 3 points, ending Thursday at 68¾. Microsoft recently reached the dizzying height of 77½, more than triple its 52-week low of 25½.

CLINTON WILDER

Netlink unit competes with 3710

BY ELISABETH HORWITT
CW STAFF

RALEIGH, N.C. — Netlink, Inc., a small company founded by ex-IBMers, last week unveiled a Systems Network Architecture communications controller that directly competes with IBM's 3710 and which the company claimed enables users to avoid expensive upgrades to their IBM front-end processors.

Netlink's Network SNA-Hub is "the only network concentrator we know that can route multiple logical units downstream to multiple hosts," claimed Netlink Chief Executive Officer Paul Wood.

While IBM communications processors such as the 3720 and 3710 require direct mapping between host ports and downstream physical units such as a cluster controller port, the SNA-Hub performs dynamic allocation of logical circuits or user devices actively seeking to communicate with a host. This provides greater flexibility both in terminal-to-host connections and in SNA network configuration, according to Wood.

Logical routing also enables the SNA-Hub to reconfigure downstream devices without having to bring down the entire SNA network, Wood claimed. Both the SNA-Hub and 3710 isolate the downstream network from the IBM front-end processor so that devices can be moved, added or deleted without the need to take down the network in order to do a system generation, according to Netlink.

The Configurator, Netlink's menu-based network control system running on the IBM Personal Computer, enables the network manager to remotely reconfigure multiple SNA-Hubs from a central workstation.

North Carolina State University at Raleigh is evaluating the SNA-Hub as a way to extend the functionality of its 3725 front-end processor, "without having to buy a whole new increment for the 3725, which is pretty expensive on a cost/connection basis," noted Sam Averitt, the university's manager of communications and hardware. It can cost as much as $50,000 to add a new module to the front-end processor, he added.

A better alternative, Averitt suggested, is to have "a lot of connections with low utility, shared by casual users" share one existing line on the 3725 through the Hub. "As in a lot of places, our users demand high-speed links and then hardly ever use them. And one lab [3725 increment] supports only eight 19.2K bit/sec. links, total." The Hub enables a much greater number of users to access that burst of speed on an occasional basis, Averitt said.

"The 3710 can do the same thing but it's more expensive — like buying a whole new front-end processor," Averitt said. The 3710 is also "less flexible; it can't do quite the same level of connectivity as the Hub," he added.

Scheduled for availability in March, the SNA-Hub concentrates up to 15 direct, leased, multidrop or dial-up SNA/Synchronous Data Link Control lines into a single high-speed host trunk. It supports IBM's network management system, Netview. Support of X.25 and the IBM Token-Ring network will be announced later this year, Netlink said.

A basic SNA-Hub configuration with two downstream ports costs $11,225. Additional two-port cards are priced at $1,250. In comparison, the 3710 starts at $20,300.

Group charges

FROM PAGE 1

by offering to describe its need to individual operating companies at its Reston, Va., headquarters.

Phillips said that he has heard that at least two operating companies are now in the process of drafting tariffs for basic services that will be offered under ONA.

The delaying tactics stem from the operating companies' strategy of "springing their proposals for tariffs and interconnection standards on us at the last minute," Phillips declared. "It's likely that some users will find that their systems and operating environments are incompatible with the new standards; they want to make sure we have no time to respond."

"The problem is that AT&T is no longer the controlling sector [for the telecommunications service industry]," said William Rahe, a vice-president of the enterprise networking strategies division at the Gartner Group, Inc., a Stamford, Conn.-based research group.

He added that since divestiture, local carriers have unveiled several proprietary basic services.

Another issue up for discussion at the March ONA forum is how to work with T1C1 subcommittees — bodies of customer-premise equipment (CPE) vendor and carrier representatives that develop CPE-to-carrier interface specifications. A draft proposal for data link protocols, recently completed by the T1C1.2 subcommittee, should go to ballot in April, noted William Buckley, director of technology planning at CPE vendor Verilink Corp.

Rather than wait for ONA, many companies are "working with vendors for something practical now" in terms of standardized connectivity within their own networks, one communications manager noted.

"The operating companies aren't bad guys, but they see themselves as competing with each other and with AT&T, so they are using ONA forums to further their business strategies," Buckley explained. "We just don't want them to forget the poor customer while they're making their ONA decisions."

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INSIDE LINES

Oft-predicted, yet never announced. Increased channel speeds for IBM mainframes failed to appear again last week when IBM rearranged its 3090 mainframe line. But the channel enhancements — with IBM likely to hike speeds to 4.5M byte/sec. — aren't dead. Observers say last week's announcement was oriented toward IBM's mainframe group, the Data Systems Division, while the channel enhancement is closely tied to letting IBM 3380 disk drives support higher speeds. The disk drives come out of IBM's General Products Division.

■

Lotus may catch the wave. The immensely successful VAX market may lure Lotus to DEC's product line, according to a company source who said the firm is considering porting 1-2-3 to DEC's product line. Access Technology has been very successful in that market with its 20/20 Spreadsheet package. The source also said that Lotus is considering removing copy protection from all of its products, addressing perhaps the No. 1 complaint of Lotus users.

■

It's not a laptop; it's not a desktop. It is in between. Look for Compaq Computer's announcement within two months of a machine weighing 19 lb with a flip-up Gas Plasma display, two full-height expansion slots, full-size keyboard, 20M-byte hard disk and a 5¼-in. floppy. The machine uses the Intel 80286 chip running at 8 MHz and has no battery power.

■

Notes from DOSLand. Microsoft is working on a faster version of Windows that takes up less memory and is aimed at Intel 8086/8088 machines. Microsoft officials have taken umbrage at reports that IBM will announce its own version of 286DOS that is incompatible with the versions provided to clone makers. Not to worry, according to the Microsofters. Microsoft and IBM will use the same DOS, although IBM may choose to add some proprietary communications capability to a new line of PCs. We shall see. Also expect some of your applications to run more slowly under 286DOS.

■

Vaxstar, where are you? Word of DEC's yet-to-be-announced low-end engineering workstation have surfaced again, and this week's talk concerns a mid-month introduction. According to sources, that time frame is likely because they have received invitations from DEC to a "non-disclosure meeting" on Tuesday for a discussion of the Vaxstation family. However, one invited source said he wouldn't be surprised if something much bigger than Vaxstar is discussed, because Ken Olsen is expected to be there.

■

Circuits busy in D.C. The first IBM Personal Computer AT-based X.25 switch will be announced by Amnet at the Communication Networks '87 conference in Washington, according to Paul Bell, president of New York City consulting firm The 23K Group. With the switch, Amnet will sell a software package, priced in the neighborhood of $25,000, that performs routing and network management functions. Also at the show, TRW Network Services Division will announce an Advanced Connector Unit that supports TCP/IP and an operating system based on Fusion from Network Research that reportedly provides peer-to-peer communications for a wide variety of operating systems and hosts. General Datacomm, meanwhile, will join the switch vendors with a centralized network management system, called Megaview, that has a "partially PC-based" architecture designed to interface with IBM's PC Netview interface.

■

The first shall be last? Aspen Peripherals, the upstart firm that promised an IBM 3480-compatible cartridge tape drive, controller and automatic loader by April, has lost its founder. According to President and CEO Donald Lundell, Ronald Vitullo left "to pursue other interests." The company says its products are installed at several locations and that evaluations are positive, but a source close to Aspen claimed the product is scarce and the company is "bunkering down to work on the drive and the controller."

■

Divorce anticipated. Speculation is brewing that Joseph J. Kroger, former Sperry president, will leave Unisys in March. It is believed he did not sign a new employment agreement when Burroughs acquired Sperry and may leave in early spring when his old agreement expires.

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BREAK THROUGH COMMUNICATIONS TIE-UPS

MICRO-MAINFRAME LINK ANALYSIS

DOES DEC OR IBM LEAD IN CONNECTIVITY?

WINNING AT NETWORK POLITICS

BELL WARS

SATELLITES' UNCERTAIN FUTURE

SPECIAL SECTION: MANAGING LANS

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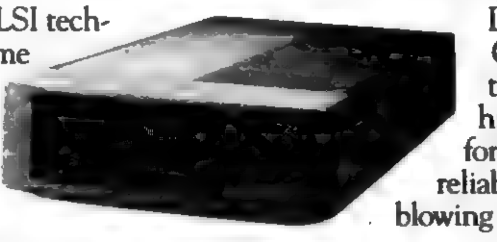

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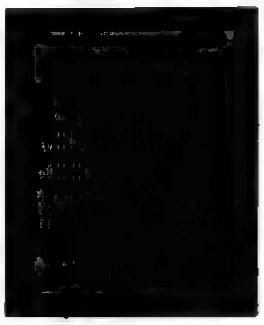


Networking. Connectivity. Interconnection. No matter how you phrase it, linking dissimilar systems into a coherent whole remains MIS's mandate. The skillful manager will acquire what his company needs or make the most of existing equipment, choosing communications solutions through a blend of technological and business know-how. It is the new breed of political technocrat that can keep a firm competitive in the communications age.

COVER PHOTO BY P. CHARLES LADOUCEUR

FEATURES

Page 22

Micro-Mainframe Links Reach New Heights 11
Stan Kolodziej
The micro-to-mainframe link market is rich with choices. This analysis will help you put old products, new products and future product offerings in perspective.

DEC Leads Connectivity Race 15
Michael Millikin
Digital Equipment Corp. has established itself as the premier connectivity vendor. But don't count IBM out of the contest yet. Find out about this duel.

Untangling Network Politics 18
Michael Tucker
To survive in the communications arena, MIS managers must mix machine smarts with political savvy. Read how some successful managers have done just that.

Bell Wars 22
T. Doane Perry
The deregulation of the Bell system has allowed the regional holding companies and operating companies to become viable vendors of data goods and services. This telecom analyst will reveal how each entity is faring and what that will mean for you.

The Fax Market Takes Wing 27
Rebecca Hurst
Improved technology, standards and ease of use have all contributed to the surge in facsimile machine purchases. Read about the wares in the rejuvinated fax market.

Take A Byte Out Of Crime 29
Rebecca Hurst
Because information has truly become a strategic business resource, executives are increasingly seeing the need for data security systems. But even with the most sophisticated equipment, education remains the best defense against computer crime. Find out what you need to know to protect your data.

Satellites Confront An Uncertain Future 45
Lynn Haber
Failed satellite launches and the *Challenger* disaster have slowed the satellite industry down but not grounded it. See where the industry is today and what these events mean for business.

SPECIAL SECTION: LOCAL AREA NETWORKS

Page 33

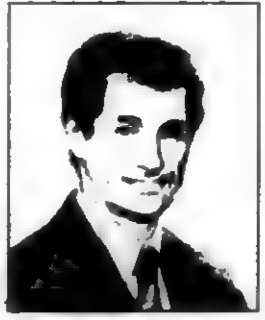
Net Management: Streamline Your Data Flow 33
James Herman
The number of devices linked by information networks is beginning to escalate. Find out what's out there to help MIS maintain and control its networks to get the most from company data.

Users Appraise Value Of LANs 37
Stan Kolodziej
Local-area networks have been criticized for creating as many problems as they solve. MIS managers discuss the pros and cons of using their particular LANs.

Peer Networks Gain Ground 39
Michael Durr
Host networks are giving way to peer networks. Read about what is causing this shift and if it is the right avenue for you to take.

DEPARTMENTS

Page 6



Editorial 4
Insider 4
Manager's Corner 5
Q&A 6
News Analysis 7
Products 49
Calendar 60

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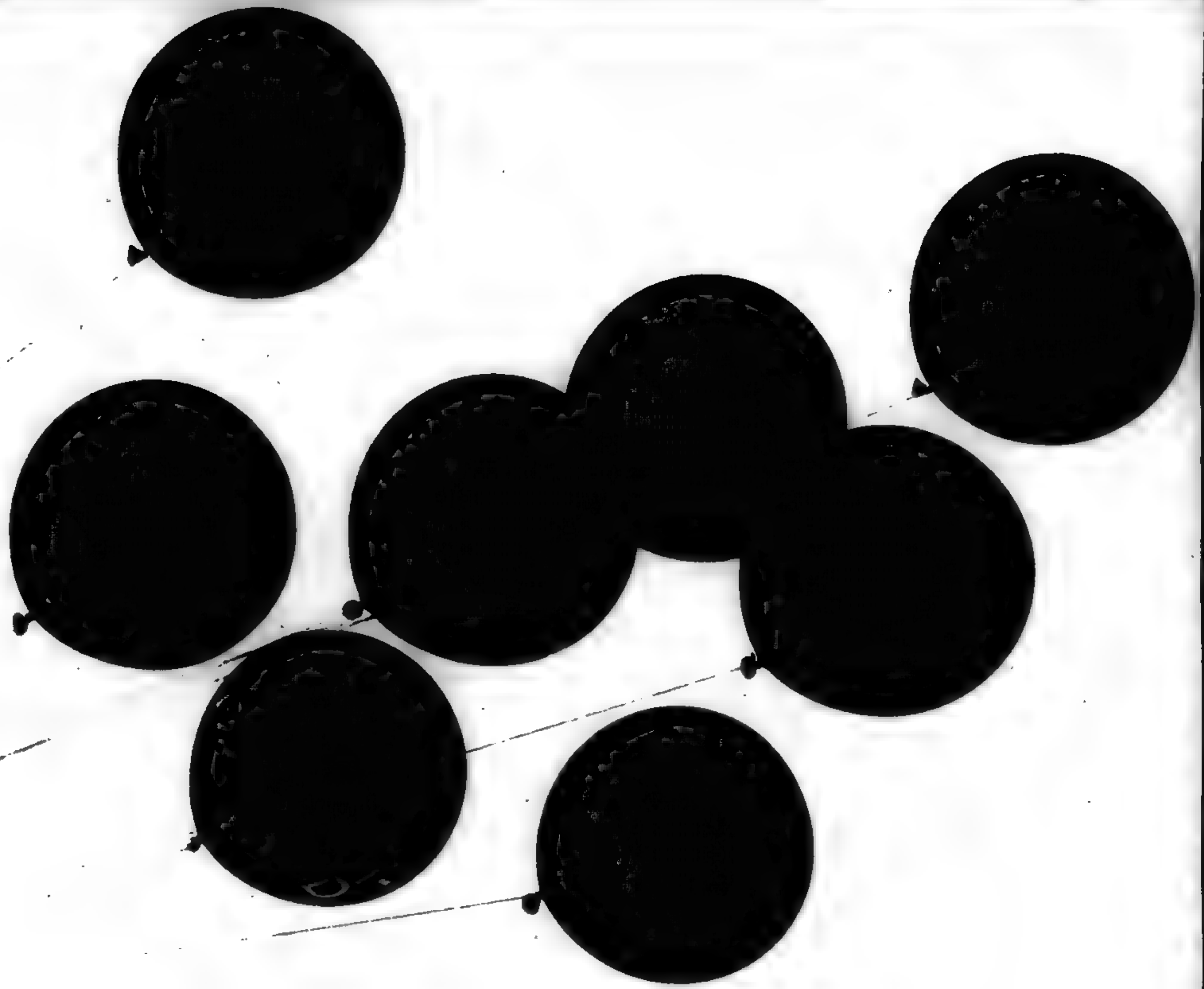

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NETWORKING

COMMUNICATIONS VIEWPOINT

EDITORIAL

The Buck Stops Here

The need to keep up with new technology continues to be the No. 1 concern among *Computerworld Focus* readers, according to our research. In few cases is this more imperative than in the communications arena. Evolving and conflicting standards as well as products and technologies that are promised but won't be available for several years all add up to a dilemma for you, the MIS manager, who will be taxed with developing an integrated system through the 1990s.

By all reports, it is MIS that is increasingly responsible for the overall communications function in organizations. A recent study by the Diebold Group, Inc. showed that 54% of MIS managers are responsible for all telecommunications in their companies and for 13% of local voice systems. In addition, the study showed that 75% of the telecommunications managers surveyed report directly to the MIS manager. As the demand for access between users and data bases and among different groups of users multiplies, it will be the job of MIS to provide this important strategic resource.

And what a job it is! Communications and network management have become a complicated hot potato that can burn the unwary MIS manager. Network management is not really just one problem but two. Not only does MIS need to grapple with the technical problems, but it also needs to overcome the political problems.

The technical issues alone are overwhelming. Capabilities must be created to manage the developing information infrastructure — but how do you do it? Deciding on the most advantageous network management product, coping with a multivendor environment and attempting to integrate voice and data are all problems on the MIS agenda for 1987. In addition, trying to decide whether to follow a single local-area network strategy or implement a number of separate networks throughout the company is a problem that needs to be addressed and resolved before further long-term decisions are made. MIS must also play the role of detective so that it can discover all the PC LANs hidden thoughout the company, a situation reminiscent of when PCs first snuck into offices.

And solving the technical problems is only half the battle. MIS must also address and resolve the political and implementation issues so no one group feels offended. There are factions that want access to everything, factions that want total access but won't share any of their own data and factions that want to maintain control of the networks and will resist any attempts to gain influence. Shared access and increased connectivity also will mean changes in work methods and, oftentimes, reporting structures in a company — never an easy task to deal with.

As increased communications brings the strategic information resource and the role of MIS to the forefront, top management will look to MIS for answers. In other words, the buck stops with you.

Ann Dooley

Lessons of PC History

INSIDER

Timothy J. Caffrey

Personal computer network technology has done a lot of growing up in the last 12 months.

The tedious debates about wiring standards, access methods and baseband vs. broadband are mercifully behind us. The high costs, normally associated with new products, are slowly coming down, although average costs per PC connection still hover around $1,000. Communications gateways, Intel Corp. 80386-based local-area network (LAN) servers and refined network operating systems are all contributing to higher levels of performance and functionality.

Importantly, progress has not been confined to systems and applications. PC LAN standards have solidified around IEEE 802.3 hardware standards for Ethernet and AT&T's Starlan, IEEE 802.5 for token-ring technology as well as software standards like Microsoft Corp.'s MS-Net (based on MS-DOS 3.1) and IBM's Netbios.

With these guidelines in place, buyers can feel more confident about the value of their LAN investment. Standards set the stage for connections to a greater variety of peripheral devices, for interconnection between LANs and for the development of more robust applications.

Overcoming a bad reputation

Despite these technical achievements, despite the adoption of stable frameworks for connectivity and despite the emergence of clear leaders in the PC LAN marketplace, PC LANs still suffer the stigma of illegitimacy. Somewhere in the minds of major buyers lurks the conviction that PC LANs are not to be taken seriously, that for real communications problems, users should look to large systems architectures for direction in systems designs and standards.

In the short term, the alternatives are lean; PC-based communications still fall functionally short of large system networks.

Most current PC LAN configurations are small (connecting an average of eight workstations) and isolated (most lack gateways to other systems or networks). Only 15% of large organizations surveyed by Framingham, Mass.-based International Data Corp. say they believe that PC LANs are effective substitutes for departmental minicomputers.

For the long term, however, the future of computing is etched on the Intel 80386, not on the IBM 3090. The PC LAN, as an extension of the PC revolution, is the arena from which the standards for price and performance in networking will emerge. PC LANs, in fact, are fueling the next step in the evolution toward downsizing, the growth of distributed processing and the decentralization of control over systems acquisition and design.

History repeats itself

Despite the long-term importance of PC LAN architectures, our large systems myopia may blind us to the lessons learned during the introduction and assimilation of PCs in large organizations. The first lessons were learned when it became clear that the number of personal computers in use far exceeded the number officially sanctioned by MIS.

The same is true of PC LANs. Despite official statements that there are perhaps one or two such networks in controlled pilot projects, most organizations hide a handful of low profile, jerry-rigged PC LANs, usually supporting those individuals who acquired their PCs in the same way.

As MIS finds out about these networks, the overriding policy response will be to crack down, to seek control through the imposition of standards. Just as with PCs, when these policies fail in the face of changing technology and economics and in light of the growing political power of individual departments and divisions, MIS will acquiesce and assume the role of facilitator and consultant.

In the brief history of PC LANs, the standards weapon has been brought to the front quickly. Inevitably, however, the battle will be lost. Small systems architectures carry the price/performance momentum that will force the hand of MIS once again.

Decentralized planning, even in the area of network deployment, is the most efficient road to more responsive and cost-effective systems architectures.

Caffrey is vice-president of Office Automation Services at International Data Corp. in Framingham, Mass.

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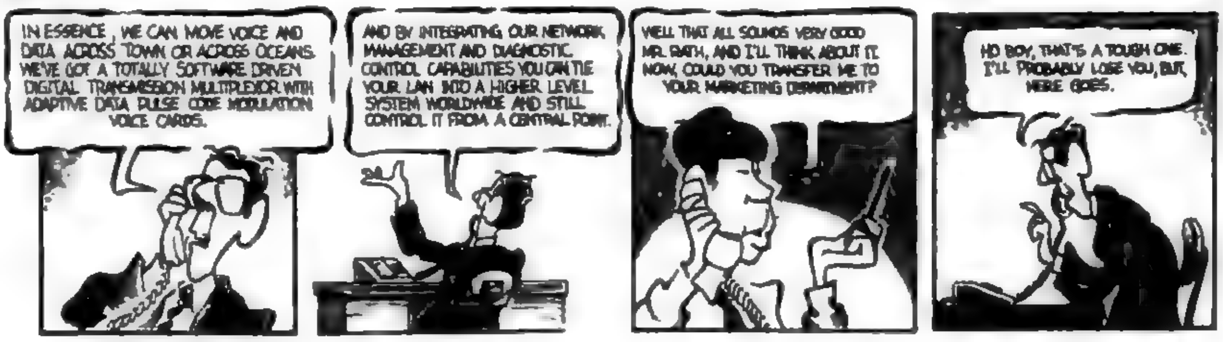
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COMMUNICATIONS VIEWPOINT

Prepare For Financial Disaster

MANAGER'S CORNER

Jim Young

A disaster recovery plan details steps for how essential DP services can be provided to an organization in the event of a catastrophe. No doubt you have such a plan for responding to unexpected calamities.

However, many DP managers are not prepared for a more likely occurrence — financial disaster.

All too often, the DP department reacts to these circumstances only after it is too late. Top management must often mandate measures in the absence of a well-thought-out plan from DP managers. This need not occur because you can anticipate circumstances and minimize their impact beforehand.

Bad times around the bend

Plan for bad economic times because today the businesses that least expect financial surprises must sometimes face them. Takeovers or acquisitions can quickly put the most profitable company into a conservative posture. High-growth situations can be so delicately leveraged that even slight fluctuations in revenue can apply the financial brakes. Competition and even markets can change quickly. Tax laws and other legislation can have immediate impact, or management can alter spending patterns. So while some DP departments have more reason than others to prepare for hard times, all perceptive managers should at least review how they would respond to varying degrees of financial pressure.

An analysis of this type should evaluate the impact of funding at a series of reduced levels ranging from the superficial to the severe. This can be applied to various cost categories. The most obvious analysis is to review the annual budget.

However, you should study possible reductions to capital spending and their impact separately. These areas can be more critical than budgets when the financial goals are to conserve cash and not just to increase earnings. You should perform an additional evaluation on staffing levels. Some companies respond to financial troubles with mandated staff cuts or controls regardless of savings available in alternate areas. Personnel is frequently cut using a no-growth strategy, a no-replacement strategy or predetermined reductions.

There are several successive cost categories to evaluate in testing reduced general spending:

■ **Discretionary spending.** Managers should identify and itemize spending for services that can be avoided if necessary. This might include limited travel and education, temporary help and consulting.

■ **Cost-reduction programs.** Managers can reduce certain spending without giving up anything appreciable. They can consider alternate, less expensive equipment maintenance programs. Also, different financing arrangements for software could reduce future years' budgets. The savvy manager can evaluate less expensive vendors or in-house efforts for activities such as hiring or technical work.

■ **Development activity.** At some point, companies must accept that cost reduction is not just an exercise in belt tightening to get rid of superficial activity but will require the loss of substantial programs. MIS should prioritize DP development projects that represent measurable spending as well as future uses of resources with their associated costs.

In performing a cost analysis, managers should consider how projects can be deactivated. Are project teams discrete groups or community efforts? Can the projects just be abandoned or is a great effort required to dismantle and check the work? What are the real savings and when will they be realized?

■ **Equipment.** If machine capacity exists or if MIS can reduce some usage, managers could achieve equipment cost savings by eliminating or trading down computer equipment. Options can be improved by ensuring short-term lease arrangements or sublease provisions. Also, equipment contracts should economically permit early cancellation. If a firm owns its equipment, the manager should check on its value in the secondary market.

The same analysis can be performed on peripherals such as printers, disk drives, tape drives and the like. It may be possible to cut back on peripherals. MIS managers should examine lease terms to ensure that individual items can be addressed within the contract boundaries. As equipment and its costs are scrutinized, so should the uses that justify each piece or level of equipment.

■ **Staff.** Personnel is the last area MIS should examine. Are there part-time or temporary positions that can be collapsed into existing jobs? How much of a reduction would attrition alone provide? Are these the kind of losses that are desirable or acceptable?

A financial disaster contingency plan could include the following components:

- *Prioritized cost-reduction lists.* Managers should develop a prioritized list of cost reductions for various levels. They should identify all mandatory facilitating actions and consequences.
- *Timing issues.* Comparisons of long-term vs. short-term actions can give insight into a DP environment's ability to withstand a long spending drought. This will include specifics like cash-flow projections.
- *Actions.* Like a disaster recovery plan, protective actions should be undertaken in proportion to the likelihood of a problem occurring. These actions could include the way project activity is organized, the structure of internal support activities, how equipment is financed and general guidance on make vs. buy or inside vs. outside analysis.

The final recommendation is to complete this analysis with key managers in private, then file it away without sharing it — not with the department staff nor top management — because such seemingly negative thinking may not be consistent with management direction. Remember how Noah was treated when he built an ark in dry weather.

But a manager should not avoid this planning exercise. If you fail to anticipate problems, it could hurt your organization far beyond what is necessary for a proportionate scale back. Regardless of the specific direction you take, one message is clear: Be prepared.

Young is principal and director of consulting for Arthur Young & Co. in Worcester, Mass. He has worked in the industry for 15 years.

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CIRCLE READER SERVICE NUMBER 225

COMMUNICATIONS VIEWPOINT

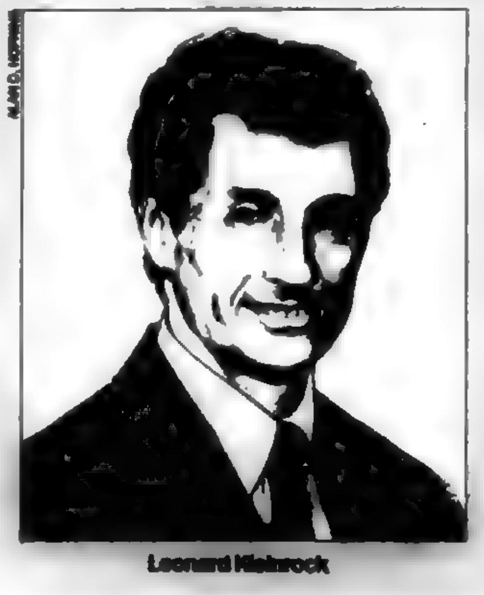
Kleinrock: Connectivity Still Users' No. 1 Concern

Leonard Kleinrock is a professor in the Computer Science Department at the University of California in Los Angeles. He is also president of the Technology Transfer Institute, a Santa Monica, Calif., company specializing in seminars for computer executives.

One of the early developers of the Arpanet packet-switching technology, Kleinrock is interested in computer networks, packet radio systems and distributed data bases.

Kleinrock recently spoke with Computerworld Focus *Senior Editor Stan Kolodziej about the growing crisis in U.S. corporate networking.*

Q&A


Leonard Kleinrock

> [AT&T] tried to get into the computer market and lost big. I believe AT&T's position now is to fall back into voice, its traditional marketplace.

You have predicted that networking problems will escalate during the next 10 years. Please elaborate.

A major problem [in the networking arena] is the incompatibility in the micro/workstation field where systems just can't talk to each other. Users are now developing their own personal data bases. More users want to talk to the corporate data base, and they are running into immediate communications problems. At this point, for example, the ability for a local-area network [LAN] to talk to value-added networks, metropolitan-area networks or any other networks is poor.

Value-added networks are coming in fairly quickly, and the whole T1 game has opened up now, so the whole question is how users will talk over their private network from one LAN to a LAN at the other end. There is a very difficult interaccess problem here because the protocols don't exist. The seven-layer architecture of the ISO [International Standards Organization] is a partial solution, but it has not been implemented at the higher levels in a standardized fashion.

Intercommunications is now very poor and links are slow because of the software overhead involved. Right now, the companies making software bridges and gateways are making all the money.

Is that such a bad thing?

Only in the sense that it's inefficient when users begin attaching other equipment together on networks. To do that, they have to go into many layers of protocol and storage, and it tends to be super slow. Just look at what happens in most LANs now once you pass through the higher level protocols. It just slows things down miserably. Even though the network technology is fast, the communications bandwidths are high, the process speeds are high and the response is terribly slow.

Is the number of standards in and of itself causing confusion in the marketplace?

I don't think so. Let's look at the LAN experience. There the [Institute of Electrical and Electronics Engineers, Inc.] took on the job of creating standards. It came up with three standards initially to satisfy the various vendors' demands, if you will. It created the token-ring standard, which IBM was behind; the Ethernet standard, which Xerox Corp. pushed; and the token-bus standard, which Datapoint Corp. was behind. It also created a standard for the manufacturing area, [Manufacturing Automation Protocol (MAP)].

Well, those standards haven't caused too much chaos to this point. In the case of MAP and [the Technical and Office Protocol], these originally involved specs at the lower two levels of the ISO architecture. The users, however, took things into their own hands and decided to specify their own higher level protocols for Layers 6 and 7.

Mind you, I think these standards sometimes come prematurely. In the case of LANs, standards were forced by the users and the manufacturers, but the LAN designs themselves indicate that the standards came in too quickly, too early. The reason is because there are now far better systems and access protocols from vendors that go beyond the ones that have been standardized.

Yet these standards at least allowed people to commit to the installation of LANs, even if they were not perfect, and there will be another generation of LANs coming up in short time.

Where do you see the networking market heading at the end of this decade and into the 1990s?

What's going to happen has already happened so many times before. There is going to be a proliferation of different, incompatible products, and there is going to be a shakeout. There will be two or three major vendors, and they will set the standards and call the shots. That's fine, except that it's very brutal in terms of the vendors that don't make it. And it's hard on users who purchased equipment that no longer functions and is no longer supported.

How will IBM fare in the LAN wars?

Very well. Its Token-Ring Network has a wonderful future. It has the right architecture for a large class of problems. It is IBM's gateway into [Systems Network Architecture], it supports LU6.2 and has built-in, peer-to-peer communications. IBM is betting its entire future on it in some sense, and I think it's going to go.

What about AT&T?

[AT&T] is unpredictable. The firm tried to get into the computer market and lost big. I believe AT&T's position now is to fall back into voice, its traditional marketplace. The difference is it is now going into it recognizing that packetized voice is the way in which the firm can move its voice revenue into the data communications market. I think it will try and back into data communications and the computer market through its traditional voice marketplace.

What will be the long-term effects of network incompatibility on U.S. industry?

People are already slow in bringing the latest telecom technology into their corporate plans because people are cautious. LANs and other networking facilities such as value-added networks have been accepted slowly, because, I think, users are waiting for these markets to settle. In the meantime, corporations are slowing down their immediate access to information, and there's a penalty to pay for that in overall productivity that cannot be recovered.

The big crunch, however, will be the software crisis that is going to accompany all of this. It's hard enough for single systems with a homogeneous collection of users to get their applications written in a timely fashion. When you try to get heterogeneous machines talking across networks, there is simply no software support, and I really don't know where that support is going to come from.

What about bypass technologies? Do they hold promise?

Yes. A big factor is the appearance of fiber-optic communications. The thing that made packet switching happen in the 1970s was that the cost of switching dropped more rapidly than the cost of communications, so people were willing to waste money in the switch, in the logic, in order to save money in the communications.

Fiber optics is going to make a dramatic change in that tradeoff. It's not unlikely in the next decade that we will want to waste communications to save some processing because communications, through fiber optics and other bypass technologies, is going to become very cheap.

Overall, it seems that connectivity looms large as a networking issue in the coming years.

[Connectivity] will be the driving issue and will affect the way we [design] our systems. Massive connectivity will bring massive parallel computers using small microprocessors cooperating in large computations.

There will be a whole slate of applications for parallel processing. These machines will be important because the costs of micro MIPS [millions of instructions per second] are far less than the cost of mainframe MIPS. These machines will eventually be used to run networks with much greater capacity than minis and mainframes for a fraction of the cost.

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CIRCLE READER SERVICE NUMBER 228

NEWS ANALYSIS

Illinois Bell's ISDN Economics On Trial

The Integrated Services Digital Network (ISDN) took a step closer to commercial reality late last year. On December 23, 1986, a coalition of companies announced the first American field trial of an ISDN network. In the experiment, Chicago-based Illinois Bell and its suppliers provided an ISDN operation to McDonalds Corp. located in Oak Brook, Ill.

While the experiment gave the coalition new information about ISDN technology, the test's real rewards may have more to do with money. The participants hope to discover the costs of an ISDN environment and the most effective means of billing those costs to users of the service. Thus, the test could mark an important turning point in the history of the ISDN effort. ISDN is the goal of a worldwide industry effort to integrate telephone, computer and video communications on common telephone wires.

The dream is that eventually a user will be able to plug a telephone, a computer, a video monitor or other equipment into a single phone jack and have it communicate with any other wares on the network.

As little as two years ago, ISDN seemed almost impossible. But, intense standards work thoughout the communications industry has made it not only possible but real.

In 1986, there were several field trials of ISDN technology — notably in the Asian Rim nations, where such companies as Tokyo-based Fujitsu Ltd. staged large-scale ISDN networks in Japan and Singapore. (In fact, Fujitsu America, Inc., located in San Jose, Calif., is one of the main suppliers of technology and equipment to Illinois Bell.)

Functioning ISDN by 1988

The Illinois Bell/McDonalds trial is the first U.S. ISDN field test. Thus far, the test has been limited to a few demonstration calls. By early 1988, however, the participants say they hope to have a fully functioning network linking some 400 workstations at five different McDonalds' locations.

Illinois Bell says it intends to offer ISDN networks to its customers in '88. For this reason, the McDonalds' installation is considered a shake-down cruise for what the company hopes will be an important product. "We know pretty much exactly what we want to find out by this," notes Illinois Bell spokesman Tim Bannon. "We consider this more than a trial. It's a test of the basic soundness of ISDN. . . . What we hope to do is take the McDonalds' experience and project it to our other customers."

Specifically, the participants are trying to discover what is required for the long-term operation of ISDN networks. The company will be looking at such things as maintenance, provisioning (which Bannon says is "telephonese for all the legwork that has to be done prior to the installation of even one piece of equipment"), engineering requirements and the costs of an ISDN environment.

"We are going to use the trial to identify specific costs so that we can set up billing structures when we move ISDN into the full market," Bannon explains.

Illinois Bell's suppliers have similar goals. Fujitsu America's Charles Kissner, vice-president of the firm's switching development division, notes, "Technically, we already have very good ISDN technology. What we need to discover now is, first, What happens when we link all the pieces together?; and second, What is the value to the customer of an ISDN network?"

The common theme for everyone involved is that the trials have very little to do with ISDN technology as technology. Instead, they have to do with discovering how ISDN can be sold profitably. The Illinois trials thus have the look of test marketing rather than industrial research and development.

The trials suggest that ISDN is in transition. It will increasingly be considered a maturing, if not yet wholly adult, technology. And as with any adolescent, it will be concerned not with its own development but with how it will earn a living. According to Fujitsu's Kissner, "The question for ISDN is no longer whether it's technologically possibly but rather whether it's economically justified."

M.T.

Videotex Alive In Business

Videotex is alive and growing — not in the consumer market, which has become a dead zone for U.S. videotex, but, of all places, in the U.S. corporate market.

Link Resources, Inc., a New York-based market research company, says it expects corporate videotex installations to increase from about 500 in 1986 to 5,000 by 1990. This growth is not spectacular but pretty respectable for a technology that was once considered as compatible with U.S. business as oil is with H^2O.

"Videotex is simply becoming a more cost-effective, reliable way to prepare, update and distribute time-sensitive information on a regular basis, away from paper distribution," according to Bob Smith, executive director of the Rosslyn, Va.-based Videotex Industry Association (VIA). "Videotex is also being seen as an alternative to more expensive corporate electronic publishing applications. It's [also] a lot easier than trying to get data through data base

See **VIDEOTEX** page 57

COMMUNICATIONS UPDATE

Local connectivity is king in the realm of communications concerns, but international telecommunications issues are playing an important role as well.

Unify Unveils Its DBMS Scheme

With interest in local connectivity, distributed processing has caught the interest of data base management system vendors, which have begun announcing architectures that support distributed data bases. However, one vendor reports it is taking a different direction and term for its DBMS vision.

Unify Corp. of Lake Oswego, Ore., announced at the January 1987 Uniforum Unix conference in Washington, D.C., that a cooperative processing architecture will be the base for Unify products that will be announced during the next year and a half.

The difference between this cooperative processing scheme and distributed processing is one of dimension, says William Merchant, a Unify manager. "In distributed processing, data bases are put on different machines, and everything is at an equal level," he explains. "With cooperative processing, different parts of the DBMS are distributed on different systems."

Unify's cooperative processing architecture has three levels. At the first level, a user with a Microsoft Corp. MS-DOS-based personal computer or Apple Computer, Inc. Macintosh can access human interface software. If the user needs to go to a data base application, his computer will pull the application information down from a departmental computer that is linked through RS-232.

Finally, if the user needs to view or manipulate data from the data base, the data can be downloaded from the data base on a corporate minicomputer or mainframe residing on a local-area network with the departmental system.

The objective of the cooperative architecture is to utilize higher cost processing only when it is necessary, Unify's Merchant explains. Initially, the application and data base levels will only run on AT&T Unix-based computers.

Macintosh Talks To Unix Machines

Following the debut of communications products that allow Apple Computer, Inc. Macintoshes to communicate with IBM and Digital Equipment Corp. computers, a natural step would be products that permit Macintoshes to talk to Unix machines. Two companies, Eurosoft International, Inc., headquartered in Pisa, Italy, and Centram Systems West, Inc. in Berkeley, Calif., have introduced such Mac-Unix products.

Eurosoft's Macnix communications product consists of two parts. The server software residing on the Unix computer provides an icon shell that lets users move, copy or delete files and execute commands using a mouse. The client software permits a Macintosh or Macintosh Plus to download a Unix file by moving an icon from one window to another. Together, these two components reportedly provide a virtual file system that includes all Unix host files and any active Macintosh disk.

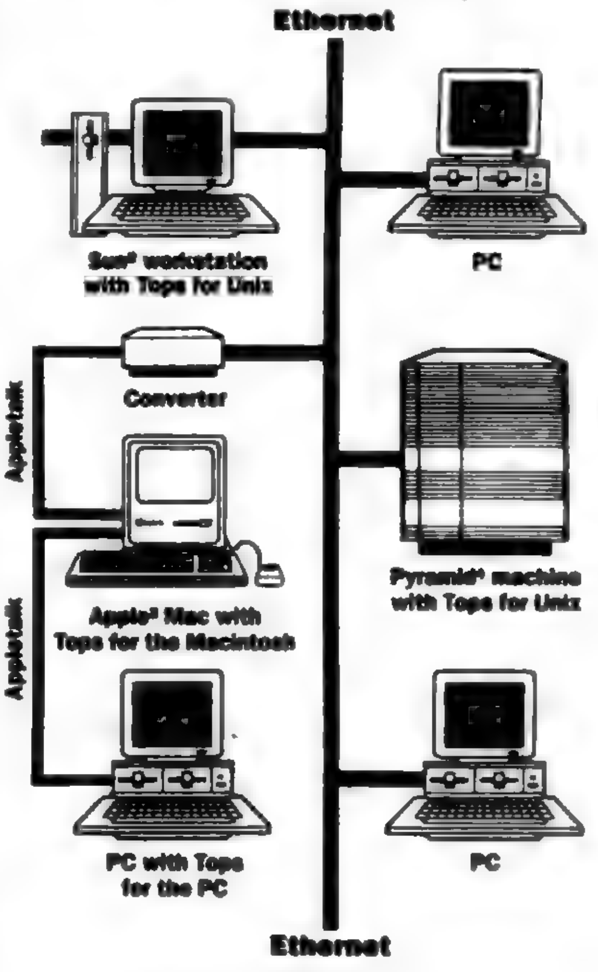
Centram's Tops local-area network supports Microsoft Corp.'s MS-DOS as well as Unix and the Macintosh operating system (see chart this page). Tops serves as a translater between different operating systems so that when a Macintosh user gains access to an IBM PC hard disk or a Unix-based computer, all the files and directories appear exactly as if they are local. Unlike Macnix, any machine on a Tops network can function as a file server or a client because Tops provides a distributed file system.

The Tops software runs over Apple's Appletalk network for Macintosh-to-PC connections and over Ethernet for Unix-to-Macintosh or PC communications. To connect Ethernet to Appletalk, users require a Kinetics, Inc. conversion box or DEC Q-bus. Centram has already signed distribution agreements with two Unix companies — minicomputer vendor Pyramid Technology Corp. and software developer Mt. Xinu. The company plans to introduce Tops for other operating systems, according to Centram's President Nat Goldhaber.

The most extensive use of

See **UPDATE** page 57

Tops[1] Network Links Mac, MS-DOS and Unix


Ethernet
Sun[2] workstation with Tops for Unix
PC
Converter
Appletalk
Pyramid[4] machine with Tops for Unix
Apple[3] Mac with Tops for the Macintosh
Appletalk
PC with Tops for the PC
PC
Ethernet

[1] Tops is a registered trademark of Centram Systems West, Inc.
[2] Sun Microsystems, Inc.
[3] Apple Computer, Inc.
[4] Pyramid Technology, Inc.
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NEWS ANALYSIS

The Terminal Case Of The Dedicated IBM 3270 Machine

The palmy days of dedicated IBM 3270 terminals seem nearly to have come to a grinding halt. Why did the mighty fall?

International Data Corp. (IDC), a Framingham, Mass., research company, has painted a dismal picture of a 3270 terminal marketplace. IDC reports that the market has dropped from an average 26% annual growth rate during the first half of this decade to a stagnating 4% annual growth rate that should continue through 1990.

Ilene Goldman, head of the Workstation Program at IDC, lists decreasing U.S. mainframe purchases in 1985 as a big factor for the 3270's decline. According to Goldman, large systems purchases in the U.S. declined 26% in 1985, while 1986 saw a rebound of only 6%.

Other reasons for the decline include increasing competition from stand-alone personal computers and microcomputers on local-area networks (LAN). Personal computers are using 3270 emulation hardware and software to access mainframe data bases, and LANs are using gateways to get microcomputer nodes into mainframes. In fact, IDC estimates that in 1985 there were 296,000 personal computers using terminal emulation packages as a means of accessing a mainframe. The research company says it expects that number to jump to 2.5 million personal computers by 1990.

> ”
>
> *Research firm International Data Corp. reports that the 3270 terminal market has dropped to a stagnating 4% annual growth rate that should continue through 1990.*

PC won't completely displace 3270

"The personal computer will not completely displace 3270 sales in this decade nor in the immediate future," an IDC report explains. "The reason is that the 3270 terminal is, and will always be, a cheaper 3270 solution [compared with personal computers]. Also, not all users who interact with mainframes need stand-alone processing capabilities."

What is clear, Goldman adds, is that this incursion of PCs is changing the face of the 3270 terminal market.

"IBM is suddenly becoming very aggressive in the 3270 terminal market," Goldman explains. "During the first nine months of 1986, IBM decreased the prices on their entire 3270 line by about 20% overall and nearly 36% on some of their low-end terminals. It's putting incredible pressure on the independent [non-IBM] terminal vendors."

Goldman says that before the IBM price cuts, vendors like Telex Computer Products, Inc., Lee Data Corp., Memorex Corp., ITT Courier Terminal Systems, Inc. and CIE Systems, Inc. could stay competitive with IBM by offering terminals with lower price tags, a little more performance and extra support.

IBM wants to be price, support leader

IBM, however, is now offering three-year warranties on some 3270 product lines and, in effect, Goldman claims, is trying to become the price and support leader, "something unheard of a few years ago. The independents are going to find it hard to match this price and support challenge from IBM."

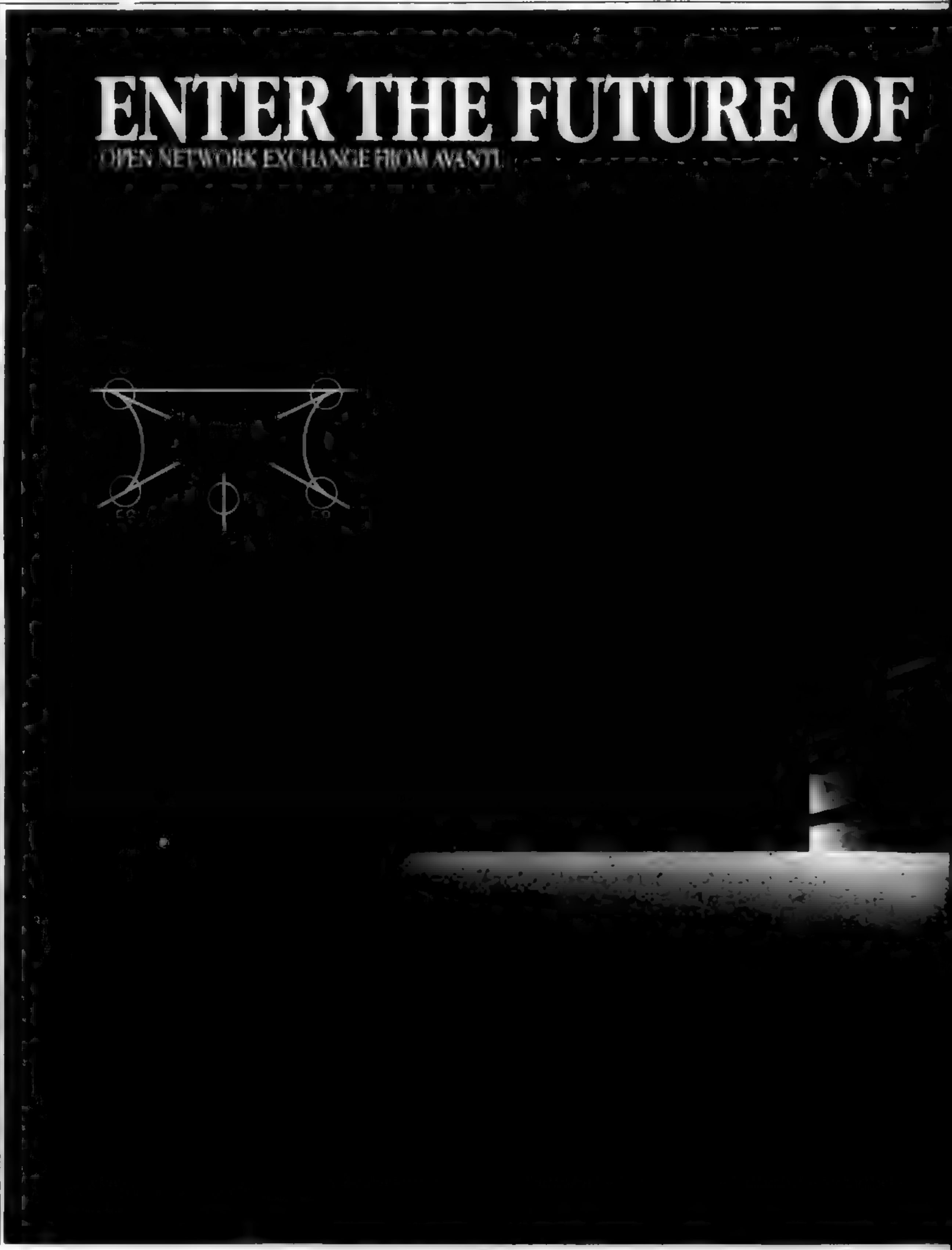
What is clear according to Goldman, is that IBM's strategy is to go into the shrinking 3270 terminal market with guns blazing.

"IBM is going to tighten the screws a little more in the next few months by introducing two new products, the 3179 color and the 3180 monochrome terminals, which are enhancements to its current lines. With the U.S. 3270 terminal market becoming a saturated, shrinking commodity market and with sales margins decreasing IBM has to sell more, and it's not going to tolerate the independents," she explains.

Not that IBM is hurting. The company still maintains about 60% of the total U.S. 3270 terminal market, according to IDC. In the meantime, Goldman says, the independents have seen the writing on the 3270 wall and are not standing still. Most of these companies have been planning a diversification strategy for the past few years to avoid being blown out by IBM and a cooled terminal market.

"None of the main terminal players today is surviving on the display business alone," Goldman explains. "A lot of their business and revenues are coming from other data communications products like personal computers with emulation boards, T1 multiplexers and, eventually, local-area networks. They have all had to readjust their communications strategies."

S.K.



CIRCLE READER SERVICE NUMBER 227

TCP/IP Is The Solution For Users Who Want Connectivity Now

OSI Products Are Still Too Far Away

Promises, promises. The International Standards Organization's (ISO) Open Systems Interconnect (OSI) model holds the promise of universal connectivity, but it will be years before this promise becomes a reality. In the meantime, organizations that need to connect different computer models are turning to the Transmission Control Protocol/Internet Protocol (TCP/IP) network protocol developed by the U.S. Department of Defense almost 15 years ago.

"People are spending money on TCP/IP because they want connectivity now, and TCP/IP can provide it fairly inexpensively," says Steve Zamierowski, communications industry research program manager at International Data Corp. in Framingham, Mass.

The issue is that OSI is not fully adopted, says David Langlais, director of product support for TCP/IP protocol vendor, The Wollongong Group. "Today, you can't show Digital Equipment Corp. OSI products talking with AT&T OSI," he explains. "With TCP/IP, you can pop onto the Data Defense Network and test your TCP/IP implementation with others." In fact, at the 1986 Uniforum Unix conference held in Washington, D.C., more than 40 vendors' computers were connected over Ethernet using various TCP/IP products.

'There are a lot of politics'

The differences between OSI and TCP/IP acceptance are due to the architectures' ages and the groups defining the standards. The OSI model is only a few years old and is in the developmental stages.

In addition, many people view the ISO as an international committee that is trying to define what is best for the world, says Suhbash Bal, vice-president of marketing for Excelan, Inc. "There are a lot of politics with real or imaginary situations," he comments. Therefore, he predicts, the results of OSI will be good, but they will be a long time in coming.

"OSI will not be available in any off-the-shelf form for three to five years," Langlais concurs.

By contrast, TCP IP is a mature product that is proven and reliable, Bal says. "Many of the shortcomings TCP IP had five years ago have been cleaned up," agrees Rollo Spencer, assistant long-range technical planning manager at the National Aeronautics and Space Administration/Ames facility, where TCP/IP is used to connect computers from Cray Research, Inc., Amdahl Corp. and Silicon Graphics, Inc.

Moreover, because the DOD developed TCP/IP, it created a standard application protocol that is vendor independent. This protocol ensures compatiblity among all TCP/IP implementations, Bal explains. ISO has not yet fully addressed the applications protocol, which is the top layer of the OSI model. "I don't see any local-area network architecture taking off unless the applications can communicate with each other," he asserts.

> *'The longer OSI is delayed, the more entrenched TCP/IP will be.'*
>
> — **Suhbash Bal**
> **Excelan, Inc.**

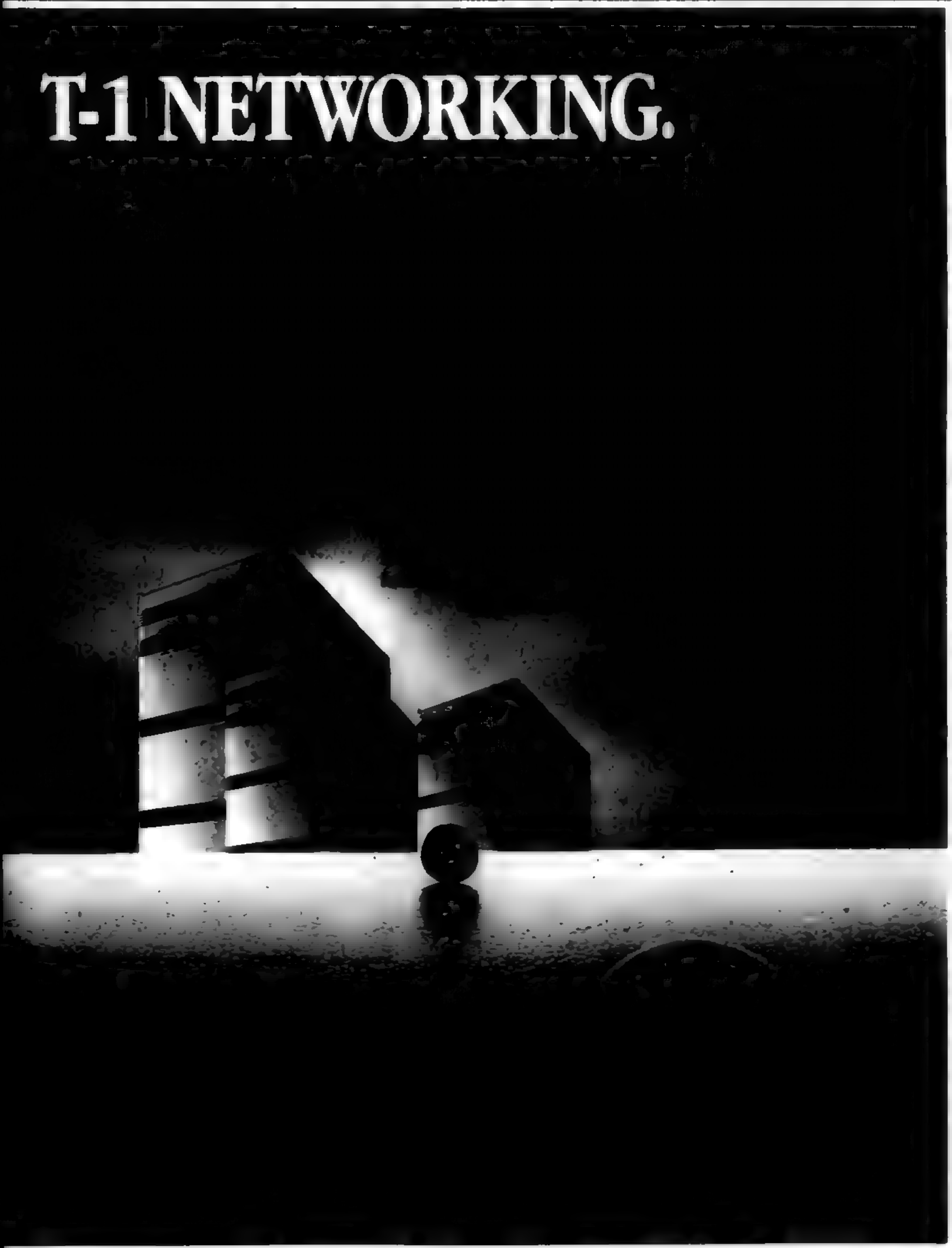
'Want something that works today'

However, analysts, users and vendors agree that as OSI matures it will replace TCP/IP. "We're well aware of OSI, and we have plans to make the transition to OSI when it is available," Spencer says. Realizing that NASA/Ames's plans reflect those of many organizations, vendors such as Wollongong and Excelan are making transition plans of their own. "Our message is that we know OSI is coming, but if you want something that works today, TCP/IP is a good alternative," Langlais says.

"In the next year, we'll begin introducing migration products," Langlais says. These products will provide a gateway between OSI and TCP/IP and will allow them to co-reside, he says. Excelan says it plans to introduce similar gateways, and both companies expect to offer full OSI-based products once ISO adopts standards for all seven layers of the OSI model. The vendors also say they intend to keep transition costs down to encourage users not to delay their networking purchases until OSI is mature.

The arrival of OSI will not spell sudden death for TCP/IP. Once the network model is mature, the migration from TCP/IP will be gradual, analysts and vendors explain. Additionally, the more time it takes OSI to become a standard, the longer TCP/IP will remain in organizations, Excelan's Bal states. "The longer OSI is delayed, the more entrenched TCP/IP will be," he concludes. "TCP IP will only get stronger."

R.H.



Modem Mart Features Speedy Units

Modems aren't what they used to be, and for users that's good news.

There are external, internal and even portable modems now. Newer modems provide diagnostic capabilities and greater speed — up to 19.2K bit/sec. Modems that provide lower than 300 bit/sec. and even 600 bit/sec. transmission speeds are on their way out.

"Most modem vendors don't carry 300 [bit/sec.]," notes Steve Zamierowski, manager of the communications industry research program at International Data Corp. in Framingham, Mass. The primary reason for the decline of the 300 bit/sec. modem is cost. "The price difference between 300 bit/sec. and 600 bit/sec. is about $50 dollars," Zamierowski explains. Users who buy higher speed modems can quickly make up the cost difference, he says, because they save time and money on phone line connections.

In the past, modem speeds were limited to 2,400 bit/sec. on public telephone lines, but newer error-correcting protocols within the modems are allowing them to carry 4.8K bit/sec. and 9.6K bit/sec. transmissions, according to Zamierowski. Private leased lines, which charge a flat monthly rate, can handle higher transmission speeds of up to 19.2K bit/sec. Ironically, higher speeds are more important for users who do not have leased lines because public networks charge by the minute.

In response, modem vendors that make small profits on low-end modems are introducing higher end units for corporate users that need greater speed. These modems include advanced error-correcting protocols, diagnostic capabilities, on-board multiplexing options and a hefty price tag; for example, users can get a 9.6K bit/sec., four-port, time-division multiplexer modem for $5,000.

In the interest of portability

Modem vendors are also producing faster internal modems for portable computers, but these modems offer fewer features, Zamierowski notes. In the interest of portability, a few vendors have begun offering external modems that work with cellular phones.

Use of specialized and high-speed modems will continue to increase for the next few years until the Integrated Services Digital Network becomes widely established, Zamierowski says. Then the need for modems that convert digital signals to analog will be curtailed by the widespread availability of digital networks.

R.H.

MIS Can Escape Single-Vendor Rut

MIS managers' drive to abolish single-vendor solutions has suddenly gained extra momentum. Several products have recently been introduced or upgraded to allow dissimilar machines to cooperate on MIS-oriented tasks.

Current players in the heterogeneous network game include Austec, Inc. in San Jose, Calif., and Venturcom, Inc. in Cambridge, Mass.

Venturcom markets a distributed application development system known as Prelude. Written in C, Prelude consists of a library of modules that may run on a network of very different computers — as long as those machines run on Unix System V Release 3.

Because most MIS people do not work in Unix System V or C, Prelude may not be the answer to their prayers. But, for those who do, Prelude provides more than 100 separate program modules that can be parceled out among several different machines in a network. Thus, a single application could be composed of linked modules on mainframes, minicomputers and personal computers.

A company that may have more to offer individuals working in a traditional MIS environment, that is Cobol or non-Unix, is Austec, a local incarnation of Australian concern Austec International Ltd. Austec currently markets two distributed products: Acenet (formerly Acebridge) and Acecobol.

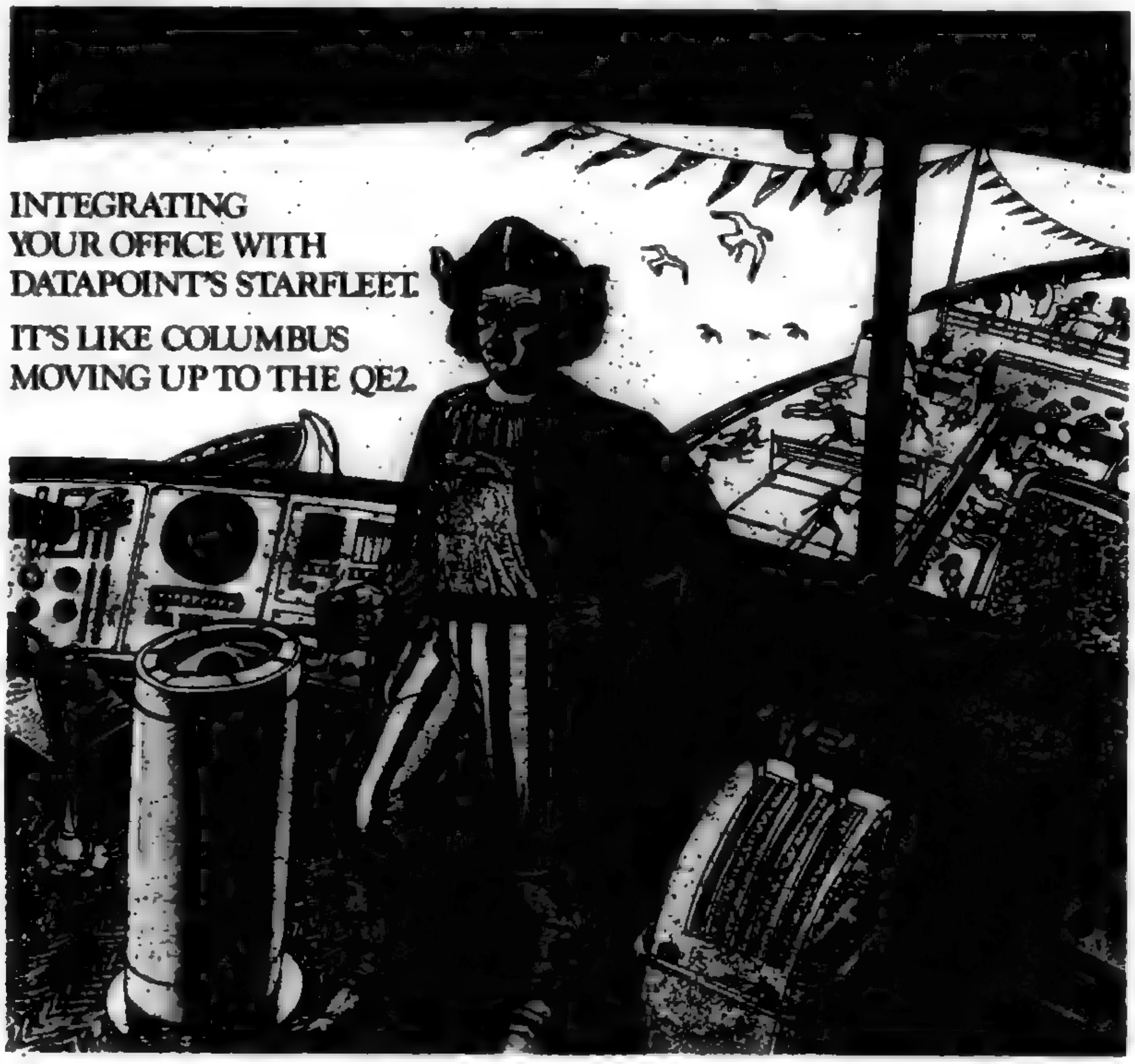
Acts as a virtual machine

Acenet sits atop the operating system of individual computers in a network and acts as a virtual machine. One Acenet node can then communicate with any other Acenet node in the network. There are currently Acenet versions of Microsoft Corp. MS-DOS, Unix and several proprietary operating systems. In a 1986 newsletter, market research firm International Data Corp., located in Framingham, Mass., reported that Acenet "has demonstrated, under independent laboratory testing, to possess capabilities that go very far in providing the user with . . . true distributed resource networking capabilities."

Acecobol, meanwhile, is a Cobol compiler for distributed environments. According to Austec spokesman Chris Lock, "It lets the user take almost any existing Cobol application, recompile it and then use it as a networked application in a network of heterogeneous machines."

The importance of products like Prelude, Acenet and Acecobol is that they vastly increase the power of the user to select or reject hardware in terms of price and performance alone. If any piece of software runs on any hardware, then customers will be no more bound to one supplier of computers than they are now to their suppliers of typing paper.

M.T.



When it comes to large scale departmental computing, many vendors simply don't know the devil from the deep blue sea.

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CIRCLE READER SERVICE NUMBER 237

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MICRO-MAINFRAME WATCH

Micro-Mainframe Links Reach New Heights

KEN CONDON

·BY·STAN·KOLODZIEJ·

For those in MIS who are hoping the micro-to-mainframe link market is becoming a simpler world, this article won't offer much solace.

The fact is, the micro-to-mainframe market has been multiplying during the past two years into several distinct but interrelated areas. The early link products such as terminal emulation boards and protocol converters (both showing great staying power) have been joined by newer, vendor-integrated links, extended links and products that are nearly as much local-area network (LAN) and data base as they are micro-to-mainframe link.

It is a world growing rich with choice — and potential frustration. Product categories are increasing in step with the number of corporate micro users wanting access to mainframe data. The result is a trade-off; while few MIS managers would probably wish to go back to the days when micro-to-mainframe links solely meant basic file transfer, there is no doubt there is more need for MIS to understand the market and get a handle on what types of links they need now and in the future.

"What we're trying to do now is educate our users about all the tools available with their micro-to-mainframe products," explains Paul Incao, a programmer in the Trading Systems and Technical Support division of Shearson Lehman Brothers, Inc. in New York. "We're busy putting together a full report on the direction of micro-to-mainframe links throughout the entire company. It's as much a need for us [MIS] as it is for the end users."

Seymour Merrin, a vice-president at the Gartner Group, Inc., a Stamford, Conn., research firm, claims that much of the current market confusion can be traced to both MIS and link vendors failing to realize just how difficult most micro-to-mainframe links are to install and manage.

"You have to be a real corporate professional to handle links," Merrin says. "Vendors have oversold the simplicity of links, and MIS has underestimated what is involved. The fact is, I think most micro-to-mainframe links are still very slow, and the software that is required is extremely difficult to write."

Merrin sees a dilemma shaping within the micro-to-mainframe market. At this stage, he feels, there are no link products that offer complete transparency and ease of use to end users. The software to do it can be written now but would be too expensive.

"I see some vendor storming the market with a truly transparent, affordable product, but not until 1988," Merrin says. "It will be a third-party vendor, not IBM. I don't think the IBM culture is capable of producing the big link product. Their history in software speaks for itself.

"I think one thing is clear, however. The corporate mainframe users — and not just vendors — have to be involved in producing link products. Data on mainframes is proprietary, with diverse formats. It's a totally different need than packaged [link] software can deliver."

In the meantime, however, micro-to-mainframe product sales are climbing. International Data Corp. (IDC), a Framingham, Mass.-based research group, sees the installed U.S. base of micro-to-mainframe software reaching 609,000 units shipped in 1986, up from 429,000 in 1985. IDC estimates the total U.S. market of shipped and installed link software to have reached $1.2 billion in 1986.

The U.S. terminal emulation board market is also showing few signs of flagging. IDC estimates 225,000 board units were shipped in the U.S. in 1986, up from 187,000 in 1985, and reaching 338,000 in 1987.

The market for emulation boards is still hot because the boards are far less expensive than most current micro-mainframe software solutions, generally priced at only a few hundred dollars. However, it's a case of getting what you pay for. Plug-in boards offer little more than basic file transfer capabilities.

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MICRO-MAINFRAME WATCH

Shearson Lehman's Incao says that Digital Communications Associates, Inc. (DCA) Irma boards were the standard within Shearson Lehman three years ago, until IBM came out with its PC VM Bond emulation product that enables the transfer of PC files to other PCs.

PC-PC file transfer degrades data

"One of the current problems of doing PC-to-PC file transfer is having to go through the host first, which can degrade data and alter [data] formats on the way," according to Incao. "We are also bringing in Persyst, Inc. boards. I don't think it's good to be reliant on only a few vendors."

Offering more in the way of capability are file transfer link products such as Blast from Communications Research Group, Relay Gold from VM Personal Computing, Inc., and PC/SQL-Link from Micro Decisionware, Inc. These products use software resident on both micros and mainframes and enable users to restructure data they wish to extract from the mainframe.

To access data from an IBM 4381 mainframe, Hublein, Inc. in Farmington, Conn., is using VM Personal Computing's Relay Gold asynchronous communications packages.

"Most of our bigger offices are using Forte Communications Corp. communications boards on their PCs to link with the host, but the smaller offices have gone with Relay because we can use dial-up lines instead of controllers and leased lines," explains Ray Angelo, manager of the information center and office systems at Hublein. "With Relay, we can do full-screen emulation and file compression. Relay 3270 software also allows us to communicate remotely with other PCs without having to add emulation hardware."

So-called vendor integrated link products from such data base suppliers as Cullinet Software, Inc. with its ICMS, Information Builders, Inc. with its Foctalk and McCormack & Dodge Corp. with its PC Link offer more sophisticated micro-to-mainframe links that interact directly with their proprietary data base management systems to provide data extract and application development tools on micros.

For example, Kerr-McGee, Inc., an energy company located in Oklahoma City, has been using PC Link from McCormack & Dodge to port data from its IBM 3090 mainframe to IBM PC XTs and streamline general ledger and payroll applications.

"PC Link has given us some major application facilities," explains Tom O'Neil, manager of Kerr-McGee's accounting systems and procedures. "The Download facility allows our users to build extraction parameters to bring down very specific mainframe records and files. We can also do some interactive uploads to the mainframe, taking some massaged data from a Lotus Development Corp. 1-2-3 application and plugging it into our mainframe McCormack & Dodge Millenium data base management system.

"The big plus," O'Neil adds, "is the ability to be selective and redefine mainframe fields, tailoring the extract parameters and only getting the data you need. I don't think you can do that with many other links."

Shearson Lehman's Incao says micro-to-mainframe links are broken into three categories at his company: coaxial, asynchronous and synchronous. Though the company has link products pertaining to each category, Incao says, it is still looking for a product that will transparently work with mainframe data directly.

"What we're seeing within the company are continuous themes of users transferring data files into Ashton-Tate's Dbase III, massaging the data and then transferring the data back to the host. One of the most transparent link products I've come across is Micro Tempus, Inc. Tempus-Link," Incao says.

Tempus-Link is part of a category of products known as extended links. These links generally combine data base extract and virtual disk facilities for microcomputer users.

Montreal-based Micro Tempus pioneered the use of a virtual disk in micro-to-mainframe links to make file transfer easier for users and relieve the mainframe CPU part of the direct micro-to-mainframe link. Virtual disks are used on mainframe virtual drives that mimic PC disk drives. Functions that can be handled on a PC drive can also be handled on a mainframe virtual drive, and virtual disks create a common working and storage area accessible to both micro and mainframe.

> *'I see some vendor storming the market with a truly transparent, affordable [micro-mainframe link] product, but not until 1988. It will be a third-party vendor, not IBM. I don't think the IBM culture is capable of producing the big link product. Their history in software speaks for itself.'*
>
> **— Seymour Merrin**
> **Gartner Group, Inc.**

Seattle-based Washington Mutual Savings Bank, for example, is using Tempus-Link to access mainframe data and keep up with the various stages of loan applications.

Looks like a CICS application

"It looks just like an IBM CICS application," explains Ken Osprenga, a senior programmer/analyst at the bank. "The virtual disk facility gives us the ability to handle batch micro-to-mainframe jobs by off-loading and holding data until we need it."

Tempus-Access, the newest link product from Micro-Tempus; uses DYL-270, a data extractor from Sterling Software, Inc.'s Dylcore division that reads any sequential IBM ISAM, BDAM and VSAM file structure while also interfacing with numerous DBMS such as Cullinet's IDMS, Applied Data Research, Inc.'s Datacom/DB and IBM's DL/1 and IMS.

Omnilink, an extended link product from On-Line Software International, Inc. of Fort Lee, N.J., is being used at Fabri-Centers of America, Inc., a Beachwood, Ohio, company operating specialty fashion stores across the U.S.

Before the arrival of Omnilink, Fabri-Centers' PC users had been rekeying hard-copy data from the firm's IBM 4381 mainframe into PC spreadsheets. Apart from being time-consuming, the rekeyed data was often prone to errors. According to Anthony Berg, director of the company's information center, a large part of Fabri-Centers' decision to go with Omnilink was the product's ability to be selective in downloading data.

Another extended link product making a splash is The Application Connection (TAC) from Lotus. TAC is a mainframe data base extract application that has an integrated PC query and retrieval facility. TAC is also unique in that it does not actually perform any file transfer nor does it use the host to provide a virtual disk facility.

Used with other file transfer products

TAC, however, is used in combination with several leading file transfer products including Relay Gold, Tempus-Link and Irma Link. TAC also supports a number of host data bases and file formats such as On-Line Software's Ramis II and Information Builders' Focus.

The LAN gateway market promises to make some noise in the next few years. The market for gateway boards installed in LAN PCs used as servers was projected by IDC to amount to $3.6 million in 1986, and it may climb to $12 million in 1987. The market for gateway boards installed in dedicated LAN servers is expected to be higher.

Products like DCA's Irmalan, CXI, Inc.'s Pcox/Gateway and the Net/One PC System from Ungermann-Bass, Inc. offer connectivity to various mainframe hosts through hardware and software installations on LAN PCs.

Information Builders has used a unique approach with its PC/Focus-Multiuser product, which is a LAN implementation of PC-Focus supporting multiple concurrent users. PC/Focus-Multiuser works with networks from Nestar Systems, Inc., IBM, Novell, Inc. and AT&T.

A plus for the product is that Focus applications can be developed and executed on LAN PCs or sent to the host for execution.

A more popular approach is the Net/One PC System from Ungermann-Bass that enables a PC to achieve full connectivity to a host through the company's NIUPC, a single circuit board that plugs into one expansion slot on an IBM PC or compatible, essentially turning that PC into a network server.

"I think you're going to see a lot of cooperation between LAN and emulation board companies in the future," explains Ilene Goldman, program manager of the Workstation Market Program at IDC.

"Instead of reinventing the wheel, LAN companies like Novell and others have been contracting with board makers to provide direct gateway service to a host from LANs. That type of cooperation will increase," she says.

Gartner Group's Merrin also sees LAN gateways growing in importance in the micro-to-mainframe market for economic reasons. "Truly transparent link software can be written, but it would be too expensive and would slow sales considerably," Merrin claims.

"There is an option, and that is placing the software on a file server in local-area networks and providing a gateway to the mainframe. This would help spread software costs over a number of micros on the network. I think it's the only way companies are going to be able to justify the growing prices of mainframe-based link software," Merrin says.

Looming large over the field of micro-to-mainframe communications is the specter of IBM's Advanced Program-to-Program Communications (APPC) LU6.2 communications protocol, which will eventually enable all systems on IBM's Systems Network Architecture (SNA) network to communicate directly with each other without the need of special software or hardware.

On the surface, LU6.2 would appear to make the lion's share of the micro-to-mainframe market obsolete. Not necessarily. While vendors are increasingly bringing out products supporting LU6.2, some analysts are predicting that APPC will not make a significant impact until the end of this decade.

"IBM hasn't laid out its APPC strategy yet, and we won't see full LU6.2 implementation until 1990," Goldman explains. "Even so, APPC is not automatically going to make the micro-to-mainframe industry obsolete.

"There will still be a huge aftermarket and installed base of users who will want to plug into LU6.2 after purchasing micros. PCs based on the Intel Corp. 80386 processors are not going to be providing LU6.2 right away. These 386 computer vendors will rely on board suppliers such as DCA and others to give them the LU6.2 connection," she says.

Until then, users are being confronted with an increasingly diverse range of micro-to-mainframe products. It's a big market, in large part made possible through the courtesy of IBM, which has left a legacy of heterogeneous operating environments that can't speak with one another.

DEC takes up where IBM leaves off

Integrated systems vendors like Digital Equipment Corp., however, are not complaining. DEC, for one, has lately been feasting on IBM's lack of communications foresight. The Maynard, Mass.-based company has been steadily stockpiling a series of links and gateways that tie IBM PCs into its VAX minicomputer environment and into IBM mainframes using the SNA network.

Other integrated systems vendors, such as Hewlett-Packard Co., Wang Laboratories, Inc. and Data General Corp., are also putting more emphasis on micro-to-mainframe communications in their product strategies.

Explains Mike Gayowski, DEC's marketing manager for IBM connect products: "The entire link issue is becoming very important. Any company that makes it easy to give access to mainframe data and different operating environments is going to be ahead in this game."

Kolodziej is Computerworld Focus *senior editor.*

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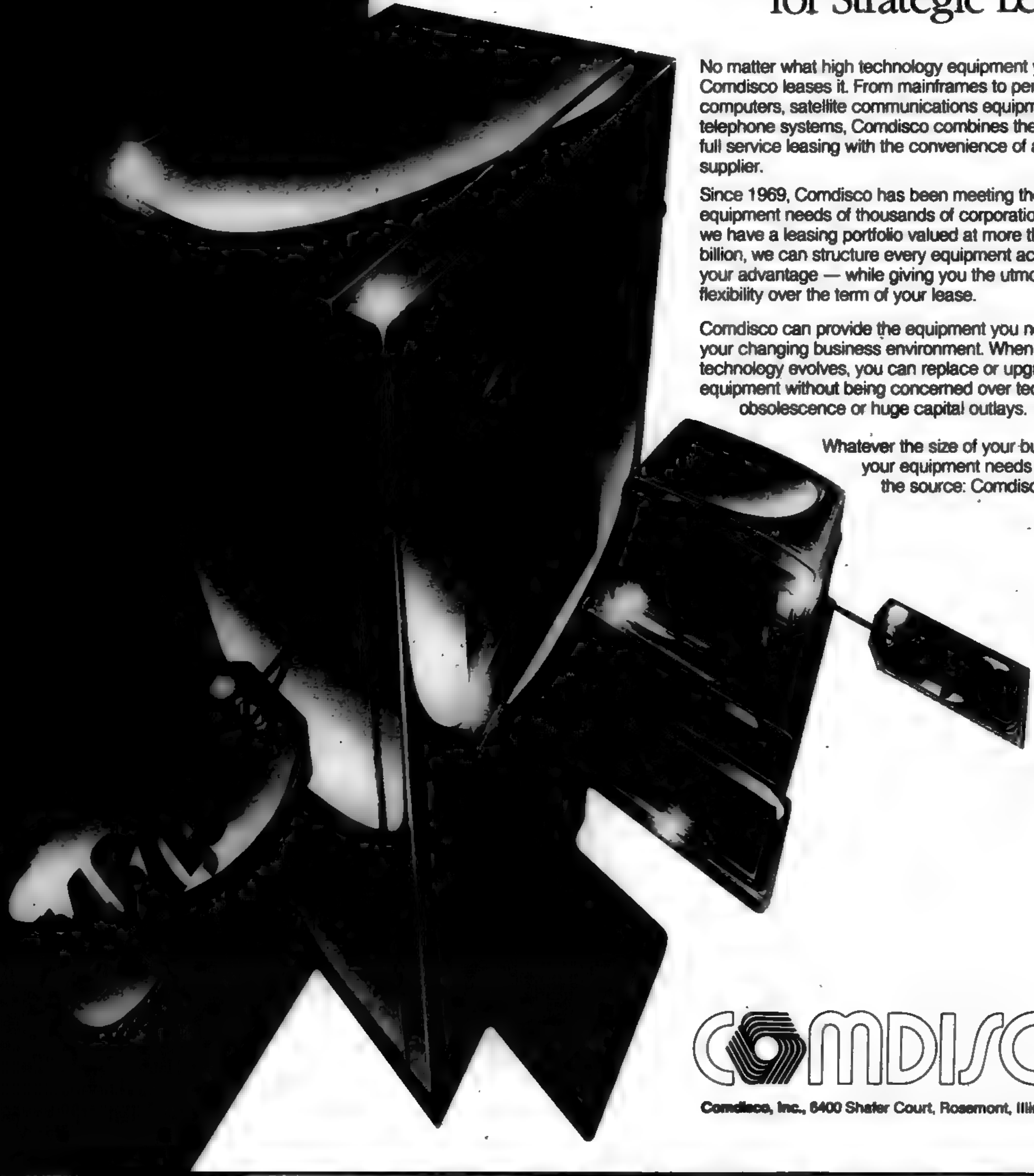

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VENDOR ANALYSIS

DEC Leads Connectivity Race

•BY•MICHAEL•MILLIKIN•

With users demanding connectivity, IBM and Digital Equipment Corp. are vying for the lead in the interoperability race. Both are on the fast track, pursuing the goal through different means.

On one side there is DEC, the darling of the connection set, embracing universal standardization to help it pull ahead. On the other is IBM and the force of Big Blue, relying on a combination of its own networking solutions and outside standards to make it the champion. In a contest that will be fraught with political implications, users may find that they are the biggest winners of all.

The circumstances of the computer industry are familiar to us all. Because end users in a multivendor world want interconnectivity, no vendor in its right mind would now come out in favor of a closed, proprietary architecture. Openness is the watchword.

There is some very real money to be made by vendors that can satisfy user demands. In the long term, a global network will be possible — computers will have the same interoperability as the telephone system. But in the short term, the vendor that can provide better interconnect solutions will gain market share.

The question is, of course, what rules to follow. IBM's Systems Network Architecture (SNA) is a dominant standard. Smaller vendors that want to play interconnect must provide a solution that taps into SNA. In this manner, two smaller vendors' products may be able to communicate through their IBM interconnect products.

SNA could become the common protocol language of computer communications. The alternative is to create from scratch an agreed-upon standard that would play Esperanto to IBM's English. When connecting to IBM on SNA's terms, other vendors always have to catch up. Hence, a lot of furor revolves around IBM's delays in publishing the specifications of its protocols.

If all vendors agree on a planned language, then they are on an equal footing. That planned alternative is realized in the International Standards Organization's (ISO) Open Systems Interconnect (OSI) suite of protocols.

DEC is assuming the mantle of OSI champion and for more than just altruistic reasons. The vendor recognizes the bias implicit in relying upon SNA as a standard. Not content to follow in anyone's shadow, even an enormous Blue one, DEC made the correct logical leaps. After putting its IBM interconnection products in order, it jumped on the OSI bandwagon.

The sides are clearly drawn. DEC leads the rebellious multitudes beneath the OSI banner. IBM stands in opposition, truculently trying to maintain its dominance even as its empire crumbles. Or so the fable goes.

IBM is in a slump. Weak financial returns and a lack of interoperability among its own strategic systems underscore the perception that IBM has stumbled. And, in fact, Big Blue is losing market share in the departmental computing arena, primarily to DEC. Today's favorite industry pastime is debating whether IBM will open its architecture further in response to increased market pressures or whether it will slam the door shut.

Conspiracy theories aside, IBM has a very good business reason to endorse open architectures. The more devices that IBM can connect to, the more million instructions per second its processors will use and the more revenue IBM will bring in. Add to this the fact that closing architectures would only force more customers to rebel and damage IBM's sales figures further.

Has DEC's success with interconnection driven IBM to adopt a more open stance? Such statements are at best difficult to quantify and are at worst a matter of opinion. However,

DEC's success and IBM's stance are certainly symptomatic of the current demands of the marketplace.

It appears that IBM has committed itself to open architectures and is pursuing this goal with its four-point plan:

- It will continue to expand its advanced-function architectures.
- It will publish the specifications to these architectures.
- It will support international standards development.
- It will implement accepted international standards.

One key point in this plan is the publication of specifications for the SNA architecture. Some vendors have long complained that these specifications have not been available quickly enough or with enough detail to make them easy to implement. But IBM's first priority is to develop new advanced protocols for internal use.

Although IBM is beginning to open up its architecture, it has no desire to become a development laboratory for the rest of the industry. Publishing its specifications, a considerable task, must be done with great care lest IBM find itself ensnared in yet another legal tangle.

(A current European lawsuit takes IBM to task over what is an architecture and what is an implementation of that architecture. Essentially, the plaintiffs are trying to force IBM to give them some of its actual code on the grounds that it was characterized as part of IBM's architecture rather than an implementation of that architecture.)

SNA has a reputation for rigidity and complexity. But in keeping with the times, SNA is becoming more flexible and less hierarchical. Reduced definition is now an important feature. In the past, users had to make changes to their network definition off-line in batch mode, but this is not practical in a large network. Routes can now be selected when a session is initiated without being defined in advance.

> ”
>
> *DEC is assuming the mantle of OSI champion and for more than just altruistic reasons.*

Additionally, IBM brought out its Low Entry Networking (LEN) extension to SNA, which supports easily managed, peer-oriented networks. The first product within LEN is the Advanced Peer-to-Peer Networking (APPN) announced in June 1986 for IBM's 370, System/36 and 38.

APPN supports dynamic expansion of the network without service interruption, dynamic rerouting and a distributed data management architecture. All of these components are necessary if IBM is to meet its goal of cross-system consistency and interoperability.

Big Blue, after all, has a terrible interconnectivity problem within its own disparate product lines.

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In addition to the peer-to-peer protocols, IBM is working on SNA Network Interconnection (SNI) and Extended Network Addressing (ENA). SNI enables two separate SNA networks to be connected into a single logical network in a manner that is transparent to both network administrators and users. SNI can also be used to split a very large network into more manageable domains, which IBM does with its own Information Network service network.

ENA provides a complementary feature by extending the number of bits that can be used to describe a network node in a very large network. Today, IBM provides 23 bits for this purpose but has room in its protocols for up to 48 bits — enough for an overabundance of SNA addresses.

As far as participation in international standards goes, IBM is damned if it does and damned if it doesn't. If IBM stays aloof, it will be accused of trying to sabotage or delay the process. A standard can hardly be universally accepted if the largest vendor ignores it. On the other hand, if IBM does participate, it may be accused of trying to shanghai the process.

For example, some factions within ISO earlier approached IBM and requested that it propose that its LU6.2 be included in the OSI specifications at the session layer.

IBM agreed and made the proposal, only to see it torpedoed by anti-IBM rhetoric from other ISO factions. Whether the LU6.2 issue is dead depends on whom you talk to.

A second example of IBM's travails in this arena is its history with the Corporation for Open Systems (COS), which was formed in March 1986. At the time COS was formed by its 18 original members, IBM was expressly not invited to participate. Most observers jumped to the conclusion that IBM was once again trying to sabotage a worthy cause. In May 1986, COS graciously decided to let IBM join after all, which IBM did amidst a flurry of stories about how it was dragging its feet.

Although IBM has kept a low profile in ISO, it has been active in the organization from the beginning.

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>
> *A standard can hardly be universally accepted if the largest vendor ignores it.*

In fact, Big Blue and other deep-pocketed companies such as AT&T tend to flood the committee rooms with bodies. IBM has 70 of its top people from affected business areas spending part of their time on ISO.

Much of IBM's ISO work, however, is in Europe, where its business need for ISO support is the greatest. In La Gaude, France, IBM has an ISO-compatibility certification facility and has completed implementing the ISO transport and session layers (the fifth layer of the ISO model). In Heidelberg, West Germany, IBM has a research center for OSI Levels 6 and 7 and expects to have these implemented by year-end 1987.

IBM has probably done as much to support and implement ISO as any manufacturer. Unfortunately, it has done so quietly and only in areas in which it has absolutely needed to.

So far, IBM has made little attempt to bring its ISO implementations home, thus leaving the vendor open to criticism that Big Blue only participates in the ISO for three reasons: It wants to influence the ISO's direction to its benefit (the LU6.2 affair); it wants to hedge its bets; and the politics of Europe give the company no choice.

IBM also supports X.25 via its X.25 SNA Extended Interconnection (XI) product, which enables an X.25 transport, public or private, to be substituted for the first three layers of SNA. But as is the case with ISO support, IBM has grudgingly sold X.25 SNA XI in the U.S. only when it has had no other choice.

OSI squares off with SNA

Regardless of any standards work, SNA is still IBM's strategic networking product. Although IBM will make gateways to OSI available in a timely fashion and will sell OSI solutions on a case-by-case basis, OSI will by no means supersede SNA. IBM will continue to market and invest in SNA for the long term.

IBM's basic approach to OSI is to coexist with it by providing gateways. DEC, on the other hand, is loudly proclaiming that it actually plans to integrate OSI into Decnet.

This means that Decnet will offer a much more open and efficient multivendor networking environment because other vendors with OSI networks will be able to connect with native protocols and not through a gateway to SNA. Gateways cost money, and they strangle performance.

Interconnectivity hype aside, IBM and DEC offer two choices. IBM pushes SNA — with its increasing functionality and flexibility — as its champion, but offers coexistence with the standards world. DEC embraces these standards and integrates them into its own networking architecture for increased performance and economy. The next few years should be very interesting.

Recognizing that support for multivendor networking would become a basic criterion for continued success, DEC began positioning itself with its IBM interconnection products several years ago. These packages, DEC claimed, let DEC connect better to the IBM world than IBM could.

The IBM interconnection packages satisfied a market demand and helped DEC establish a position as a supporter of multivendor networks in a world in which IBM set the dominant standard.

Besides, every other vendor was jumping on the IBM interconnect bandwagon. Had DEC not established a leading role in this area, it would have made it all the harder for the smaller vendor to challenge IBM's hegemony as successfully as it has already done.

But at the same time, DEC began planning its OSI work. In the late 1970s, interest in OSI was more academic than practical. By 1982, as it implemented Phase IV of Decnet, DEC was eyeing OSI support as its next step.

In the long run, IBM's support for OSI will relieve DEC of a burdensome engineering problem — that of keeping up its suite of IBM interconnect products. OSI will be the common industry language.

Currently, DEC says, it has four things reinforcing its position as OSI advocate in the industry. First, the company has a clearly stated strategy — to integrate OSI into Decnet. Second, it has already established itself, both with sound products and persuasive public relations, as the industry connectivity leader. Third, it participates in industry standards organizations and forums. Fourth, DEC's management, from Chief Executive Officer Kenneth Olsen down, has a clear vision about OSI's strategic value.

In June 1985, DEC issued an aggressive statement of direction, basically laying out a challenge to itself and to competitors. DEC promised the following:

- To produce an OSI transport layer product by early 1986.
- To announce an X.25 offering by the end of 1986.
- To deliver a Manufacturing Automation Protocol (MAP) 2.1 product by the end of 1986.
- To announce an X.400 product by the end of 1986.
- To integrate the lower four layers of OSI into Decnet by 1988 in a nondisruptive manner.

DEC is ahead of its own schedule. The VAX OSI Transport Service (VOTS) appeared in February 1986. DEC followed up early this summer with the X.400 message router gateway and VAX Packet Net Switch Interface (VAX PSI), an X.25 product, and Release 1.1 of VOTS. DEC also produced the OSI Application Kernel (Osak), an OSI Layer 5 product not mentioned in the June statement.

Taken together, these products help DEC set the pace of OSI. VAX PSI covers Layers 1, 2 and 3. VOTS 1.1 sits across Layers 3 and 4. Osak resides at Layer 5, and the Message Router X.400 gateway covers Layers 6 and 7.

At Autofact '86 in November, DEC introduced its MAP 2.1 product. This OSI suite is not a finished set of products. DEC wanted to be the first to set an example. Why the haste? The battle is between the de facto standard set by IBM with SNA and the de jure standard of OSI. Clearly, it is in DEC's best interest to have buyers perceive OSI as viable, and what better way than to have products running in an OSI environment?

A smooth transition

DEC's ultimate goal is to enfold the OSI layers so smoothly into Decnet's layers that users receive the benefits of both — the multivendor interconnection of OSI, the value-added features of network management and so on. OSI applications will benefit particularly from such an arrangement, as DEC's own features can fill the gaps in which the laborious standards process has not yet been able to define specifications.

Messaging is a good example. While the X.400 specifications for the envelope are fairly well set, standardized definitions for directory services are still several years away. In the interim, DEC's own directory services kick in. DEC's message router transparently handles the directory tasks for exchanging messages with other X.400 systems, compliant public mail networks and other Decnet networks using VMS mail, All-in-1 Mail or other mail systems and applications that access the router.

Not that this strategy of stressing value-added products on top of a standardized foundation is unique to DEC. But DEC is very strong in areas in which other vendors and OSI implementations are weaker. The synergy between DEC's version of SNA, called the Digital Network Architecture (DNA), and OSI will create a fruitful marriage for the next few years.

What's on deck? Suites of upper layer OSI products such as File Transfer Access Management and application-specific protocols are expected next. DEC will keep pace with the developing standards, such as office document architecture and office document interchange format.

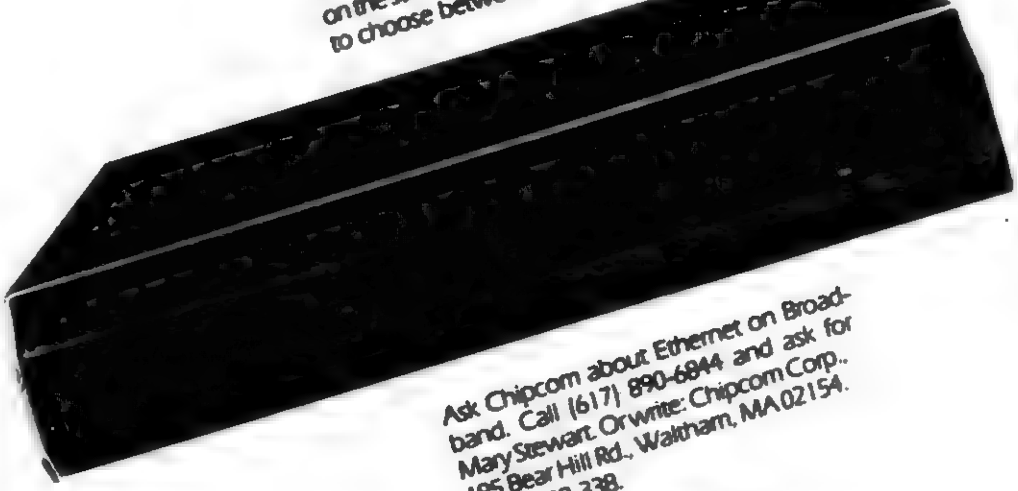
> ”
>
> *Customers, of course, are the long-term winners in this connectivity race.*

Standardization, to a certain degree, requires adherence to a lower common denominator of functionality. On a plot of functional innovation against time in networking architectures, the Decnet plot would be steeper and run above the OSI standards' plot.

Customers, of course, are the long-term winners in this race. SNA adherents will end up with more flexibility and power. OSI backers will have their global standard and thus interconnection without the performance degradation of gateways. By establishing itself as the leading advocate of OSI, DEC stands to gain against IBM in the current market. More important for DEC's continued success, however, is the continuing growth of OSI as a viable alternative to SNA.

Standards work is as much a political process as an engineering one and can bog down for very human reasons. DEC is aware that it needs to keep its weight behind the wheel to keep it rolling. ■

Millikin is an associate editor with Patricia Seybold's Office Computing Group in Boston, which specializes in departmental and work group computing. He has been in the industry for four years and is an editor of "Patricia Seybold's Office Systems Report" *and* "Patricia Seybold's Unix in the Office."



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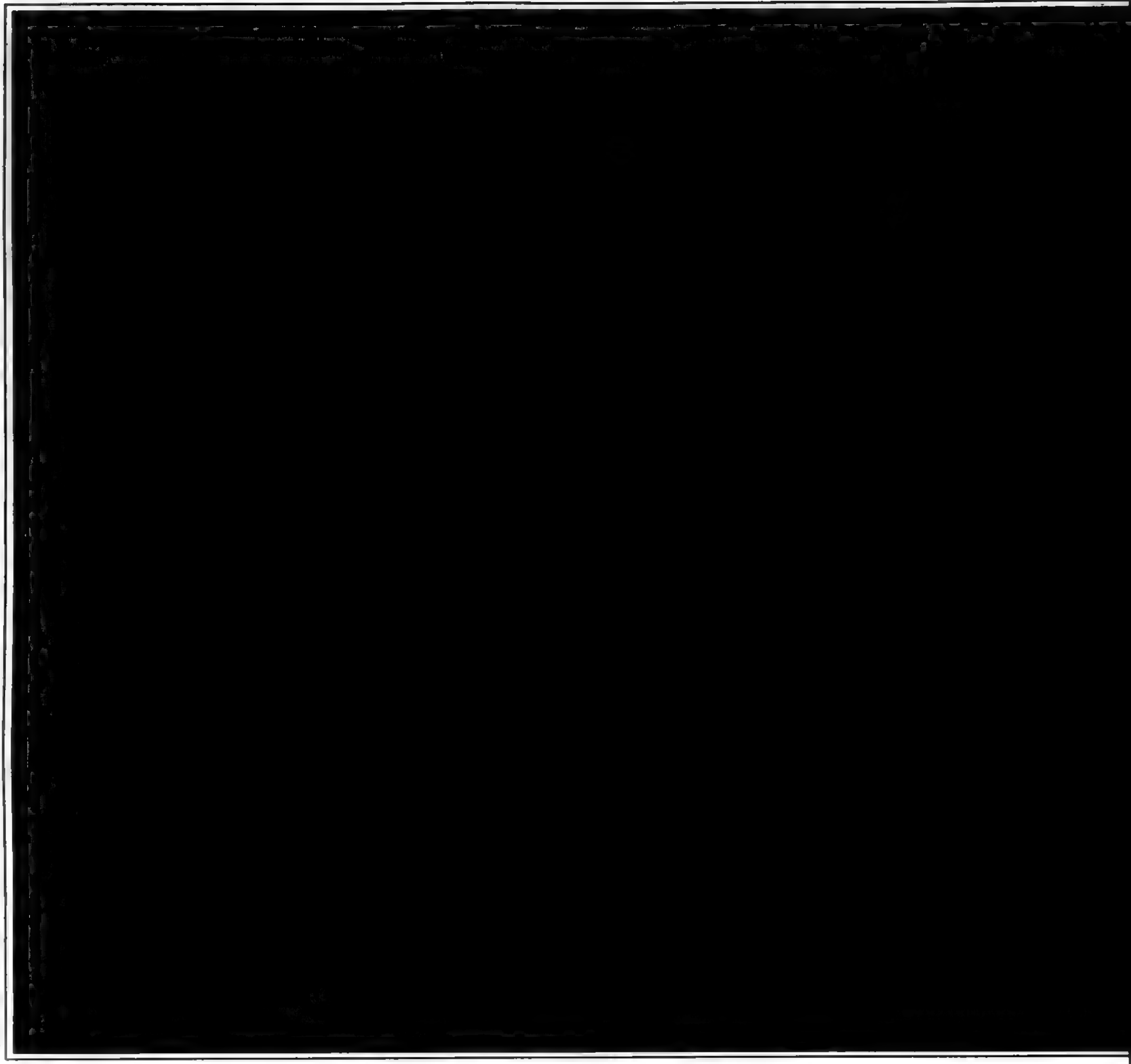

P CHARLES LADOUCEUR PHOTO

Untangling Network Politics

•BY•MICHAEL•TUCKER•

Remember when data communications was going to be the salvation of MIS? By the simple expedient of wiring everything into the same network, MIS was going to cut costs, improve service, win the hearts and minds of chief executive officers everywhere and finally get those pesky IBM Personal Computers under control.

Instead, MIS soon found that data communications brought its own unique set of problems. And, guess what? Those problems were not purely technical. Beyond the complexities of cables and protocols, networking creates an entire set of political concerns.

First, the islands of computing in a corporation — engineering, sales, the office of the micro manager — may have absolutely nothing to gain from a bridge to the mainland. Indeed, the various island kings, the executives who have built power bases by being independent, will correctly regard data communications as a threat to their positions.

Second, and much worse, in an age of mergers and acquistions, MIS people are coming into conflict with one another. As companies, and so their data networks, merge, MIS executives who may have invested thousands of man-years in the creation of proprietary networks are finding their own positions very delicate indeed.

In both cases, MIS people discover that the best defense and offense is to acquire the marketing and diplomatic skills necessary to manipulate network managers as much as the networks themselves.

Data communications have always presented MIS with the potential for conflict. Early in the game, when communications was coming under the control of specialized executives, many analysts suspected that MIS faced a real threat from an emerging class of corporate network managers.

However, in recent months, that threat seems to have abated, with MIS gradually absorbing communications functions. "The trend we see is data communications and MIS coming together, with MIS winning most of whatever battles occur in the process," notes Jeff Kaplan, director of communications industry research at Framingham, Mass.-based International Data Corp, a market research firm.

Kaplan argues that this MIS victory is a logical outcome of the nature of MIS technology. "The requirements of data communications are so complicated that the people who have been doing it for years on mainframes — MIS — tend to keep on doing it with micros and minis."

However, if MIS has won the communications mandate, it now finds that communications itself has become the issue. As MIS people go into their organizations and attempt to link personal computers, minis and mainframes into one coherent whole, they are encountering serious resistance.

A software vendor tells a particularly instructive story about one of his clients, a large East Coast investment firm. Since everyone involved would rather not be identified, the vendor likes to call his story a fable rather than history.

"We went into the place with an accounting package. Everything looked good. We had a great relationship with the MIS director, and she was really behind us. Then, we got into trouble. You see, there was this guy, a specialist, who'd been hired in the early 1980s to bring PCs into the operation. And now, it was like his personal little kingdom. I mean, he had a rule that no one was supposed to even look at a manual unless he himself had personally read it, cleared it and issued it to the staff."

The vendor's product was supposed to be a networked application. "This guy took one look at our product and just went ape. He wanted nothing on 'his' machines that even looked like a link to the mainframe."

Finally, the MIS director was able to get enough support from her CEO to go around the specialist, though not to defang him completely. "They kind of walled him up in his office. His authority was restricted to just those PCs that were already in place. New purchases came under the authority of MIS."

As a result, the investment firm now has two independent systems: a networked collection of mainframes and newer Personal Computer AT-class machines and an aging set of stand-alone PCs. The two groups cannot communicate except by the physical transfer of disks or by bootleg modems and terminal emulation products supplied by the PC users themselves.

Still, the MIS officer is relatively content. Time, after all, is on her side. Eventually, the specialist's PCs will grow obsolete. The MIS officer's network, on the other hand, will grow larger, more complex and more powerful with every passing year. Morever, the MIS officer is finding allies among the specialist's end users, who chafe at his attempts to restrict their technology. Subverting the specialist with things like bootleg modems has become the company's leading indoor mass participation sport, exceeding even the office football pool.

The moral of this fable, the software vendor says, is *politics*. The MIS director was successful because she was an expert politician, not because she was a technologist. She gained the support of her superiors by aggressively marketing networking as the answer to the company's information-related prayers.

At the same time, she was able to gain the loyalty of end users by presenting herself as their advocate and, thus, neatly claiming the traditional populist appeal of the micro manager for herself. And, concludes the vendor, it is these political, not technological, skills that MIS people are going to need most in the wiring of their organizations.

However, this particular MIS director had some advantages that many people in her position do not. Specifically, she was able to outflank her rival because he had already done much of the work for her by alienating his superiors and his users.

A far stickier situation occurs when an island of computing or independent data network has support at the executive level but must be integrated into a larger system anyway. The stickiest of that already stickier wicket probably occurs when one large company acquires another. In that case, a data network that may have functioned perfectly for years and that has the support of local management and end users must suddenly be merged with the data network of the buyer, which, in an age of leveraged buy-outs and junk bonds, may actually be smaller and less sophisticated than that of the acquired firm.

Transamerica Corp., a San Francisco-based insurance and financial services corporation, has been in the buyer's role since early last year. As a result, its DP division, Transamerica Information Services, headquartered in Las Vegas, Calif., deals frequently with the politics of network integration. "I must admit, we have had some potential for problems in acquisitions," says Gary Ho, Transamerica's director for data communications. "Integration has to be approached with some tact and with sensitivity."

Ho's operation supplies that sensitivity in two ways. First, Transamerica Information Services is set up to make its clients feel as independent as possible. "We run our data center like a separate company," Ho says. "We're run as a pseudo-business within the corporation. We even bill our customers. We treat them as though there were competitive alternatives to us."

E. F. Hutton Talks Politics

The best way to deal with political problems in networking is not to have them in the first place.

New York-based investment and financial services firm, E. F. Hutton & Co., is one company in which this happy situation exists. Hutton came late to information systems, and when it finally decided to invest in computers, it did so with the full participation of DP experts at the highest levels. As a result, says Bernard Weinstein, Hutton's first vice-president in charge of systems and communications, "we were fortunate enough to adopt an information strategy that dealt with these kind of problems from the beginning."

Hutton had unique requirements for its computers, not the least of which was security. As a company dependent on its brokers' contacts, it could not afford to let a disgruntled employee simply "dump a customer list to a floppy disk and walk out of the building with it," Weinstein explains. Therefore, he says, "we looked at PCs and realized we could be spending a lot of money for something that might get out of control. So, we designed a system that filled all the firm's personal computing requirements but with fewer PCs."

Hutton does this by putting most of its brokers' PC applications on multiuser systems. "We looked at the different software packages that were wanted," Weinstein explains. "Then we arranged for the companies that produce them to port the software over to our local branch processors." At each desktop, the end-users have a terminal or a diskless PC.

"The real revolution here," Weinstein says, "is in providing end-user computing without end-user computers. In effect, we avoided political problems with a preemptive strike."

However, Weinstein admits that his position is somewhat unique. Most MIS people are not coming into a firm that does not already possess a large installed base of PCs and PC software. Moreover, Weinstein says, there are situations in which those computers simply cannot be integrated into any larger systems. "I'm a pluralist in these things. I think every organization has to look at its own communications requirements, its organization and its culture. In an engineering firm, for instance, where you might want to put an engineer on a pedestal, our system would be far less successful."

— Michael Tucker

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And, second, Transamerica Information Services then sells itself to those customers. "You have to convince them that [integration] is a good business decision," Ho says. "You have to show them how it will improve their service, their performance, their flexibility, the ability to expand . . . while reducing their costs. Basically, you have to show them how *you* can make *them* money."

Indeed, selling is as important to Ho's philosophy of integration as physical interconnects.

It is important to remember, though, that Transamerica is dealing from a position of strength. It is a buyer rather than a seller, and its information processing division can afford to be tactful and sensitive. If Transamerica Information Services comes across a particularly unyielding network manager who simply refuses to buy no matter how sweet the deal, the firm can simply fire him.

The other end of the stick

What, though, of the MIS person who is on the other end of the stick? The person who, after what may have been a heroic effort to install a companywide data network, discovers his employer has been acquired in a flurry of junk bonds?

MIS people in this position report that their careers suddenly depend on the degree to which the takeover is friendly. Or, more precisely, their jobs depend on the degree of independence the buyer is willing to allow its purchase to have.

If that degree is small, then the MIS people involved many times have little choice but to accept a demotion. They go, essentially, from being the rulers of their own shop to someone else's assistants. In very grim situations, they may even have to scrap the data network they have so painstakingly developed and install someone else's less sophisticated system.

How MIS people should respond to such developments depends on how easily they can adapt to a new employer. If the purchasing corporation is relatively open and has room at the top, then they might best be advised to swallow their pride, sign aboard the new ship and attempt to regain (or even surpass) their old position in its DP operation.

On the other hand, if the corporation is not open to new talent, then the most productive thing they can do may be to resign. "How am I handling it?" asks one MIS person, whose company was recently acquired by a larger and much less friendly corporation, "Well, I smile a lot, drag my feet as much as possible and look for another job."

But, if the acquiring companies allow a larger degree of independence, then the acquisition process can be relatively painless. There is, however, a price: A company may inherit an entirely new set of political problems. The MIS manager has to become something of a diplomat.

For example, a food products combine, Nestle SA, located in Vevey, Switzerland, acquired San Francisco-based coffee vendor Hills Bros. Coffee, Inc. in 1985. The purchase was part of Nestle's larger strategy of obtaining food and food service companies in the U.S.

The manager of communications at Hills was then, and still is, Roger C. Prow. He reports that as Nestle's U.S. investment grew into several loosely related firms, the company moved to network them but allowed them to continue to exist as independent entities. "What they have done," Prow says, "is set up a data communications committee of the Nestle companies in the U.S. to see what can be done to produce a joint network."

The data communications committee functions almost as if it were an industry standards effort. And, as with any standards effort, there are all sorts of questions to be worked out like who has to change what and who has to pay for it. "The biggest hassle you get into is how you charge the cost," Prow says. "If your Nestle company has to upgrade your communications front-end so it can talk to some other Nestle company, who pays for it? . . . Right now, it's pretty much 'If you have to do the upgrade, you have to pay for it.' "

It may be that eventually the Nestle companies will settle their networking problems by surrendering some independence. "At present, we're splitting the cost," Prow says. "If we put in, say, a new line, 50% of the cost is paid by all the Nestle companies and 50% is charged to the companies that actually use it. But, in the future, we may work it out by going to Nestle USA and saying, 'Okay, this is going to be out of your pocket.' "

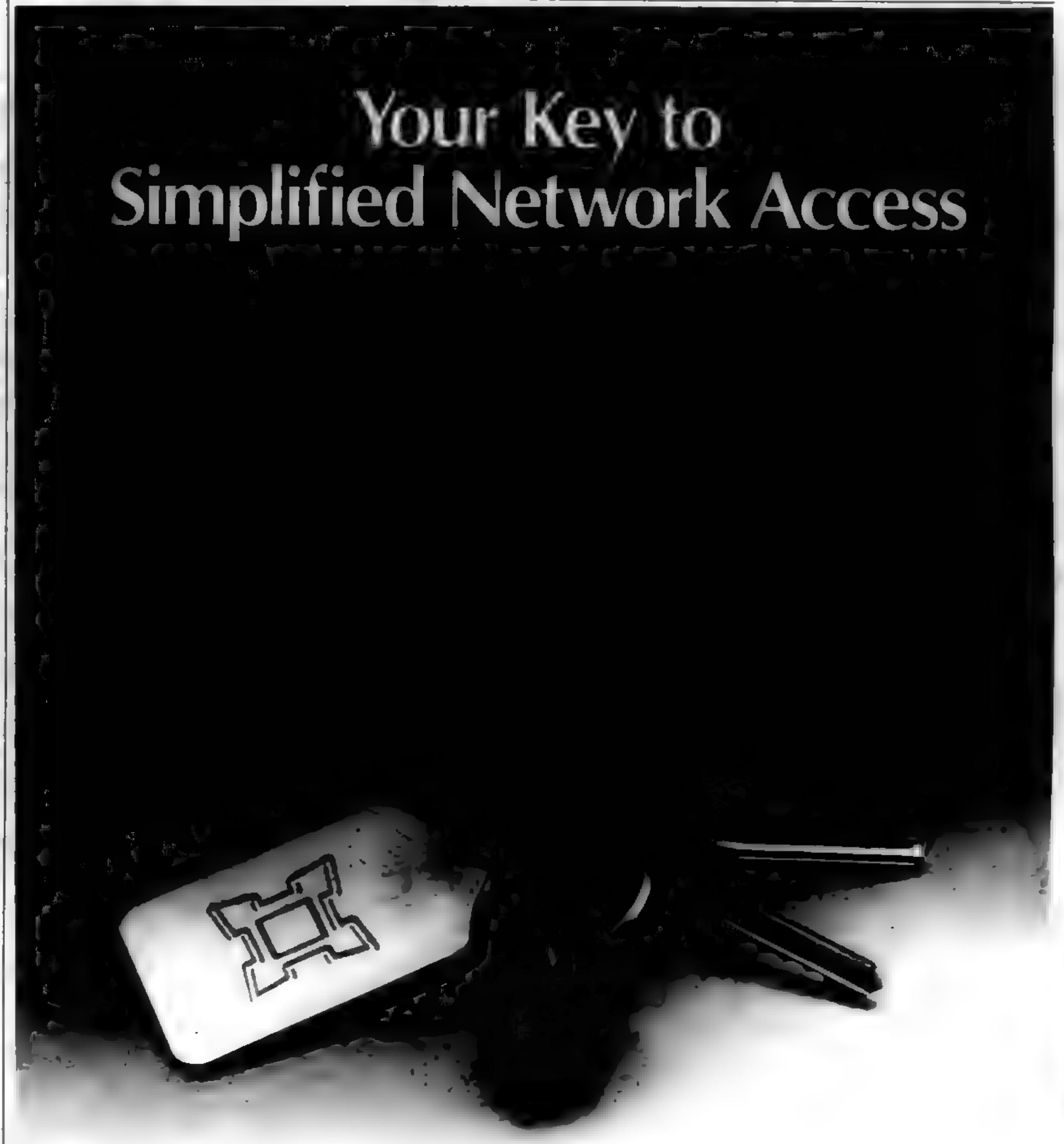
MIS takes on new roles

Thus, MIS people are unraveling the politics of networks by taking on the new roles of diplomat, marketer and office warrior. New roles, that is, for MIS officers working at an operational level; executive-level managers have played all three and more since the beginning of organizational behavior.

In fact, even a quick glance at what is happening to MIS in the networking world reveals a grander theme. Data communications is merely one of the many areas in which MIS is making the transition from a technical profession to an administrative one and in which the MIS director is being replaced by a new creature, the chief information officer (CIO).

What that situation will mean for MIS remains unclear. It is, however, certain that MIS will have to learn an entirely new set of skills, of which politics will be only one aspect. And the education may not be particularly pleasant. According to one information officer who has successfully made the transition from MIS director to CIO: "The difference between a CIO and an MIS director? It's simple. You burn your bridges behind you. You learn to think company. And sometimes that means leaving MIS way, way behind." ◼

Tucker is Computerworld Focus *features editor.*



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TELECOM TRENDS

Bell Wars

•BY•T.•DOANE•PERRY•

The world of corporate communications is split in two, between the voice switching and transmission hemisphere of the telephone manager and the data processing and data communications hemisphere of MIS. As the business communications system becomes more of a strategic necessity than a cost center, corporations will seek ways to coordinate the pieces of their communications operations and make them responsive to shifts in business direction.

The phone companies, which traditionally served the slow-growing but huge voice needs of telephone managers, would love to sell data goods and services into the smaller but faster growing arena of MIS. In light of this scenario, what can MIS and the chief information officer (CIO) reasonably expect to get from this strategy of the local telephone companies?

The regional holding companies and divested Bell operating companies are viable vendors because they will be around for a while. Besides the inherent strength that comes from dominating the local loop of the communications infrastructure, they have also made themselves financially strong. Furthermore, the divested companies are staffed with competent, energetic people; however, these firms also have many less competent people left from the days of monopoly market service.

The postdivestiture, deregulated (and reregulated) regional holding companies and their local operating companies have at least four organizational problems:

- The long chain of command necessitated by their large size.
- A horizontal split between holding and operating companies.
- A vertical split among the operating companies within each holding company.
- A vertical split between the regulated and unregulated sides of each holding company.

For example, the Centrex systems supported by the 22 divested operating companies within the seven holding companies are not generally compatible with each other.

But even with these problems, the divested companies are bursting with entrepreneurial business plans. One operational difference between the data and voice worlds is the importance of long-range planning. The telephone companies do a lot of planning because their enormous physical plant is expensive to upgrade and migrate. At data and computer companies, which are forced to zip around in faster moving markets, long-range planning is done by people who are either about to retire or who have been kicked upstairs.

Because these companies lack research and development operations, a chief thrust of their planning is to acquire other firms. And it is the strategy of a great many start-up datacom firms to make their fortunes by being acquired by a phone company.

The phone companies proclaim they will make acquisitions strategically to avoid becoming scatter-gun conglomerates with a smorgasbord of offerings. The central notion is to acquire software vendors that can enable the companies to offer gateway services that make existing systems work better together. But given the breadth and diversity of their responsibilities and opportunities, the phone companies have to work hard.

The holding and operating companies' chief problem is that their power, ambition, energy and competence is limited by a set of constraints. The most publicized constraint is pro-competitive regulations that curtail the turf on which the companies can operate — and rightly so because the phone companies do control the local loop, which is a so-called bottleneck in the nation's communications system.

A lesser known restriction is the brief experience of most telephony people outside the monopoly markets — where the rationale was to spend more on plant and equipment to maximize return on investment as allowed by the Federal Communications Commission.

A final constraint is a certain prejudice in the datacom world against personnel with telephony backgrounds. The prejudice originates from a different way of thinking about requirements — telephone people think of switching through a central circuit to charge for a piece of the business; datacom people think of sending packets through a distributed system of clear pipes. That's one reason why some data-oriented people see the Integrated Services Digital Network as a notion with telephony origins that is the wrong approach for data.

The FCC's Computer Inquiry III, one of the main regulatory proceedings now affecting the divested firms, represents both a major stumbling block and a source of relief. For example, when the Ameritech regional holding company recently announced a plan to invest in David Systems,

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Inc. to obtain equipment that would improve the data handling capability of Ameritech's central offices, the holding company's competitors immediately cried foul on the grounds that the move would amount to manufacturing, from which the phone companies are prohibited.

Many a good telephone company business plan will trip on regulatory hurdles. The question, given that the divested companies are viable vendors and that they have ambitious business plans, becomes, Can they pull it off?

That question cannot yet be answered with certainty, but it is fair to say that those companies with the right mix of personnel, organization, regulatory relief and acquisitions will do well.

While there is some doubt whether the telephone companies can achieve their new mission even though they are aggressive and fiscally strong, MIS and the CIO must discover what goods and services the divested companies will offer and how good these offerings will be.

MIS and the CIO will likely surmise that the companies are best at high-quality, low-cost data communications transport, such as X.25 packet switching, switched 56K bit/sec. alternatives to point-to-point pipes and IBM's Systems Network Architecture (SNA), because they have low incremental costs and do not have much more to learn in this mart.

Many of the phone companies hope that by adding network intelligence they will be able to increase their traffic by enabling customers to do without some of the hardware that users now need to support SNA and packet switching. Network intelligence means various combinations of processing power, protocol conversion, gateways and use of data bases.

However, phone company competitiveness through modernization is threatened by changes in the regulation of rates of equipment depreciation. After the May 1986 Supreme Court decision, conservative depreciation rates set by state public utility commissions will replace aggressive rates allowed by the FCC.

Regulation blues

The Supreme Court's depreciation ruling shifts the balance of regulatory initiative and momentum toward state utility commissions and away from the FCC. The regional holding companies and divested operating companies face new forms of regulation, particularly through accounting measures rather than further deregulation.

MIS and the CIO will also find that the phone companies are a good place to buy customer premises equipment (CPE), especially wiring and switches such as private branch exchanges and key systems and particularly equipment bundled for one-stop shopping with transmission services like T1.

The phone companies are going to be best at serving the medium-size customer market because that area is their traditional customer base. Low-end products like key systems have not sold well through the telephone companies.

The phone companies have lost money — an estimated $500 million, or 7% of after-tax profits, in 1985 — in their nontelephone ventures, particularly in CPE subsidiaries. No phone company is at the break-even point yet in CPE sales. An estimate submitted to the FCC by the North American Telecommunications Association puts the firm's losses at $1 billion.

Reasons for the losses include slow growth of voice/data integration markets and duplication of sales staffs. The stock market does not think the regional holding companies can earn more from unregulated diversifications than from regulated operations. For example, Southwestern Bell Corp.'s shares dropped sharply when Southwestern announced its $1.65 billion acquisition of Metromedia, Inc.'s cellular telephone and paging business.

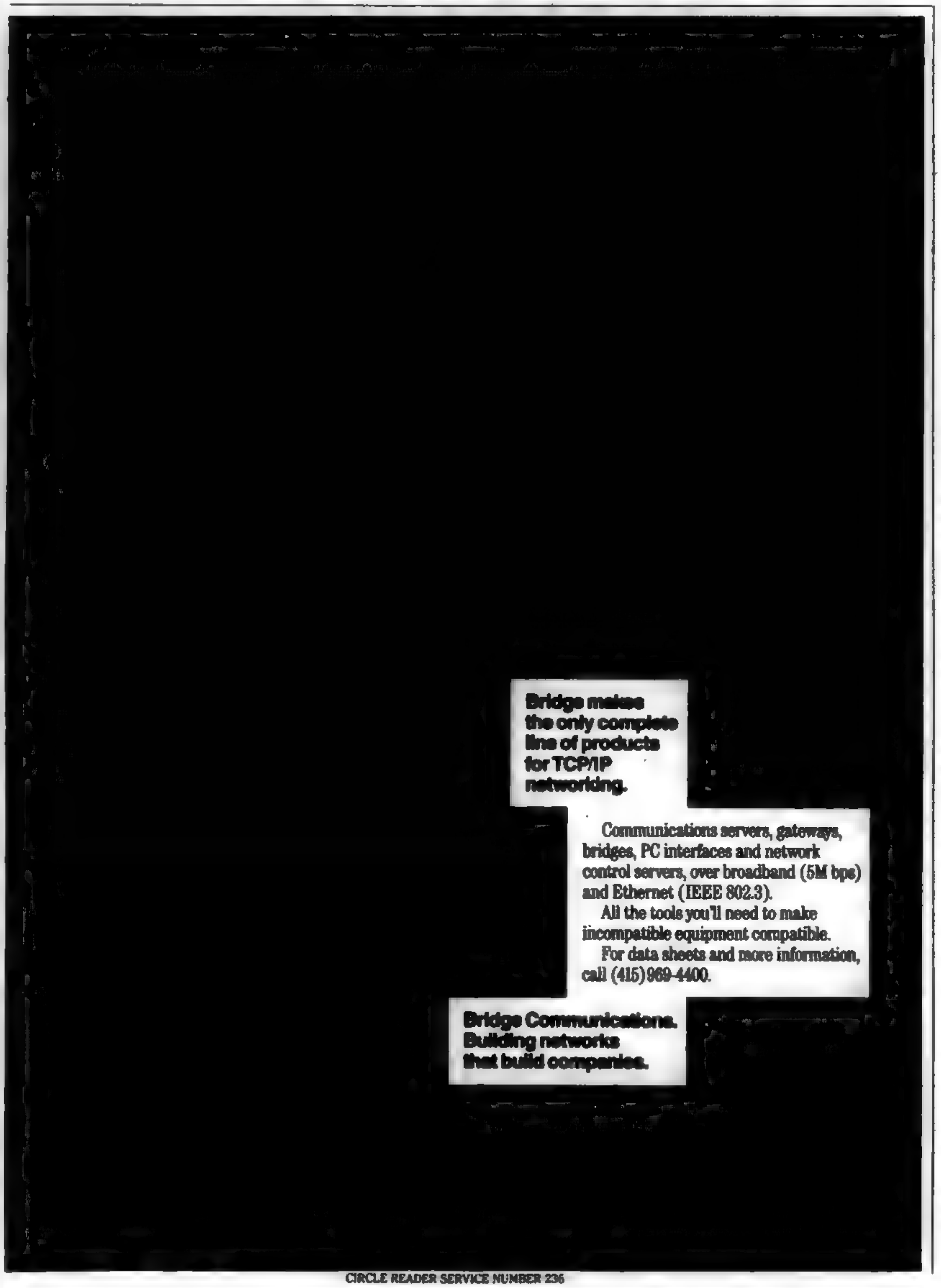
> *Many a good telephone company business plan will trip on regulatory hurdles.*

Another area into which the phone companies will venture is the large, evolving arena of systems integration, which encompasses the activities of network design, implementation, operation, management and service.

The high road for systems integrators is to claim "vendor independence" — that they meet the needs of their customers with whatever vendors' gear is best suited to local conditions. For example, 30% of Michigan Bell's customers are in manufacturing. As a systems integrator, it would design and install central office local-area networks for interbuilding requirements and in each factory.

The regional holding companies are well positioned for the systems integration market because they can leverage their low-cost information transport capability. But whether the phone companies can succeed in systems integration is debatable because this field is the most complex and data oriented of the phone companies' business objectives. Success will require new levels of flexibility in management as well as considerable integration of their own internal systems.

In the systems integration and other markets, the phone companies are belatedly beginning to realize that their greatest competitor is AT&T. For example, the phone companies are teaming with systems integrator Martin Marietta Data Systems and equipment vendor Northern Telecom, Inc. to bid against AT&T for a $4.5 billion federal telecom



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procurement called FTS 2000.

Also, the divested companies are trying to avoid dependence on AT&T for central office switch hardware and software. The telephone companies will increasingly go offshore for suppliers.

A related strategy is that the telephone holding companies have increased their direct purchases of telecommunications equipment and have developed or refurbished warehousing and distribution facilities to assist their local operating companies in reducing the need for rate hike requests and to position themselves as suppliers to large corporations with extensive private networks.

The phone companies are much alike in terms of the range of businesses into which they have gone. Besides the local exchange carrier business, a standard list of new business enterprises for the seven regional holding companies includes the following ventures:

- CPE and office automation equipment sales.
- Mobile communications.
- Directory publishing and advertising.
- Property management and real estate.
- Equipment financing and leasing.
- Venture capital development.
- International business.

In general, the phone companies are proceeding cautiously and are not responding to users' requests for proposals that call for large amounts of data communications. They want to get some experience with datacom and some sense of where the market is before they add value to their networks.

However, each regional holding company is different in terms of which businesses it emphasizes.

■ *Ameritech.*

Ameritech is lagging behind the other regional holding companies' equipment subsidiaries in getting into the office automation business. The company is, however, pressing very hard for permission to enter the telecom equipment manufacturing business and the long-distance business.

In August 1985, it was the first holding company to seek Department of Justice approval to enter those fields. Ameritech bought Applied Data Research, Inc., an international software firm specializing in IBM mainframe applications.

■ *Bell Atlantic Corp.*

Located on the mid-Atlantic seaboard, Bell Atlantic has a disproportionately large percentage of major government users, many of whom use Centrex services. This somewhat unique customer base motivates Bell Atlantic to address the needs of those users by rapidly enhancing switched network capabilities. It is also making a strong commitment, largely via acquisitions, to the business of selling and servicing computers and terminal devices.

■ *Bell South Corp.*

The Sun Belt is on an economic upswing, and Bell South has one of the largest construction budgets to keep up with growth. Its conservative acquisition and diversification policy keeps it out of the headlines, but the company has a strong reputation for technological leadership. It is foremost in offering fiber-optic technologies and packet-switched systems.

■ *Nynex Corp.*

Bypass is a major threat for Nynex. Fortune 500 headquarters and communications/information-intensive industries like banks and information companies saturate its marketplace, and most are likely bypass users. The company is striving to make its local loop more attractive and keep customers on the network.

However, Nynex is also willing to build a bypass system rather than lose a user's business. Nynex has made a major commitment to sales of telecommunications and computer equipment with its Nynex Business Information Services Co. and its Datago retail stores.

■ *Pacific Telesis Group (Pactel).*

Pactel has put major emphasis on international involvement. Although its primary efforts are focused on the Pacific Rim countries, it has established a foothold in Europe with the acquisition of Kensington Datacom, Inc., a British electronic messaging firm. The success of cellular radio in the Los Angeles area has convinced Pactel to commit $431 million to the acquisition of Communications Industries, Inc. and to the future of cellular operations. Pactel has also purchased a chain of retail computer stores.

■ *Southwestern Bell.*

Southwestern Bell continues to place top priority on the local exchange and "plain, old telephone service." For its growth in unregulated business, it has staked out *Yellow Pages* publishing. Its aggressive moves into the high-margin directory publishing could prove to be the most profitable of all the regionals' diversification efforts.

■ *U.S. West.*

U.S. West is the most aggressive and successful advocate of broad-based deregulation of local telephone services. Regulators in the U.S. West region were the first to deregulate Centrex-type services, intra-Local Access and Transport Areas private lines and toll. The company is striving not merely for detariffing but for total freedom from regulatory oversight.

MIS should keep an eye on the regional holding companies. These firms are becoming viable vendors providing valuable services, in particular data communications and equipment as well as systems integration. As regulations ease, the holding companies and their respective operating companies are well positioned to grow. ■

Perry is a senior telecommunications consultant in the Communications Group for International Data Corp., a Framingham, Mass., market research firm.

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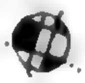

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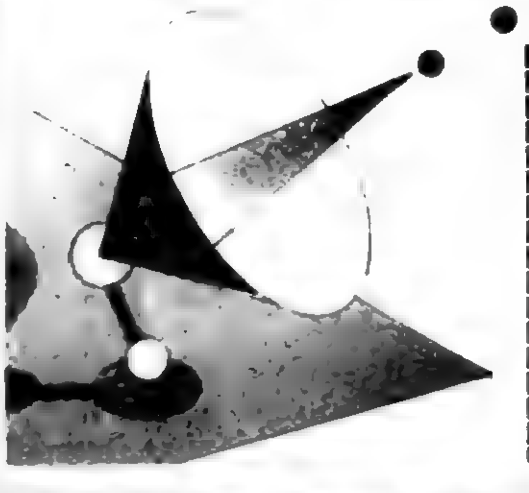

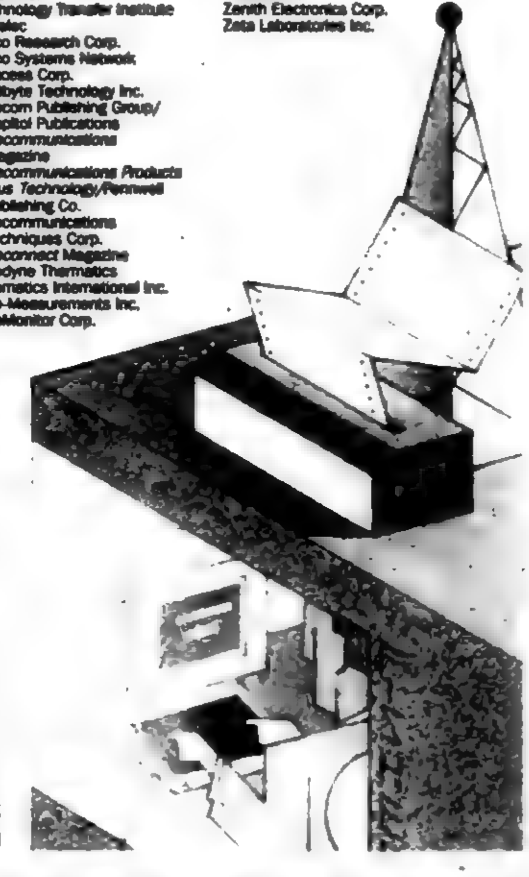

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TECHNOLOGY UPDATE

The Fax Market Takes Wing

·BY·REBECCA·HURST·

Mention improved technology, standards and ease of use, and the first thing that comes to mind is not likely to be facsimile machines. Yet all these qualities describe the faithful fax that has served corporations since the mid-1960s.

These same qualities are contributing to a surge in fax purchases after nearly 20 years of slow, steady growth. Fax shipments have risen to 157,000 in 1985 from 89,000 in 1984, according to Julie Weiss, telecommunications group analyst with San Jose, Calif.-based Dataquest, Inc. The 1986 shipments are in the neighborhood of 190,000 to 195,000, she adds.

Future growth appears equally strong. The U.S. facsimile market will reach $1 billion in 1990 from $525 million today, predicts Nancy Erskine, program director for the corporate publishing strategies service at the Gartner Group, Inc. in Stamford, Conn. This growth will come not only in Fortune 1,000 companies in which faxes already have a stronghold but also in small- to medium-size firms and even in the home-based consumer market, analysts agree.

Among Fortune 1,000 companies, a thrust toward decentralization is expanding the market for facsimile machines. Until recently, businesses customarily used a single, central fax, often located in the mail room. But, recently, corporate purchasing managers reported that they didn't know how many facsimile machines they used, says Leslie Townsend, senior consultant for International Resource Development, Inc. in Norwalk, Conn. "They didn't know how many faxes they needed because the faxes were coming out of department budgets."

Faxes are enjoying burgeoning growth in small- to medium-size companies that employ between 20 and 250 people. There are approximately 697,000 such firms in the U.S., according to the Statistical Abstract of the United States, 105th Edition released in 1985. These numbers represent a huge potential market because companies are increasingly becoming aware of the faxes' capabilities and are able to afford the faxes as their prices come down.

Facsimile vendors have also begun penetrating the consumer market within the last year, she reports. Although there are some 10 million home industries, such as consulting and catering businesses, according to Dataquest's Weiss, this new market is still very small.

To attract smaller companies and the consumer market, facsimile vendors are using new packaging and distribution channels. Some vendors are beginning to offer low-end facsimiles that are small, portable and available in decorator colors such as pink and white, Townsend says.

Other vendors are turning to retail. For example, Canon U.S.A., Inc. is targeting its Faxphone 10, a combination facsimile and telephone, toward home business use, Weiss reports. To reach potential customers, the company is selling the Faxphone 10 through The Sharper Image, a catalog sales company that specializes in gadgets.

The impetus behind the fax's growing popularity is a combination of standards, education, pricing and features. Unlike many communications media, facsimiles have adhered since 1968 to a single set of standards developed by the Consultative Committee on International Telephony and Telegraphy (CCITT).

Though the standards are divided into four groups, CCITT has defined each successive standards group so that all facsimiles adhering to the CCITT standards can communicate with each other. As a result, companies or departments can purchase a facsimile knowing that it will work with the great majority of other fax units in use today.

Education about faxes has increased business's awareness of the machine's potential. "Fax vendors have invested a lot of money in educating people," Weiss says. Canon and Ricoh Corp. have full-page advertisements in *The Wall Street Journal*, while AT&T has radio ads, she notes. The Federal Express Co.'s Zapmail promotional campaign has also contributed significantly to business users' awareness of faxes, analysts agree.

However, Zapmail, one of the most visible fax services, recently became one of the market's few casualties. Federal discontinued its popular but unprofitable Zapmail service in November 1986.

Zapmail's demise will not have a long-term impact on the facsimile market, Weiss maintains, because the market has already gained critical momentum. In the short term, Federal Express will functionally compete as a fax vendor. "The company had taken delivery on a large number of fax units before canceling its Zapmail program," Weiss explains. In addition, Federal Express is expected to sell several facsimile units to the Zapmail customers who have been renting them.

> ”
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> *A drop in facsimile prices combined with new and improved functionality and features are boosting fax use.*

The Japan connection

A drop in facsimile prices combined with new and improved functionality and features are also boosting fax use. One factor is the dominance of Japanese vendors in the facsimile market, according to Gartner Group's Erskine. In Japan, faxes have played a much more important role in communications because facsimiles are an effective way of transmitting Japanese idiographic Kanji characters. Therefore, Japanese vendors have pushed the development of features that enhance ease of use and have also steadily driven down prices, Erskine says.

As a result, business managers can choose from a variety of easy-to-use facsimiles for a reasonable cost. In tangible terms, this means a user can get a CCITT Group III fax that transmits at a rate of 15 seconds to 1 minute per page for between $2,500 and $3,500. This fax is also likely to include several popular features such as automatic dialing, broadcasting and store and forward.

Broadcasting permits the facsimile to transmit to several places at once rather than separately. The store-and-forward feature allows users to scan information into a fax, enter a phone number for a receiving fax and command the facsimile to transmit the information at a later time. For another $1,500 or so, business users can find some facsimiles that will print out their transmissions on plain bond paper. The majority of faxes, however, still use the less expensive thermal transfer method.

Most of the facsimiles in use conform to CCITT Group III standards, and this trend is likely to continue for the next few years. Group I, II and III facsimiles all work over standard public phone lines, but earlier Group I and II faxes are analog and take anywhere from 2 to 6 minutes to transmit one page. Group III and IV units are digital. All Group III machines can transmit a page in less than a minute, and many can do so in less than 16 seconds. Also, the resolution of Group III faxes is 200 dot/in. compared with 96 dot/in. for Group I and II units.

Group IV facsimiles are faster than Group III units, and they have higher resolution standards. Transmission rates for Group IV faxes are no greater than 10 seconds per page, and some have a 5-second rate. Moreover, Group IV's resolution is 400 dot/in., greater than the 300 dot/in. resolution of laser printers such as Apple Computer, Inc.'s Laserwriter.

Despite these advantages over Group III machines, Group IV faxes will not be used widely for some years. Most of the major facsimile vendors have Group IV units, International Research Development's Townsend reports, but the $10,000 to $15,000 price tag is prohibitive. People are reluctant to replace their current facsimiles, which cost several thousand dollars less, she says.

Perhaps more importantly, many firms do not have the communications capabilities to support the Group IV faxes. Group IV faxes require 56K-bit cables running on wideband networks, Townsend explains. Two common carriers of Group IV are expected to be T1 networks and Integrated Services Digital Networks (ISDN). However, it will be at least two to three years before the availability of ISDN and T1 networks is great enough to make Group IV machines viable.

No Group IV faxes on ISDN until 1990

Dataquest's Weiss is less optimistic. "Group IV facsimiles on ISDN will not be a reality until the mid- to late-1990s," she asserts. Until then, there will be limited use for Group IV because most companies do not run private digital lines, Weiss says. "The cost of converting the central office switch to ISDN is phenomenal." Consequently, the Group III fax still offers the best performance for the dollar, analysts agree.

Group III facsimiles are available in a proliferation of both stand-alone systems with a variety of features and combination products that add copier or telephone functions. Such combination products are aimed at users who want fewer devices on their desks and a chance to keep more funds in the corporate or departmental budget.

The fax-copier duo is a natural and effective strategy, according to Townsend. First, she explains, "because there are so many products being manufactured for the desktop, there is an inherent advantage to any device that serves more than one function." Second, the unit cost of a combination product is greater than that for an individual copier or facsimile, but it is less than the sum of the two units' costs. Therefore, Townsend says, these combination units are easier to sell.

The advantages of a fax and phone unit are similar. Users are attracted by its light, compact size and the cost savings of a two-in-one product, Dataquest's Weiss reports. These fax phones are aimed at upper level executives or home-based businesses, she says. Both Canon's Faxphone 10 and Mitsubishi Corp.'s Model 3160 are faxes with built-in phones.

One potential problem for these units is that the phone and fax share the same phone line. Most vendors have handled the situation by providing the fax with a buffer that holds received tranmissions and signals to the user that a message is waiting.

The most exciting development in combination facsimile products, however, is personal computer fax boards, according to Gartner Group's Erskine. It is perhaps the most active area of facsimile innovation, garnering interest and products from both fax vendors and PC software developers.

Facsimile companies, such as Panasonic Industrial Co. in Secaucus, N.J., and Murata Business Systems in Dallas, introduced PC fax products last year. Several software and peripherals vendors, such as Datacopy Corp. in Mountain View, Calif., Gammalink, Inc. in Palo Alto, Calif., and Advanced Vision Research in San Jose, announced PC fax packages as well. However, only Panasonic and Gammalink have made their products generally available since 1986. The others are scheduled to ship sometime in the first quarter of 1987.

The basic PC fax package consists of a modem board and software that converts computer files to facsimile format. The modem board, which conforms to CCITT Group III standards, fits into IBM PCs and compatibles. Using a fax conversion product with a PC, a user can send files to any fax without printing the material out first. Because of the graphics nature of faxes, these files can include not only text but graphics.

For some users, fax modems are an enhancement to the PC that allows them to cut some steps between creating documents and sending them via a fax machine, according to Weiss. PC faxes also allow corporations to leverage their PCs by adding fax functions without fax costs, Erskine adds. Most PC fax conversion products range from $1,000 to $1,500, about $1,500 less than standard Group III fax machines.

PC faxes are also viewed as remote scanners in businesses that perform computer-aided publishing or design, says Rolando Esteverena, president of Datacopy. Using a PC fax, he explains, "users can scan a drawing into a PC and send it to a remote fax." Additionally, the PC fax has applications in firms that rely on image data bases. For example, an on-line parts catalog that provides descriptions and illustrations can be updated through the PC fax and sent to branch offices.

The potential installed base of PC fax users is huge. There are 20 million to 30 million IBM PCs and compatibles in use today, Weiss says. However, PC faxes will not usurp their stand-alone facsimile siblings. "There's still a large percentage of documents sent via facsimile that are not generated by the PC." As a result, Weiss maintains, PC faxes will only enhance the market. ■

Hurst is a Computerworld Focus *senior writer.*

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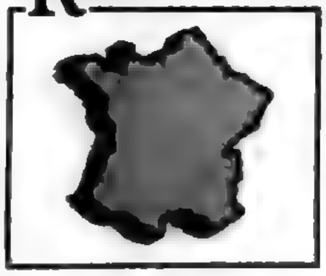

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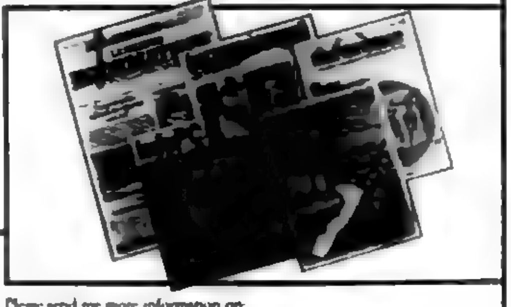

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SECURITY PLANNING

Take A Byte Out Of Crime

Because data is a strategic resource, MIS must learn how to safeguard this precious commodity.

•BY•REBECCA•HURST•

True-life stories of 14-year-old hackers with access codes to the computers of major corporations and financial organizations losing millions of dollars in mysterious fund transfers have circulated for years. In response, executives are beginning to heed the warnings and implement data security systems.

Putting together a data security system is a good first step, but it is only one part of a larger solution. To provide complete data security, data processing managers and MIS professionals need to understand the nature of computer crimes and the type of people who commit them.

MIS also needs to educate both upper management and end users about the importance of security and the company's ethics. By doing so, managers can develop a security system that extends beyond data processing to encompass the entire organization.

Unauthorized computer access occurs primarily among two groups of users: computer hackers and company employees. Most managers are familiar with the stereotypical hacker who breaks into various corporate and government computer systems, often for pleasure rather than profit.

For these hackers, technical security measures such as passwords and encryption are a challenge, says Bill Kirwin, program director for personal computer policies and strategies at the Gartner Group, Inc. in Stamford, Conn.

GREG WENZEL ILLUSTRATION, BY PERMISSION OF THE AD COUNCIL

"Hackers exist to overcome the challenge of the latest and the greatest," Kirwin explains. "Some people make a hobby of getting around copy-protection systems. When a new software product comes out, they run out and get it. They do it for self-glory."

A number of products are available that protect the computer data from the hacker, says Sanford Sherizen, president of Data Security Systems, Inc. in Natick, Mass. However, he notes, the growing crime problem is authorized users performing unauthorized acts. "We're not afraid of hackers; we're more concerned with someone in the company getting in where they have no business," concurs Harvey Shrednick, vice-president of information services at Corning Glass Works in Corning, N.Y.

Such unauthorized users may be individuals who accidentally get into the system and decide to explore, according to Wayne Cerow of Cerow Investigation and Consultants in Phoenix. More often, computer crimes are committed by disgruntled employees. Users who feel they should be getting a larger salary may program the accounting system to send all percentages of pennies to a personal account, Kirwin says. Other employees may put a time bomb into an application so that it self-destructs if their employment is terminated, Cerow explains. "An employee can also encrypt a software package and essentially hold it for ransom."

In addition, the trend for internal crime is moving from the individual to employees in collusion. "The bad news is that a couple of authorized users working together can cover each other, so it's more difficult to detect," Sherizen says.

The good news, according to Sherizen, is that separating the duties of employees seems to work in preventing these crimes.

Unauthorized users are typically trying to access the corporate mainframe, but the weak link in security comes with microcomputer-to-mainframe connections and dial-up capabilities. "Integrity of the mainframe data base is not a problem; there's adequate protection," Kirwin says.

Also, there are several mature mainframe security products available including Remote Access Control Facility from IBM, Top Secret from Computer Associates International, Inc. in New York and ACF2 from the Cambridge Systems Group in Santa Clara, Calif.

On the priority hit list of security issues, No. 1 is the ability of a personal computer to capture data that is resident on a mainframe, Kirwin says.

"Once data is captured, it's out of the computer room and susceptible to intrusion by people who want to access sensitive information." This information can be carried out on a floppy, he says. "It can also be changed on the PC and incorporated into a report that misrepresents the data."

SECURITY PLANNING

> *'Computers control assets that used to be stored in a vault. Now the computer has to be treated as a vault.'*
>
> **— Wayne Cerow**
> **Cerow Investigation and Consultants**

Kirwin claims there are three levels of cooperative processing with micro-to-mainframe links: straight terminal emulation, the ability to upload or download data from the mainframe and the ability of a mainframe application to talk to and cooperate with a PC application. As the level of interaction increases, so does the potential damage to mainframe data.

Emulation fairly secure

Terminal emulation is fairly secure because users can only look at the data. PCs that can download data extracts are a greater security risk because data can be manipulated and taken out of the office, Kirwin says.

However, this level of access does not corrupt the mainframe data base because the user is only accessing a file created from the data base.

The greatest security threat comes from a distributed network data base management system in which a product such as Oracle Corp.'s SQL Star or IBM's R Star allows the PC to pull data from the mainframe data base, Kirwin asserts.

A related PC security problem also comes up when users log on using a macro program, Kirwin states.

"Personal computers have macros that do sophisticated things like awaken the PC, log on to the mainframe, give a password, download a data extract onto the PC and log off." Typically these macros are not protected by encryption.

A simple remedy is to prevent or dissuade users from using macros, but implementing this solution is far from simple. "It's a high benefit to users to create files without having to log on," Kirwin says. "Higher security gives users more incentive to go around it by using a little macro program."

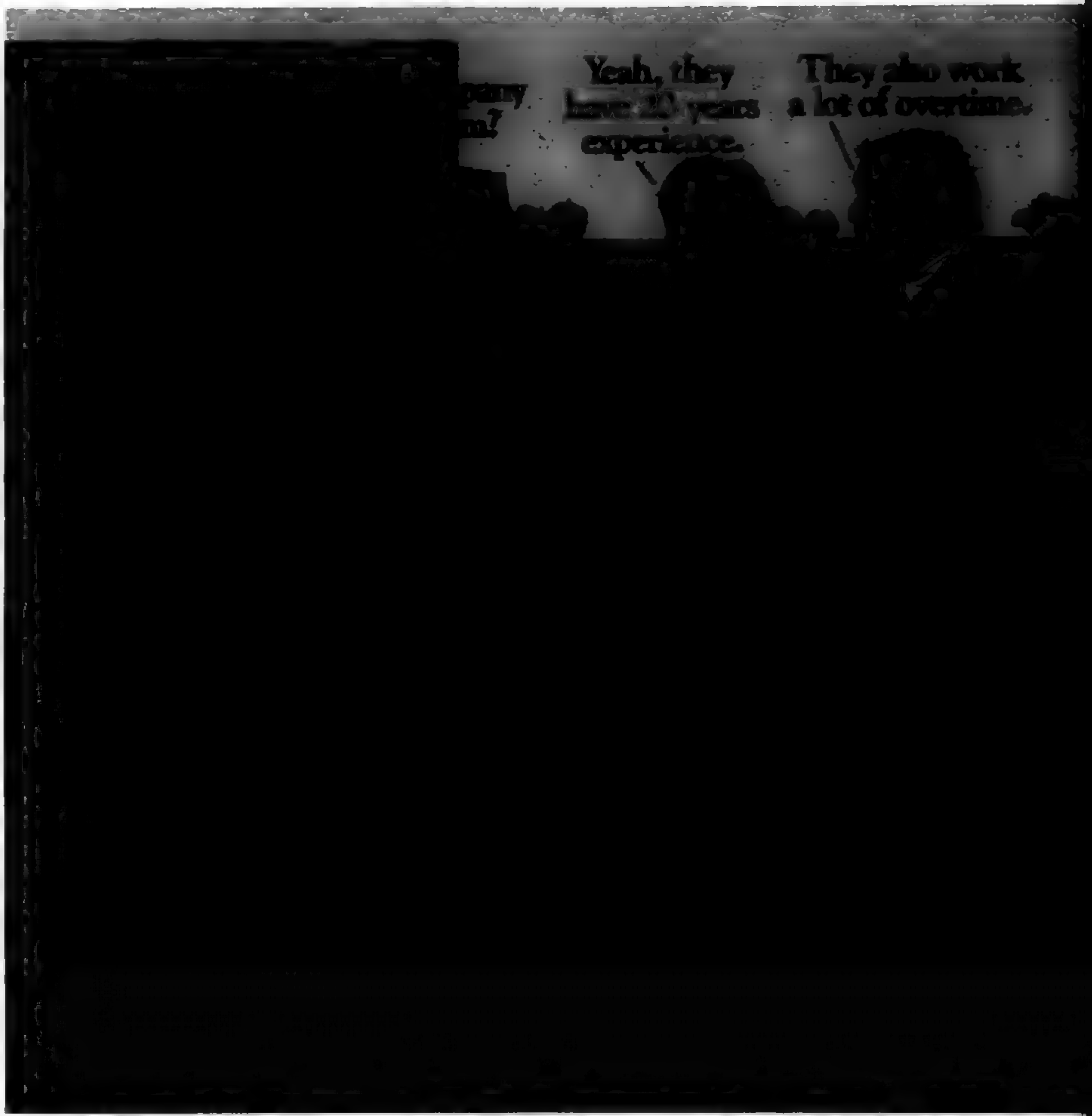
Micro-to-mainframe communications packages contribute to the problem. Typically, these communications packages have an ease-of-use option using macros, but there is no way to disable it, Kirwin says. "Smart software manufacturers would allow this to be disabled," he asserts, "but offhand, I don't know of any companies doing that."

Other options include putting the macro programs in a hidden file or encrypting them so that an unauthorized user could not see them, Kirwin suggests.

The other potential problem with mainframe links is dial-up capability, or remote logon. Dial-up access offers a greater potential for effective intrusion because an unauthorized user can pull data off and run programs locally. "Whenever you have dial-up capability, you have primary vulnerability," Cerow agrees. With dial-up access, a company cannot tell from where someone is calling. "It could be a 747 flying over London," Cerow says. "It's very difficult to track."

One protection from dial-up intruders is a call-back device and password system, Cerow says. In this system, each password is connected with a specific location. When a user calls in to the mainframe, he gives a password. The call-back device then dials the phone number associated with the password. If the user is not at the location at which he is supposed to be, he cannot log on. However, Cerow says, "many people have gotten around this by using call forwarding."

Two other common forms of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SECURITY PLANNING

data security are passwords and encryption.

Passwords or user identifications are used to control the level of access a user has. The problem with passwords is that they are easily stolen or guessed, Sherizen explains.

Change passwords regularly

Also, passwords lose their effectiveness if they are not changed regularly. "A lot of companies do not change their passwords when an individual leaves the company," Cerow says. "This person could still go into the system."

At Corning Glassworks, passwords are the primary security device and are changed regularly, Shrednick reports. "Low-security passwords are changed every 90 days," he says. "For more confidential files, we change the password every 30 days."

When employees' positions are terminated, Corning removes their access to corporate files. "In the system, we have a termination list that is checked against our security list," he says.

No encryption at Corning

Corning uses two levels of passwords; users have one to log on and a second to get into specific files. This system fulfills the company's data security needs, Shrednick states. "We don't use anything way out like encryption. Our files are not that sensitive."

The reluctance to use encryption at Corning is reflected by many corporate managers. "Encryption has increased in use, but it is not popular," Sherizen reports. "People say it's cumbersome and expensive. They feel it's not as appropriate outside the government and financial institutions."

Yet, encryption has become more affordable, Cerow argues, and as a result, he expects to see encryption in more communications products and computers.

An area in which Cerow recommends encryption code is computers that use leased lines. Many managers don't realize that a leased line will travel through the same telephone switching, fiber optics and microwave satellite path that normal phone communications do. The communication on these lines can be intercepted and monitored, and the data can potentially be decoded.

However, technical solutions such as passwords and encryption only solve part of the security problem, analysts agree. "Technical security controls will only keep honest people honest," Kirwin asserts. "An effective security system requires education, effective policies and a corporate culture that recognizes the importance of data security. The more you have of that, the less technical controls you need."

The barrier to making security management decisions for many corporations is that they do not even realize the risk to their security. Managers have not done a risk analysis that quantifies the potential exposure to security violations, Kirwin explains. "Those that have have put the brakes on micro-to-mainframe development because it takes time to put in security measures."

One cause for this lack of awareness is that many upper level managers do not realize that the traditional controls have been undercut by computerization. "Computers control the company assets that used to be stored in a vault," Cerow says. "Now the computer has to be treated as a vault."

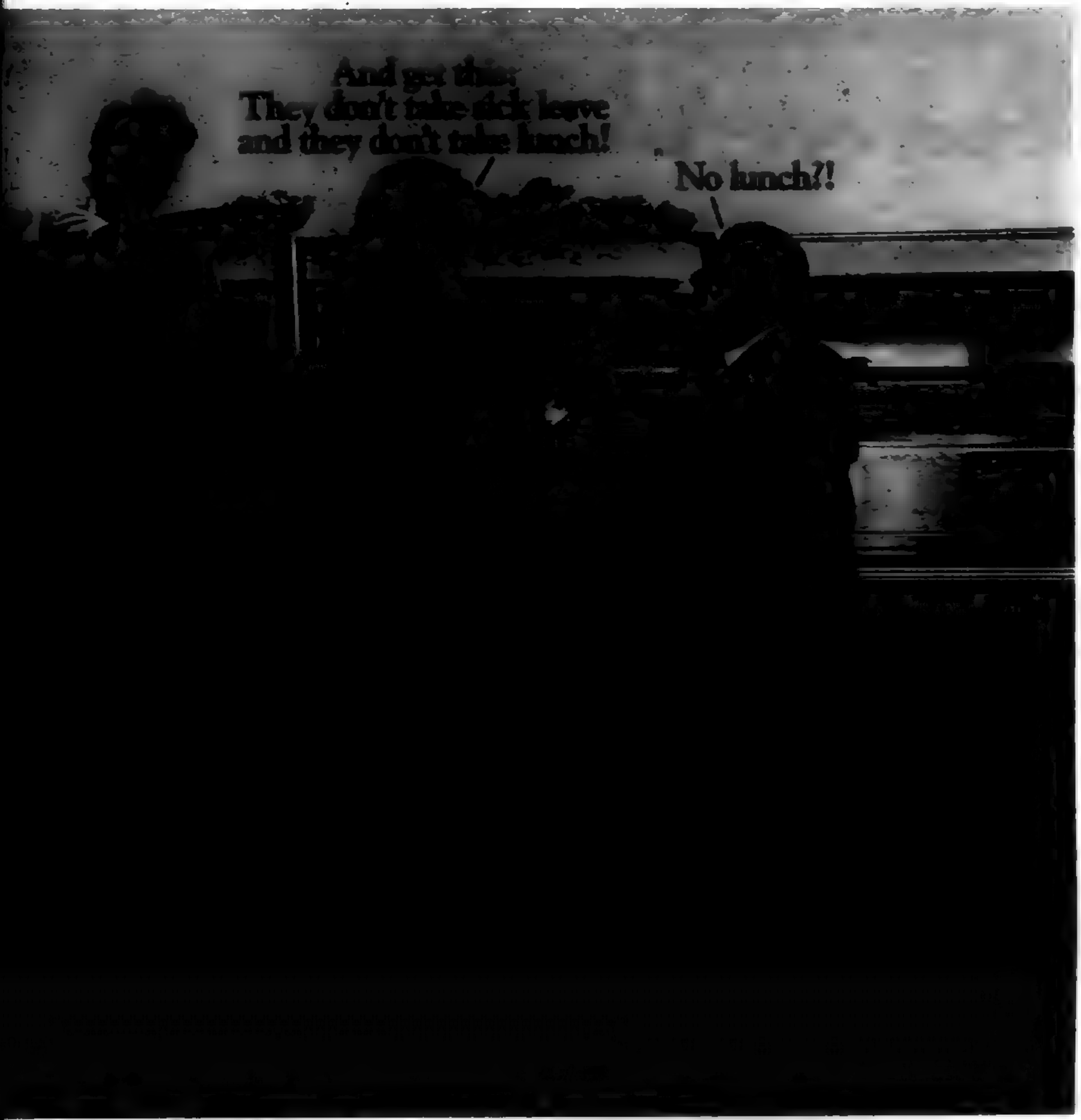
Conditions ripe for crime

In addition to locating security risks within the computer system, managers should also identify the conditions under which computer crimes are committed. Two conditions that affect computer crime are corporate culture and timing.

Certain environments are more conducive to computer crime, Sherizen states. For example, users who sense that managers are afraid of computers or don't know how to use them are more likely to abuse computer access, he says. The same is true in companies in which users do not perceive computer security controls.

Managers should also be aware that many people know exactly when to commit crimes. For more traditional burglaries, the best time to strike is when a police department is changing shifts, says Sherizen, a criminologist by training.

Similarly, computer criminals look for times when production pressures are heavy. Sherizen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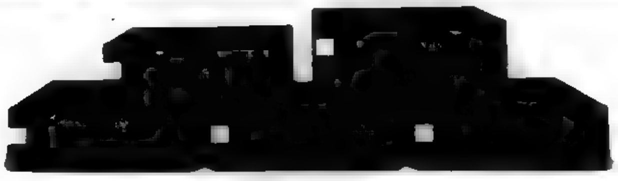

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says. At that time, computer systems are more heavily loaded and employees are off guard. "Fridays are often heavy days, as is the day before a three-day holiday," he notes. "Much of December is also a good time to strike."

More security at peak times

Given these considerations, DP managers can help protect their computer systems by stepping up security during peak performance periods.

In setting up a security system, DP managers need to decide the levels of access available to groups of users within the corporation. These decisions include whether a user should have access to certain files at all and whether that access will include the ability to inquire, download or upload information from the mainframe or departmental computer. Perhaps the most debated issue, though, is the ease of access.

"What people want is universal access and universal protection," Sherizen claims, "but there has to be a trade-off." As more personal computers are connected to mainframes, protecting data is becoming more difficult. At the same time, people are complaining about how onerous logging on to a mainframe is, he notes.

The solution, Sherizen says, is not to make access too easy. "Every time you make a computer system more user-friendly, you potentially make the system abuser-friendly." Also, users should be actively involved in logging on so they play a role in detecting unauthorized access, he asserts. "If you log on and see that someone was on your system yesterday when you weren't there, you should know about it."

Other managers and consultants emphasize the need for ease of use. "We're weighing ease of use with the security of the system," Corning's Shrednick says. "We don't want to inhibit users by setting up too many procedures, rules and regulations. Balance is the key."

Counterproductive measures

Making security too difficult to use can be counterproductive, Gartner Group's Kirwin agrees. "It's like a burglar system that never gets turned on because it's too easy to set off by accident." The more difficult a security system is, the more users will try to go around it, he argues.

Finally, users must be educated not only in the use of security systems but also in their importance to the corporation. Before a security system is implemented, DP managers may find that they have to educate upper management.

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> *'[As] you make a system more user-friendly, you potentially make [it] abuser-friendly.'*
>
> **— Sanford Sherizen**
> **Data Security Systems, Inc.**

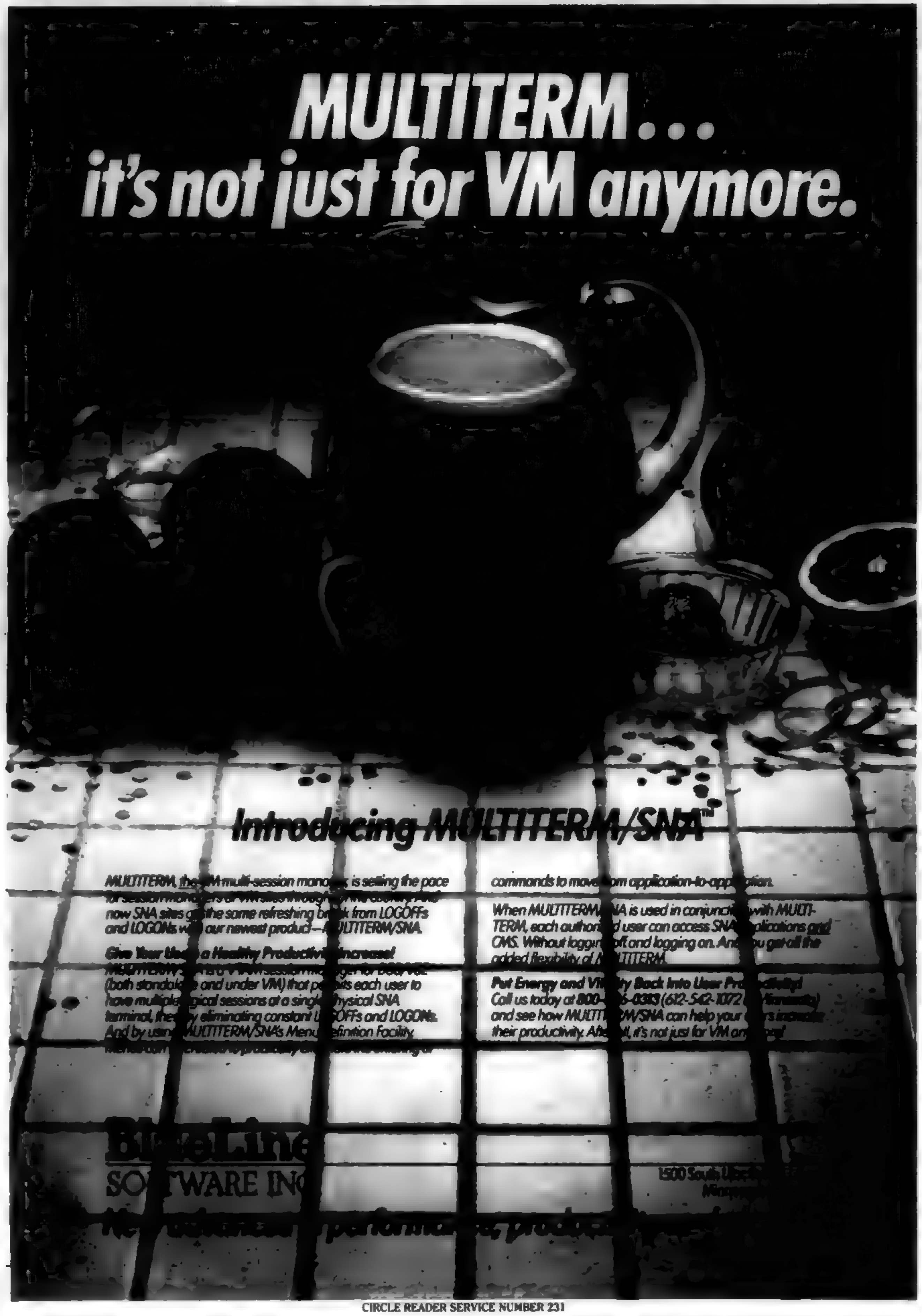
Security is cost-effective, Cerow says, but managers ask, "Where's the return on investment?" Security is more like an insurance policy, he explains. "A lot of managers have to do some hard thinking about that."

Managers have to educate users in general about corporate policies, Sherizen states. "People don't have a sense of whether they're doing something unethical or illegal."

Part of the confusion stems from a tradition of corporate perks. Former office protocol accepted that employees will take pens, pencils and paper as perks, he explains. In the new office protocol, people believe it is all right to take home a disk or use a computer for personal purposes. "They're not faced with a guide for what's appropriate," Sherizen claims.

The goal is for users to take responsibility for data security. "When they go to lunch, they should turn off their terminal or PC, and they should keep their floppies locked up," Kirwin explains. More importantly, he says, "They should want to do it." ▣

Hurst is a Computerworld Focus *senior writer.*



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SPECIAL SECTION: LOCAL-AREA NETWORKS

Net Management: Streamline Your Data Flow

DAVE RIDLEY

•BY•JAMES•HERMAN•

Communications technology is advancing at an astounding pace, and barriers to information flow are continuing to crumble. Fueled by a new generation of powerful microprocessors, the number of devices linked by information networks is expected to escalate as never before. But MIS must carefully manage the rapid growth of this new data infrastructure to the benefit of its organization.

There have been revisions to the definition of network management. Five years ago, the concept was not even known as such but referred to as network control. Patch and test facilities aimed at diagnosing circuit and modem problems were the mainstay. Operators concentrated on getting the problem pinpointed well enough to know whether to call the phone company. Analysts concentrated on optimizing the network to achieve 90% utilization. Changes occurred at monthly intervals or longer, and, in general, network control was not seen as a major investment.

Today, network management is a different discipline. Network operations specialists are supported by sophisticated systems that automatically detect and sometimes even diagnose failures on a variety of equipment. Analysts expect real-time displays of network performance data. Configuration management specialists provide rapid, continual response to changing network applications, users, devices, tariffs and services. Corporate management expects integrated reporting on network effectiveness and usage.

Network management systems are evolving to achieve this new level of effectiveness. The leading-edge information technologies that are at present transforming industries from manufacturing to financial services will be turned to the problems of network management.

As large organizations expand their repertoire of communications technologies, they also expand the number of network management systems they employ. But this proliferation of network management brings with it various problems. Complicated network situations may necessitate correlating data from many systems, which can be difficult. Operators must learn multiple command sets and user interface conventions. Sometimes it is hard simply finding a room to locate each piece of equipment. Achieving an accurate picture of the end-to-end situation is critical.

Leading vendors are addressing the area of network management. IBM has made an important step in integrating some of its own network management products through Netview, a product that provides a single network software tool for accessing a variety of capabilities.

Managing a multiple vendor environment is difficult and not likely to be resolved for a number of years. Resorting to a single vendor for communications equipment is not a solution either, because no vendor, not even IBM, is able to provide all the capabilities that a large, multiple business organization needs. For the most part, vendors have chosen closed, proprietary means for managing their network components to induce customers to purchase only their equipment.

However, there are some efforts in the industry, like that by Avant-Garde Computing, Inc., to provide integrated consoles that permit operators to use a standard command language. These products act as front ends to management systems, translating commands into the syntax required by the target system. This approach offers only limited relief from the problems of proliferating consoles and diagnostic tools because it can only handle a limited set of functions.

The development of standard interfaces, protocols and data element definitions for basic network management functions may be the answer. Progress is seen in two areas: IBM's Systems Network Architecture and the International Standards Organization's (ISO) Open Systems Interconnect (OSI).

IBM has recently published the specifications employed in its network management systems. By publishing its specifications, IBM

SPECIAL SECTION: LOCAL-AREA NETWORKS

is making available to other firms the raw material from which to build compatible products for IBM environments.

In the long run, integration of management functions and systems for multivendor environments can only be accomplished through the development of vendor-independent international standards such as those promulgated by the ISO.

Although the standards bodies have been late in realizing the need for standardization in the area of network management, this problem has now come to their attention largely through the Manufacturing Automation Protocol. The ISO has started to expand its OSI model to include what is called the OSI Management Framework. Once this framework is complete, specific definition of protocols and data dictionaries can begin.

The Management Framework defines level managers at each protocol level parallel to the peer entities that implement the OSI protocols. Level managers provide management functionality such as statistics collection, performance monitoring, access control and activation.

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> *The ideal network management system will give a company the ability to make the right choices and get the best deals using extensive data bases and decision support systems.*

Data generated and used by the management function is stored in a conceptual entity called the Management Information Base, which can be colocated with the device being managed or can be remotely accessed at a specialized management system. A special application process, the System Management Application Process (SMAP), communicates among devices and specialized management systems to exchange data and control operation. SMAPs communicate with each other using standard OSI protocols.

The existence of international standards will provide a common means of exchanging management information between systems. Standards will also allow for the development of integrated monitoring systems that combine information from a variety of subordinate, vendor-specific management systems. Eventually, the standards will be incorporated into network switches and servers, completely unbundling the management systems from the devices they manage.

Most large organizations have taken some steps toward integrating the management of their voice/data systems. Leading-edge users are deploying transmission backbones based on T1 circuits that serve both voice and data needs. Planning is now under way for a migration to integrated switching of voice and data circuits. As voice and data become integrated, it will simplify the network environment.

Integrated communications networks will require integrated operations and management. Yet, voice and data systems have traditionally been managed in very different ways.

Voice systems, primarily private branch exchanges, are usually managed on a decentralized basis using local consoles. Data systems like modems and packet networks are usually managed on a centralized basis, utilizing remote management systems that use specialized protocols to communicate with the devices they manage. Most likely, the integrated handling of voice and data will lead to more centralized control and configuration of voice equipment.

Dynamic resource allocation

As organizations build integrated communications backbones to service voice and data needs, they open up new possibilities for dynamically controlling the use of the bandwidth resource. These backbones are usually built using private switching systems made by companies such as Network Equipment Technologies Co.

AT&T offerings such as Customer Controlled Reconfiguration, Software Defined Network (SDN), Accunet Switched-56 and their counterparts from the other common carriers are examples of dynamic services that allow similar control using the public networks.

Network management systems must evolve to meet the challenge of managing the bandwidth inventory of an organization. They must provide tools for analyzing the capacity needs of an organization in real time and suggesting changes in allocation or quantity of resources. Systems capable of responding to special situations such as videoteleconferencing or a nightly bulk data transfer for backup purposes will also be necessary.

Dynamic transmission services are part of a larger trend toward measured services in which the user pays on the basis of usage. Network management systems can be important elements of managing future communications systems that rely on such measured services.

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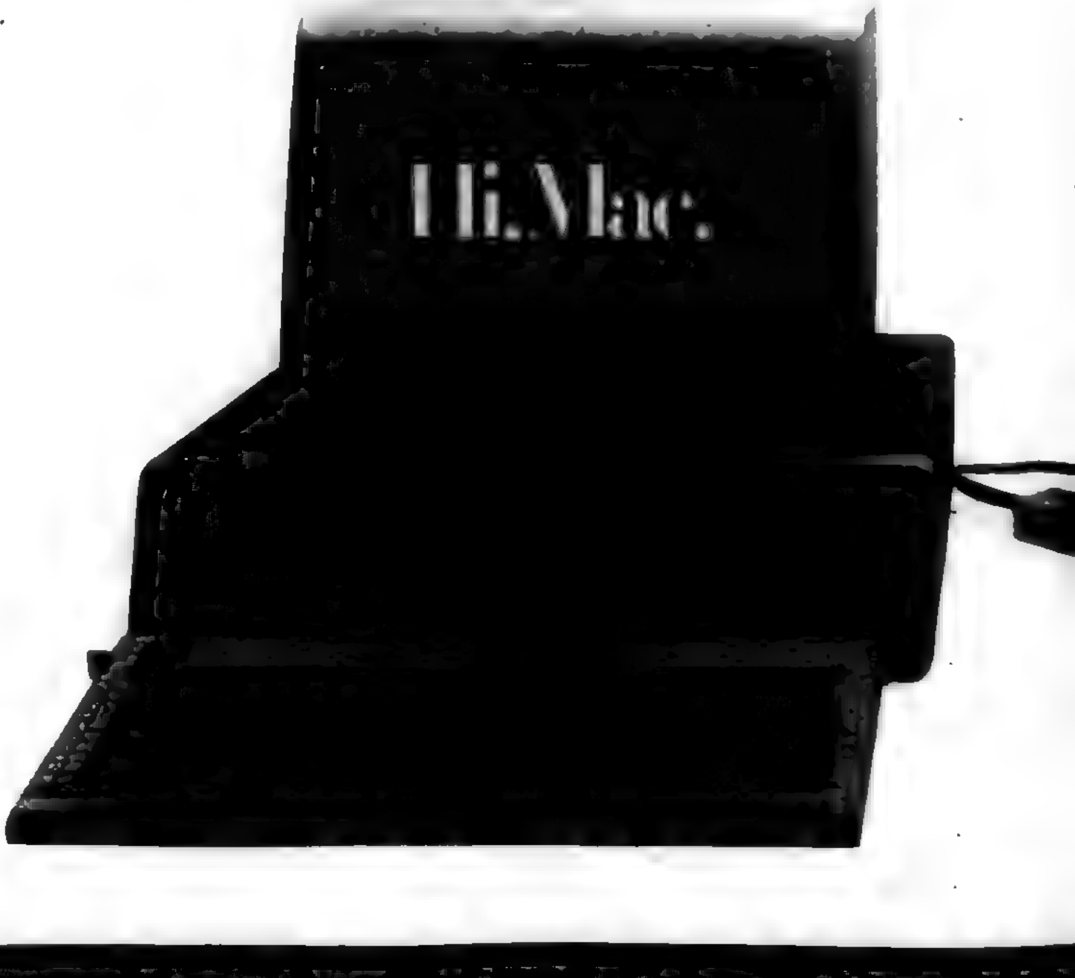

SPECIAL SECTION: LOCAL-AREA NETWORKS

Net management systems will be needed to optimize the mix of transmission services in real time, choosing those that offer the best price for the need at hand. The deregulation of the Bell system should continue to increase cost competition. The ideal management systems will give an organization the ability to make the right choices and get the best deals, using extensive data bases and decision support systems.

Another trend in carrier services that will affect network management systems is the likely increase in feedback from the public networks concerning the status of network transmission. Manipulation of dynamic services as described above is an example of this trend, but more general advances will come under the banner of the Integrated Services Digital Network (ISDN) revolution. One of the major features of ISDN is the use of the D channel for protocol-based signaling with the telephone company, which will have profound implications for management of private networks.

Although some observers predict that ISDN will mean the end of private networking, it is doubtful that such a complete change in corporate attitudes concerning the need for private networks will take place within the next 10 years.

The best of the public/private worlds

Instead, telephone company services such as SDN and ISDN will provide elements out of which to build private networks. They offer the possibility of a flexible, hybrid public/private networking approach that will allow the sophisticated organization to obtain the best of both worlds.

Hybrid networks require significant attention to network management and require close coordination between private network management and the management facilities of the public carriers. The carriers will be continually improving the range of management services that they provide and will even be offering to manage private network components from their public operations centers. For example, Pacific Bell has announced a turnkey network management service called Spectrum that may be copied by other divested Bell operating companies.

There are many interesting possibilities that these services suggest. It may be possible to use Bell operating company capabilities as backup to a privately run network operations center, either for redundancy for network operations center equipment outages or to cover for off-hour shifts and weekends rather than providing 24-hour, in-house staffing.

A specific area to consider in examining future services from the carriers is the possibility of exchanging network status information between the private and the public network. Automatic notification of the carrier when circuit failures are detected is one important possible feature. Improved carrier diagnostics on connection status is another.

Automated network management

Automated notification of circuit providers when failures occur is only one small step toward the real goal of automated network management. Given the increased complexity of today's communication systems and the labor-intensive nature of network operations, it is necessary to find ways to use fewer people to accomplish the same tasks.

Through increased automation, operators will be trained more quickly and network management systems can be designed to help them make fewer mistakes. Automation can also have the benefit of shortening the time needed to respond to a problem by eliminating the need for an operator to recognize the condition and activate the proper response.

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The most effective technique for automating network management is embedding it in the network itself. In this way, network devices are programmed to adapt to conditions without intervention. When sufficient equipment and circuit redundancy exists, devices can automatically invoke backup systems when failures are detected.

An example of such a mechanism is an automatic adaptive routing algorithm in advanced packet networks. This routing mechanism allows a network to respond automatically to circuit failures and changes in traffic loading. It does this without intervention and without the use of pregenerated tables of alternate paths. Some vendors' packet switches as well as T1 switches offer similar capabilities. IBM's Low Entry Network also has a self-configuring, adaptive routing capability.

Embedded network management, while feasible for certain functions, cannot entirely replace the function of the

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> *A number of vendors have begun to apply expert system technology to the network management problem.*

centralized network operations center. The most promising technology for automating network operations center functions is the use of expert systems and other artificial intelligence methods.

A number of companies including IBM, DEC, Avant-Garde and BBN Communications Corp. have begun to apply expert system technology to the network management problem. Such systems prompt operators to run specific tests or to take certain actions such as contacting a circuit provider. Eventually, these systems may be capable of actually performing complicated diagnostic sequences without human intervention.

Current research is pursuing the idea that the end user is best suited to resolve most communications problems or at least to activate an appropriate bypass mechanism while the problem is being fixed. In the future, automated network management systems will provide users who are having difficulty with the likely causes of system failure and give them assistance in getting the problem resolved or in finding an alternate means of establishing a connection. If this approach is eventually successful, it could lead to a dramatic reduction in the need for dedicated operations staff.

However, automated network management products are still many years away. In the meantime, improvements in operator productivity can best be gained by improving the user interfaces that invoke network management software.

Color graphics displays, with pointing devices such as a light pen, a mouse, or a touch-sensitive screen are on the market. Such displays give the operator a picture of the network and indicate the status of its components by using color. They allow the user to see the relationships between individual network components and make it easier to deduce cause and effect.

Also, integrated voice/data workstations, stations that have a telephone handset and a full-function data display combined into the same unit, should have a natural application to network operations center environments. Network operators spend considerable time on the telephone dispatching repair personnel and responding to user questions while at the same time using their computer support systems to interact with the network. A voice/data workstation would allow for automated dialing of service providers, automatic logging of incoming calls and integration of dispatch activity with the problem tracking system.

Perhaps, eventually, advanced capabilities will be applied to network management problems. These might include natural language query capabilities or even voice recognition systems. Systems that use speech output are already beginning to appear.

Operations center backup is critical

As networks become increasingly crucial to the organization's daily business, reliable backup for the operations center becomes critical. Backup planning must anticipate the disabling of the site at which the network operations center is located due to fire or natural disaster. Most backup approaches rely on redundancy and, therefore, call for the establishment of an alternate center.

Implementation of a backup network operations center capability requires complex software to maintain the network configuration data base on both systems. This requires some form of a distributed data base system, which is still a challenging technical problem.

In systems that implement multiple centers, network components also need some mechanism for redirecting their status reporting to the backup operations center and some way of knowing the addresses of all centers on the system.

The concept of alternate network operations centers can be generalized to include the use of three, four or more operations centers per network. The addition of extra network operations centers can provide additional redundancy or can provide for specialization of individual centers. Specialization can occur on functional or geographic lines.

In the long run, we may see a network of management systems established above the communications network itself, with each management system in constant communication with others to receive and distribute status and configuration information.

Cooperatively, management systems will provide comprehensive, automated and standardized facilities for measurement, tuning, fault isolation, access control and cost optimization. Such a system could be a strategic weapon for an organization. ■

Herman is director of the Telecommunications Consulting Group at BBN Communications Corp. He has more than 12 years of experience in communications systems design and has managed the Arpanet and Department of Defense's Defense Data Network.

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CIRCLE READER SERVICE NUMBER 249

SPECIAL SECTION: LOCAL-AREA NETWORKS

Users Appraise Value Of LANs

DAVE RIDLEY

·BY·STAN·KOLODZIEJ·

The local-area network (LAN) industry is healthy, although a little paler than expected. Sales and installations of LANs continue to climb, but not as high as some had predicted a few years ago. IBM's Token-Ring Network certainly expanded the market, but it hardly created a revolution or momentous shakeout among vendors. In fact, IBM's open connectivity has made room for more LAN vendors than might otherwise be around today.

And contrary to previous forecasts, LAN installations have not grown to huge proportions. To be sure, there are large LAN installations, but the trend, despite vendors' claims, is definitely toward smaller being better.

Also, LANs have not made the anticipated dent in the micro-to-mainframe market. In fact, many LAN and micro-to-mainframe vendors are sharing components and clients to help expand both markets.

LANs have garnered their share of criticism from industry analysts and users who claim vendors have overpitched their benefits while delivering underwhelming products. LANs have been criticized for creating as many problems as they solve.

Computerworld Focus asked some MIS managers their views on LANs and LAN vendors and what they would include in a LAN wish list.

Bruce Fryer, systems manager at Travenol Laboratories, Inc. in Springfield, Ill., has just finished installing three different LANs based on Nestar System, Inc.'s Arcnet topology. One of the networks, a 42-user LAN, uses PC/Focus-Multiuser, a LAN implementation of PC/Focus, which is a data base management system (DBMS) from New York-based Information Builders, Inc. The networks are used to update inventory and as a help line for product support.

Fryer says he opted for the Arcnet configuration because the topology is easy to set up and he is unrestricted as to the number of file servers that can be used. The Nestar LANs were also selected for their speed and built-in security features.

"We looked at the [IBM] Token-Ring, but it used too much memory. We also have an eye to the future, and when we told IBM that we would someday like to run IBM 3270 Personal Computers on the Token-Ring using APPC [Advanced Program-To-Program Communications], we were led to believe there wouldn't be much memory left."

Though Fryer says he and others at Travenol Laboratories have made the right LAN decisions for their applications, he adds that there is much room for improvement. "What I would like to see in LANs are more network management packages that tell you how much time users are spending on the network," he explains. "We have a diagnostics package in place, but there is nothing built in and nothing that does user logging. I feel more users are going to put pressure on vendors to beef up their network management systems."

Fryer also says that his network needs more performance and speed and that the system bogs down when there is heavy access to the Focus data base.

"I think the new Intel Corp. 80386 computers are going to put more fizz into networks, and there are going to be more servers carrying Motorola, Inc. 68020 processors."

Fryer cautions potential LAN users that they should try to make sure that the network is compatible with the hardware and software they are already running. "Everything has to work together and be tested before the system goes up," he says. "Any compatibility problem is a big problem. If anyone has to rekey something, then something wasn't done correctly."

He claims, however, that almost 100% of what everybody wants to do with LANs can be done with existing technology. "The problem is that, usually, nobody in-house knows how to implement it," he says. "There has to be more help from the vendors.

"There is also a definite emphasis toward smaller networks."

Fryer adds. "Most of the information within a corporation flows within a department, and only about 10% goes outside the departmental area. Vendors are realizing that users are aiming more toward installing smaller departmental networks and tying them together."

As for the future, Fryer advises vendors to provide better LAN security and more standardization within networking software.

U.S. West Materiel Resources, Inc., the procurement arm of Denver-based U.S. West, has also installed PC/Focus-Multiuser on a large, 240-user LAN consisting of Novell, Inc. software and Proteon, Inc. hardware.

According to Steve Dickson, technical support analyst/engineer at U.S. West, the LAN was installed in April of last year and is being used to keep track of procurement contracts and handle word processing and spreadsheet applications. The LAN has a gateway communications facility for 33 of its users to the firm's IBM 3090 mainframe. Most of the micros on the network are IBM PCs and Compaq Computer Corp. micros.

"We installed the LAN because we saw it as the only feasible way to provide computing facilities to our employees within our budgetary limitations," Dickson explains. "Eventually we'll have 400 users connected by the LAN between two buildings."

'Trade-off with IBM'

Dickson admits that they opted for Novell and Proteon as vendors after IBM said it could not deliver Token-Ring Network boards on time. "It's a trade-off with IBM," Dickson explains. "Most [LAN] vendors are supporting and writing software for the IBM, so there is a proven growth path with IBM. The Token-Ring is tolerant to devices being unplugged, the IBM wiring plan specs present an integrated, well-thought-out network that avoids the problems with proprietary, single-wire systems.

"On the other hand," Dickson says, "IBM has to come out with faster network boards, and they need to provide more bandwidth. But it's not just IBM. We also looked at AT&T's Starlan network but found it way too slow."

Dickson points out several advantages of LANs. "We're in the technical support area, and supporting 240 PCs with six servers on a network is a lot easier than servicing the same number of individual users. There is more coordination and less duplication of effort."

> ***'A LAN is merely a facility to provide for building applications, it's not the solution itself. LANs, in themselves, are technologically elegant devices.'***
>
> **— Steve Dickson**
> **U.S. West Materiel Resources, Inc.**

U.S. West cut its software costs in half by buying installed PC software already on the network instead of equivalent stand-alone software. As for the LANs' slowness, Dickson says, they have better response times on the network than they had with stand-alone PCs.

Dickson also lists some general disadvantages of LANs. The relative newness of the LAN technology itself, he says, has made it difficult to provide network technical support to users, and it has also made the company very reliant on vendors. There was also some apprehension on the part of the DP establishment at U.S. West about the feasibility of allowing Dickson and others to convert from stand-alone to networked systems.

"Sometimes it's as much a question of perception as it is of technology. It's like the idea of LANs being oversold by vendors. I think the capabilities are there, but getting them over to the users can be a problem," Dickson says.

"A LAN is merely a facility to provide for building applications, it's not the solution itself. LANs, in themselves, are technologically elegant devices."

In the future, Dickson sees IBM's network gaining in market momentum. "The more people you have who are familiar with the Token-Ring and who can come in and install it quickly and accurately, the more business will be coming their way. What this industry needs is more standardization in technical expertise."

First on Dickson's LAN wish list is the ability for LANs to provide remote internetworking through gateways to X.25, T1 or Integrated Services Digital Network transmission facilities. "I think there will be products out there capable of doing this by the end of 1987," Dickson predicts.

St. Luke's/Roosevelt Hospital Center in New York is planning an ambitious network for 1987 that will consist of broadband cable tying together 150 IBM PCs and numerous IBM 3270 terminals driven by a private branch exchange and using Information Builder's Focus mainframe DBMS on an IBM 3090 for micro-to-mainframe data extraction. Along with PC networking, the broadband cable will provide video transmission, video conferencing and patient monitoring via television.

"Networking speed isn't such a factor for us, because most of our PC users are what I would term casual users," explains Robert Tsue, assistant vice-president for MIS at the hospital.

"It's a big enough installation, however, in that we need good network management software. We have pieces of IBM's Netview management system and will probably get the entire package. We'll have auditors, other financial people and nurses using the network in-house, but we'll also have doctors dialing into the network from outside offices to check on patient health and financial data.

"Security is not that big a concern because most of our security is already built in. Network management, however, is important. We have to know who is coming on the system, from where and when. We'll need batch and real-time monitoring. We've even hired a full-time staff member to handle network management," Tsue says.

Keeping it simple

On Tsue's network wish list is "a real desire to see networks become simpler to use. I haven't seen one standard, complete book yet on what's available out there in networking. I also would like to see the market simplify itself. There are too many small LAN vendors complicating an already complicated market. It might not be bad if some of the smaller players dropped out."

Having installed networks, Doug Forrest claims he has done a lot of research into LANs. The New York City-based LAN consultant, who is currently setting up a small Novell LAN for his father, a New York furrier, says the biggest wish clients want from LANs is more bandwidth and speed.

"Since most LANs are Ethernet and baseband, you run straight into a trade-off," he says. "You can increase bandwidth and speed but at the expense of network modularity and reliability. For most installations, however, you don't need to push the limits of the network."

Forrest says that, with the right technical expertise, there are more opportunities in the LAN market now to put together low-cost, powerful networks.

"I'm putting together a Novell Arcnet LAN inventory control system using a Compaq 386 as a file server for a client," he says. "We back up files from PCs into a Bernoulli box in case the server goes down. You can't run the network from the Bernoulli, but you can at least access the stored data. If a node on the Arcnet goes down, it doesn't affect the other nodes.

"I set the entire LAN up quickly, following instructions from the vendor manual, and there were no problems. My point is, if you do your research and shop carefully, you can put together a small LAN for cut-rate prices without relying on IBM and a few others. In a way, it's becoming a commodity market at the low end."

At General Electric Co.'s Aerospace Control Systems Department (ACSD) in Binghamton, N.Y., the company is building a 600-user Ethernet network from Digital Equipment Corp. using 10 DEC VAX machines as network servers. The division of GE, which makes computers for flight control, will use the network for handling manufacturing and engineering design and production applications.

A need for net management systems

"We're not concerned with security or with speed as much as we are with keeping track of bandwidth use," explains an ACSD staff design engineer who wishes to remain anonymous. "We need some sort of analysis tool that can give us accurate details on bandwidth being employed over time. Neither DEC nor the other vendors we've looked at provide the kind of network management system software we need.

"I think that will change," the design engineer claims. "Network management is going to be one of the biggest user concerns in the future, especially with some of the larger LAN installations."

At another GE facility in Schenectady, N.Y., a systems specialist is installing two separate but integrated Fox Research, Inc. 10-Net LANs with 35 users each. He says that his biggest concern for the future is the specter of software manufacturers turning back the clock to the days of software copy protection.

"Businesses installing LANs have a responsibility to make sure they don't violate copyright laws and agreements with vendors," he explains. "We've already run into some problems with one of our [PC] software suppliers in this regard. Networking provides more of a group opportunity to copy and violate such agreements. I think it will become a bigger issue as more LANs are installed."

In the end, maybe Travenol Labs' Fryer has the right idea about LANs. "I've found there is only one universal truth in LANs," he explains, "And that is, there are no universal truths." ■

Kolodziej is Computerworld Focus *senior editor.*

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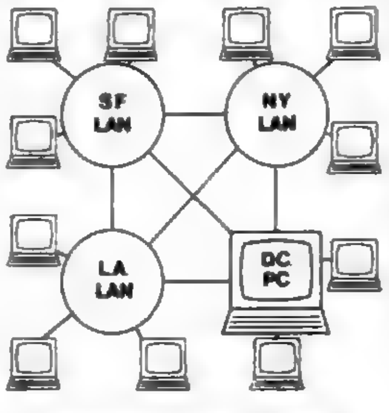

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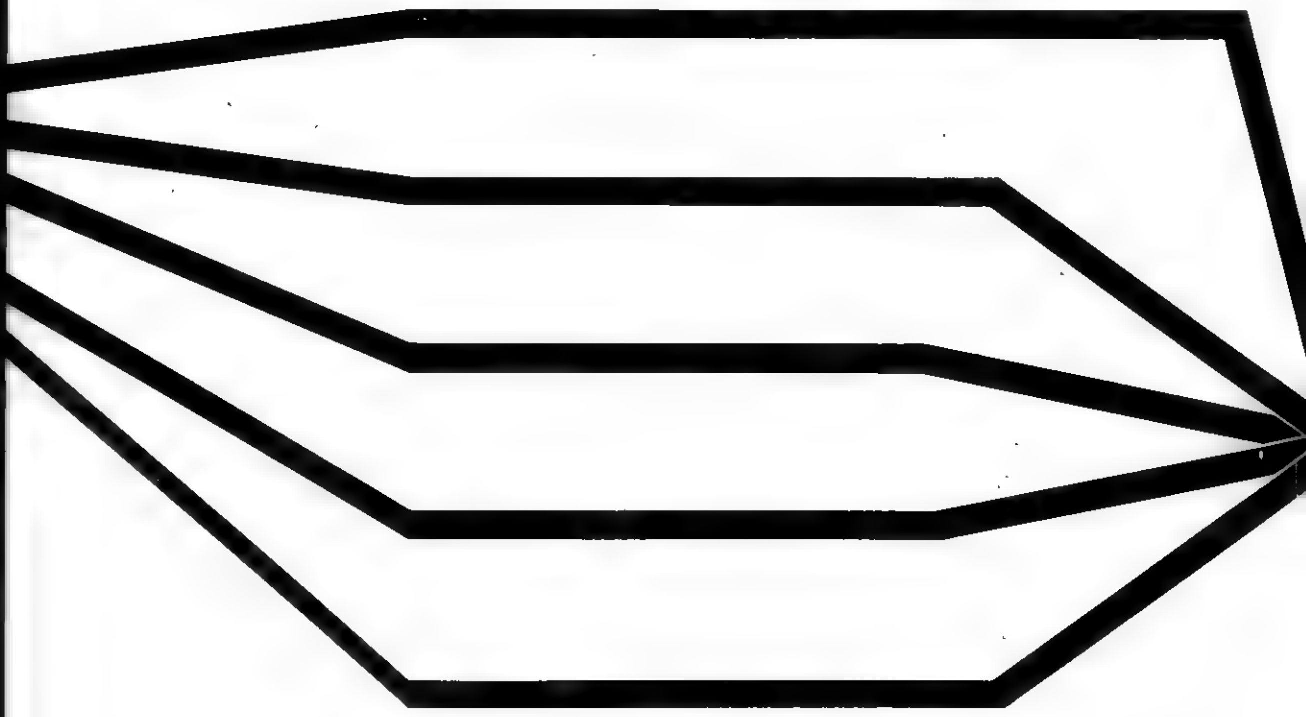

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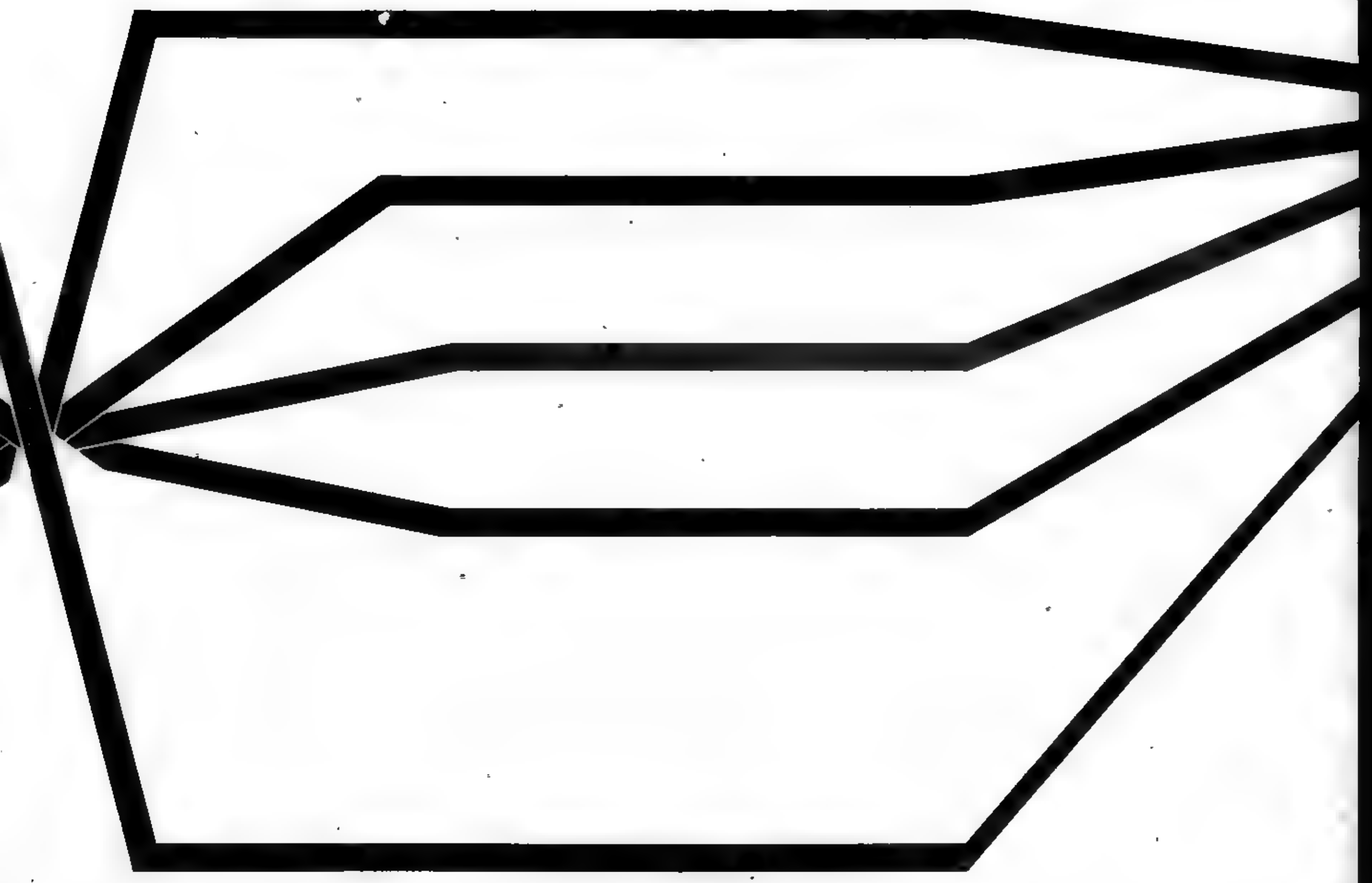

T1 NETWORKING

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SPECIAL SECTION: LOCAL-AREA NETWORKS

Peer Networks Gain Ground

DAVE RIDLEY

•BY•MICHAEL•DURR•

Host networks are giving way to peer-to-peer networks. It won't happen overnight, but the direction is clear, and MIS should keep a close eye on this trend. Pressure behind the movement is so great that even big supporters of host networks are beginning to accept the inevitable.

A 1986 report by the Gartner Group, Inc. Local-Area Communications Services comments on IBM's interest in maintaining the demand for high-margin, host-type systems. However, according to the report, "There is little IBM can do to maintain margins. Network technologies are moving too quickly down the price/performance curves to keep users on their hierarchical networks. Big Blue will have to accelerate its support for distributed solutions."

All computer companies will be affected by the move to peer systems, from the mainframe/minicomputer vendors to personal computer local-area network (LAN) companies. As peer networks grow beyond their work group orientation to encompass departmental and buildingwide networks, hardware and software vendors must develop products to support host and peer systems as well as diverse types of computing hardware.

The term "peer network" refers to a system designed to support data communications among intelligent machines. The machines are not necessarily peers, or equals, relative to their processing power or function. In fact, large peer networks can support a variety of PC workstations, file servers and other special-purpose servers. These servers might be micros, supermicros, minicomputers or mainframes.

Because peer networks are composed of intelligent machines, processing can take place in any machine, at any desired level on the network. In other words, peer networks support distributed processing.

Host networks, by contrast, require shared processing. The host computer is the only intelligent device in the system. Dumb terminals are attached to the host and must share the host's processing power. Host networks are described as hierarchical because of the inequality of the components (intelligent and dumb devices) that are communicating.

The cost difference between peer networks and host networks is partially explained by looking at communications costs.

The first step in communications management is to determine how much data movement is actually required. In most data processing environments, while data traffic may be heavy, that traffic is typically within a department. As much as 80% of most departmental data processing could be appropriately handled within the department.

In the distributed processing network, data can be processed where it is used. But, in a shared processing host network, that departmental data must travel the additional distance from the department to the host. That wastes communications services, raising the cost of data processing.

Another cost factor in comparing host networks with peer networks is the expense of host processing. Host systems are more complex, and profit margins on host processors and applications software are substantially higher than they are on PCs and PC applications software.

The MIS department of a large bank estimates that a full-service IBM VM time-sharing system, complete with processing, applications software and consulting support, costs $5,000 annually per user. The bank estimates that for a functionally comparable IBM Personal Computer AT workstation, complete software library and consulting support, the annualized cost is $3,600 per user. In this case, opting for PC-based, distributed processing results in a 28% savings.

While cost may be sufficient reason to migrate from host networks to peer networks, it is not the only reason. Much of the support for peer networking has sprung from the general acceptance of the PC. Peer networks, specifically PC LANs, operate as a natural extension of the PC

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environment, making them the logical choice for networking PCs.

The PC gave us the ability to perform distributed processing but left open the question of how to integrate that processing into an office automation network.

Peer network technology evolved as the answer to that question and as a way to support information sharing among PC workstations in a multiuser environment.

One of the foundations of peer networking is disk access synchronization. After several solutions, the computer industry settled on the Extended Open and the Physical Lock features as first defined in Microsoft Corp.'s MS-DOS 3.1. The Extended Open provides a file-locking mechanism and the Physical Lock implements record locking.

Another important technical feature of peer networks is their processing flexibility. Peer networks are often associated strictly with distributed processing. That's a misconception. Although these networks support distributed processing, processing can also be centralized.

> ”
>
> *Peer networks are often associated strictly with distributed processing. That's a misconception.*

Two activities that are centralized are disk access and network management. The LAN industry has adopted the file server system of management in which workstation requests are processed by a server machine. The server then accesses the disk. The file allocation table and the question of when and where data may be written to disk are all managed by single machines on the LAN.

Eliminates corruption

This guarantees data integrity and prevents the type of data corruption that was a common problem on early LANs when PC workstations were allowed to go directly to the disk.

Sometimes it is desirable for other activities to also be centralized. Application processing, for example, usually involves manipulation of small amounts of data and is handled in the distributed workstations. Workstation processing, however, may not be efficient for data base management and large processing jobs.

Peer networks can support batch processing so that when an end user has a large job to process, that job can be offloaded to a shared processor.

A range of batch processors

This prevents the workstation from being tied up, and it also lets the job be run on a more powerful machine. Supermicros, minis and mainframes can all be used as batch processors.

Some data base operations are more efficiently performed in a central processor.

It is not an issue in smaller data base systems, but as the size of data bases and the number of workstations has increased, so has the need for centralized processing.

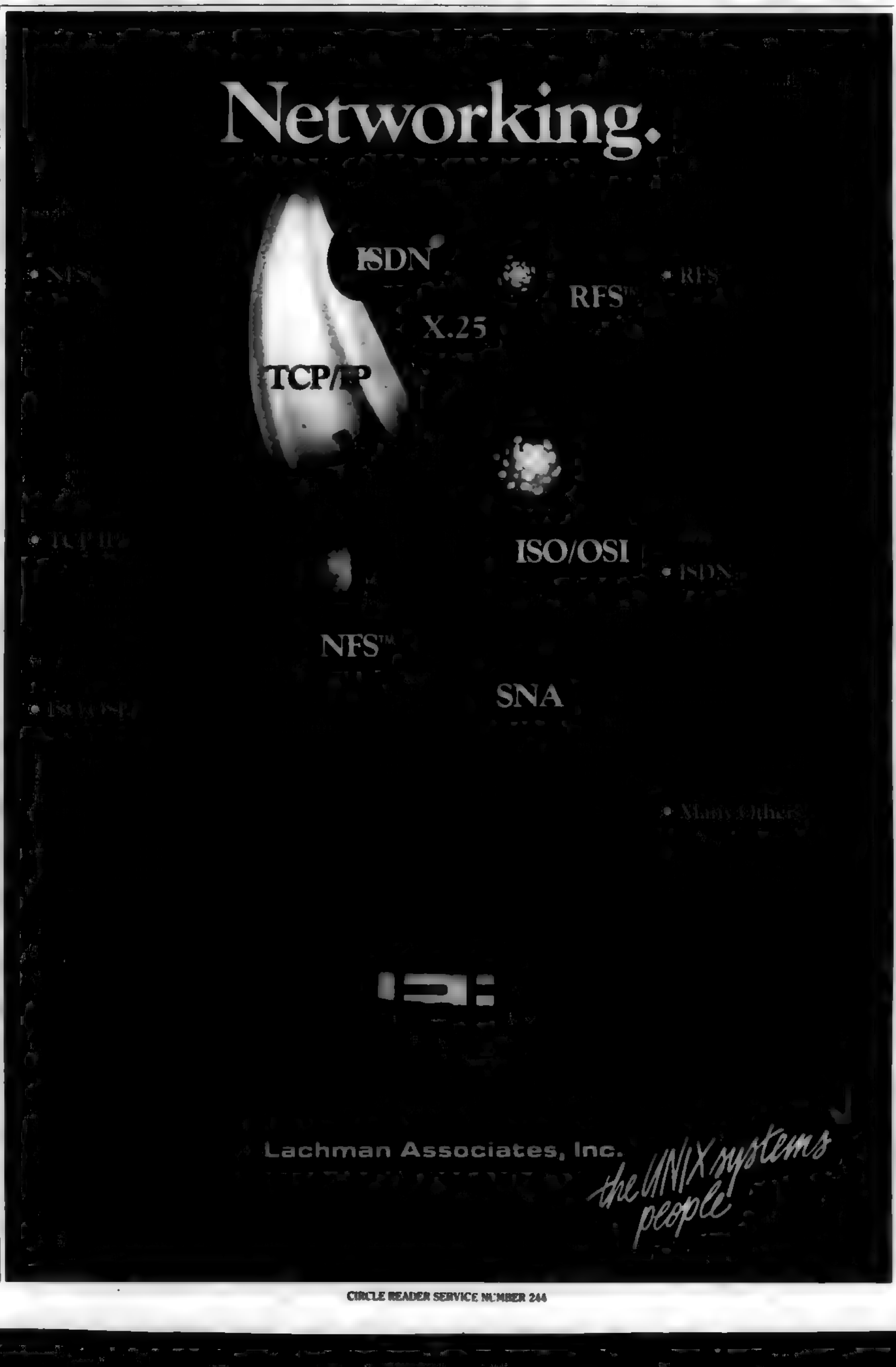
Where centralized processing is needed, peer networks permit the use of data base servers, which perform the processing.

Piecemeal growth

Peer networks have matured in small work groups and departmental LANs. The industry is now in a period of adding the pieces, such as the data base server, that are needed to move peer networks into large departments and corporatewide networks.

IBM and AT&T have introduced peer network cabling schemes for large buildings. The IBM Token-Ring cabling system and AT&T Premises Distribution System provide the first cabling strategies that are suitable for linking hundreds of PC workstations in vertical high-rise buildings.

In the meantime, minicomputer firms like Digital Equipment Corp., Hewlett-Packard Co., Tandem Computers, Inc.



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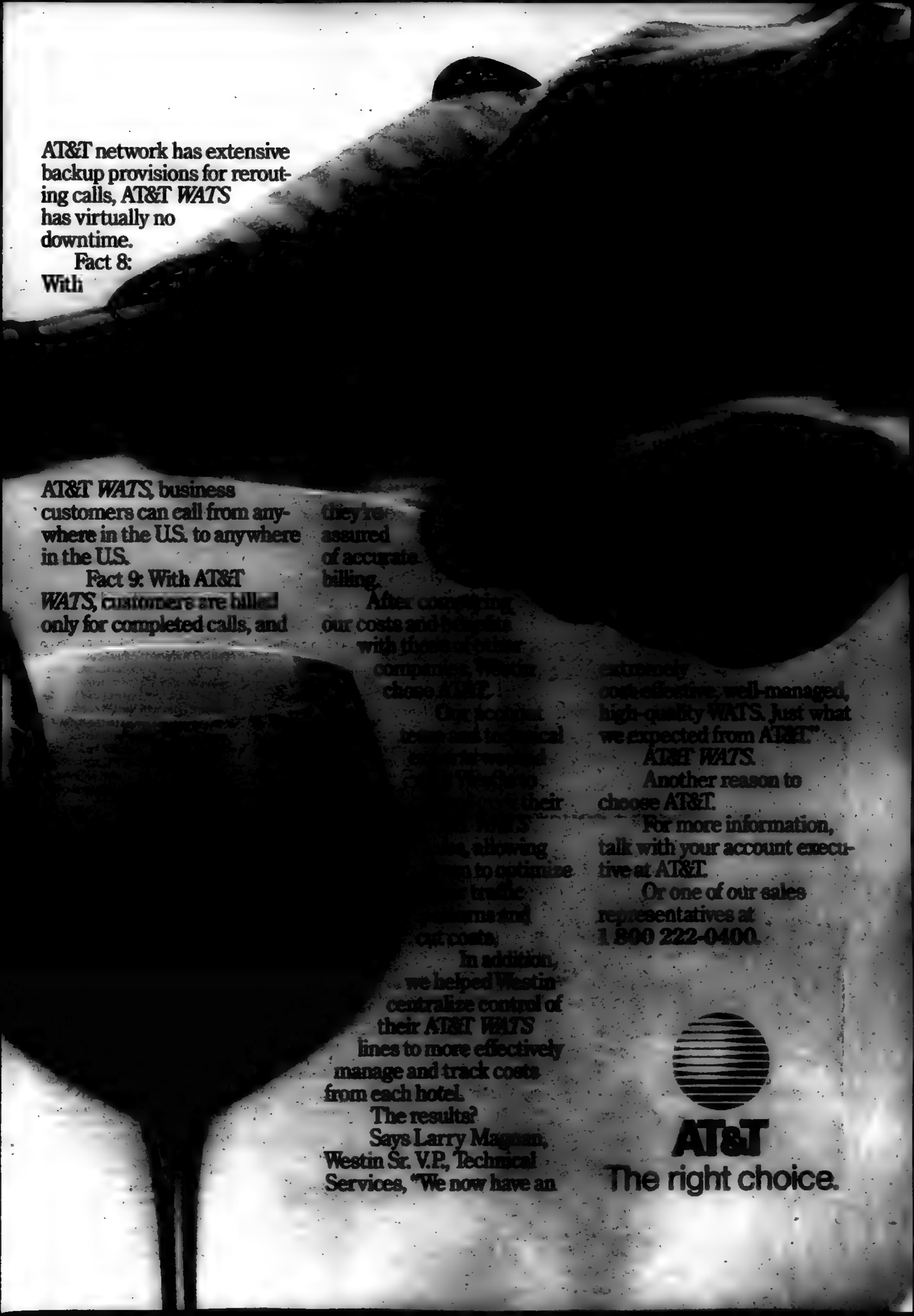

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SPECIAL SECTION: LOCAL-AREA NETWORKS

and IBM are adapting their minicomputers to act as file servers for networked PCs.

Further accelerating the peer networking trend, most of the domestic computer industry has indicated a willingness to support LU6.2, IBM's Systems Network Architecture peer networking subprotocol. LU6.2 allows applications to communicate with each other without going through a host computer.

Because of the heavy development activity to support peer networks, the issue of standards is a critical concern. The many different products suggest a dynamic but confused marketplace.

A solution in sight

Fortunately, the problem is not as insolvable as it may seem. For example, multiple standards are now routinely accommodated in LAN cables and network adapters and many LAN companies provide bridging products, which support heterogeneous internetworks.

When the same network operating system is run on top of the dissimilar hardware, the internetwork looks like one virtual network to the end user.

> *Further accelerating the peer networking trend, most of the domestic computer industry has indicated a willingness to support LU6.2.*

A solution is also emerging for integrating dissimilar types of computers on the network. Up to now most attempts at integration have used a host network approach. Personal computers are connected to a mainframe or minicomputer and can act as workstations by emulating dumb terminals.

This process gives us access to mainframe- or minicomputer-based data but in a host environment. The application stays at the host, and the processing capability of the PC is wasted.

Having PCs emulate a host system is undesirable. The device on the desktop is the PC, and that is the device users understand. That PC environment should be maintained even in a heterogeneous network.

Ideal integration

The ideal computer integration scheme would allow for centralized or distributed processing and would allow each connected personal computer workstation to maintain its own individual environment. An IBM PC would continue to look like a PC, an Apple Computer, Inc. Macintosh would continue to look like a Macintosh and so forth while they simultaneously share network resources with each other.

This kind of integration is possible through a system known as the universal network architecture (UNA). UNA offers a model for integration in which a variety of dissimilar intelligent workstations can be attached to the same server and generic file system.

In a typical homogeneous network, a set of communications programs (protocol stacks) is loaded at the server and at each workstation.

Multiple protocol stacks

Under UNA, the server would load multiple protocol stacks — one for each type of workstation being supported. A protocol translator running at the server links the individual workstation protocols to the generic file system.

Most computer systems can be interconnected through the UNA. Host systems can be connected to the network server using file transfer utilities.

PCs can manipulate the host data using their own native PC applications, and the generic file system provides a consistent set of services throughout the network.

Products that follow the UNA system are expected to be released beginning in mid-1987.

For many companies, the movement from host to peer networking starts at the desktop with PCs attached to a peer-type LAN. However, this movement has not remained limited in scope.

Because of the cost and productivity advantages peer networks have over traditional host networks, peer networks increasingly are considered for large department and corporate networks. Peer network technology is supporting these larger systems with more powerful network servers, premises-type wiring systems and the ability to perform distributed or centralized application processing.

The problem MIS faces as PCs and peer networks move into corporate computing is how to efficiently tie these diverse systems and machines together. The universal network architecture may be just the solution. ■

Durr is a consultant with Novell, Inc., a local-area network company based in Provo, Utah.

He is the author and coauthor of several books on communications and networking including Networking IBM PCs: A Practical Guide, Second Edition.

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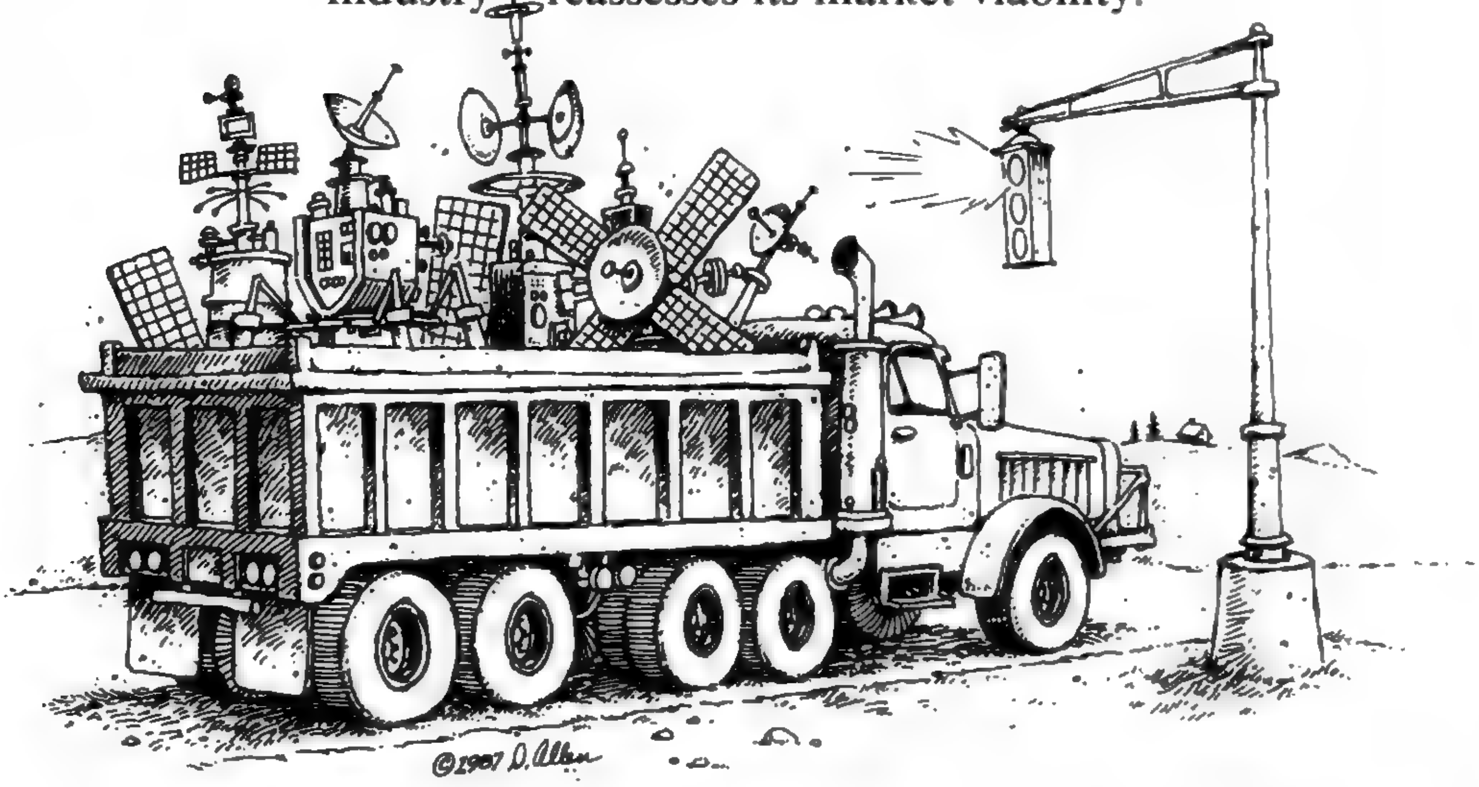
CIRCLE READER SERVICE NUMBER 232

Satellites Confront An Uncertain Future

Putting failed satellite launches and the *Challenger* disaster behind it, the satellite industry reassesses its market viability.



•BY•LYNN•HABER•

Perhaps the greatest irony for the satellite industry is that as a result of recent negative publicity surrounding failed satellite launches and the explosion of the U.S. Space Shuttle *Challenger*, both players and users have a greater understanding of this market.

"Overall, the satellite industry has been in a stalemate for the last couple of years," says C. William Reed, director of research services for Link Resources, Inc., a market research company in New York. "On one hand, there's been a glut of transponder capacity, and on the other, there's been a wait-and-see attitude by end users as to whether terrestrial solutions will provide the same efficiency as satellites."

But now, industry analysts expect that the satellite industry will stabilize in both performance and cost. At the same time, analysts believe that users of communications services will demystify their network needs and explore the variety of communications options available to them.

"There's been a lot of proposal writing over the last few months by companies evaluating what to do with their satellites," Reed says. "There's also been a lot of end users looking into VSAT networks and private terrestrial line usage."

When all this network examination is done, satellite service industry revenue will reach $4.74 billion by 1990, up from $1.57 billion in 1984, according to Link.

Link says the recent difficulties experienced by the satellite industry are not enough to completely stunt the steady growth of the domestic market for satellite services. But, Link acknowledges, the setbacks are dramatic enough to force a substantial change of direction in the markets being targeted for services and in the prices for satellite transmission capacity.

Therefore, unlike the mid-1970s when the domestic satellite market was driven by broadcasters and CATV programmers, the industry will begin to see business communications, in particular data transmission and one-way broadcast videoteleconferencing, providing a large percentage of the growth of satellite service revenues for the coming five years.

Major players in the satellite market include AT&T; Communications Satellite Corp.; GTE Spacenet Corp.; Hughes Aircraft Co.; Satellite Transponder Leasing Corp., a subsidiary of IBM; RCA American Communications; and Western Union Corp.

According to these vendors, many companies are reevaluating the status of their satellite services. For example, RCA has recently left the private-line business and will focus on Ku-band TV delivery, a spokesman reports.

Also, in December 1986, AT&T announced the $2.7 million acquisition of Ford Aerospace Satellite Services Corp., a subsidiary of Ford Aerospace. The venture gives AT&T access to some design work in hybrid Ku/C-band satellite technology. The company also announced a new Ku-band VSAT service called Skynet Star Network Service.

Reed contends that the differences between system operators and satellite service resellers are blurring. Traditionally, system operators launch, own and operate satellites, while satellite service resellers are brokers of satellite transponder time and associated services. A merging of services will occur because of cost factors, the current transponder glut and growing competition — factors that, when combined, are altering the conventional roles of industry participants.

Ever since the first commercial satellite was put into orbit more than 10 years ago, there has been little public understanding about satellite technology. Additionally, service providers have, during the years, redefined the type of communications services that could best be provided by these objects in geostationary orbit 22,300 miles above the earth.

End-user awareness

The level of end-user awareness of satellite technology and services continues to remain low. "On an awareness scale of 1 to 10, [with one being the lowest level of awareness], I'd give the public a 3.5," says Pat Aussen, district manager of satellite communications for AT&T.

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>
> *'There's been a wait-and-see attitude by end users as to whether terrestrial solutions will provide the same efficiency as satellites.'*
>
> **— C. William Reed**
> **Link Resources, Inc.**

Ray Marks, vice-president of marketing at GTE, describes corporate awareness of satellite technology as terribly low. Why? "The satellite industry did a poor job of providing information and never targeted the end user with the application," Marks says.

But now, the satellite industry reportedly is about to catch up. For starters, the problems that have recently been brought to light regarding satellite technology have been related to launches and not to the ability to provide service. As a matter of fact, Marks explains, no satellite, once in orbit, has ever been lost. Therefore, the risk lies in getting satellites into orbit. This risk factor, while it may not have a direct effect upon a satellite's ability to provide reliable service, nevertheless affects end users as the cost of launches and insurance escalate dramatically.

Even prior to the *Challenger* disaster, the state of the satellite insurance industry was poor, according to Robert J. Tirone, vice-president of the aviation and aerospace division of Alexander & Alexander Services, Inc., a New York brokerage firm.

In February 1984, two $75 million communications satellites launched by *Challenger* failed to achieve orbit, rendering them useless. One satellite, the Westar VI, owned by Western Union, was insured for $105 million, and the other, the Palapa B-2, owned by the government of Indonesia, was insured for $85 million.

While the satellites were retrieved, insurers' relief at the rescue was psychological only — the underwriters still payed $180 million on the loss.

After footing the bill for the retrieval, which cost in excess of $10 million, the insurers only recouped $40 million for the two satellites, which suffered damage and needed to be refurbished.

And while the 1986 *Challenger* disaster alone did not have a severe impact on the insurance industry — there were no insured payloads on that launch — confidence in the space industry was shaken. And if that incident wasn't enough to send ripples through an already skeptical insurance industry, the failure of a French Ariane rocket to launch two satellites shortly thereafter did.

Whereas two to four years ago each satellite on a launch could be insured for $100 million, today, companies are underwriting only $60 million to $80 million in insurance capacity per launch, regardless of the number of satellites, according to Tirone.

'Insurance is inadequate'

"This type of insurance is inadequate in most cases because it wouldn't cover the capital investment on one satellite, much less two," Tirone explains.

But a government policy enacted since the *Challenger* disaster that states that the National Aeronautics and Space Administration will not launch any commercial satellites has created optimism among both the satellite and insurance industries that stability may be reclaimed both in the sky and on the ground.

Private manufacturers of launch vehicles — such as McDonnell Douglas Corp., General Dynamics Corp. and the Martin Marietta Denver Aerospace Division — are announcing plans to pick up the commercial satellite market where NASA left off.

For example, Martin Marietta has signed a memorandum of understanding with its first satellite customer, Memphis-based Federal Express Co. The first commercial launch is targeted for as early as 1989, with a second option in 1990, a spokeswoman says.

A McDonnell Douglas spokesman reports that his company is in the discussion stages regarding commercial launches. A final decision by McDonnell Douglas rides on a contract award decision by the U.S. Air Force for a medium-class rocket called the MLV. A stipulation of that contract, according to the spokesman, is that the rocket provider will have to offer commercial launches. All three launch vehicle vendors, McDonnell Douglas, Martin Marietta and General Dynamics, have bid on the MLV contract.

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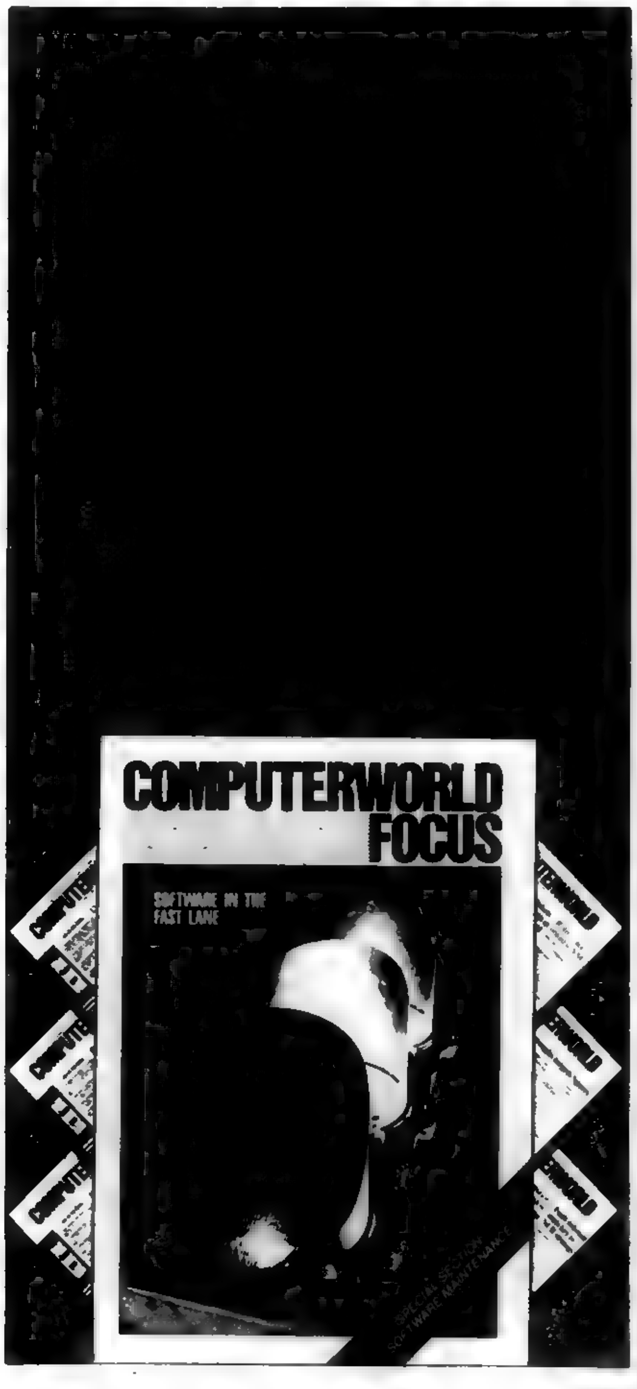
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SATELLITE OUTLOOK

It is expected that satellite companies that scheduled launches prior to the space shuttle disaster will find alternative means of launching, such as using the budding independent satellite vehicle industry in the U.S. or foreign launch vehicles such as the Ariane.

And, according to reports from company spokesmen, users have found alternatives. Satellite Transponder Leasing Corp., for example, has plans to launch its SBS 5 satellite in the second half of 1987 on an Ariane vehicle. GTE also has two launches scheduled for 1987 aboard an Ariane, and RCA has secured 1989 and a 1990 launch dates on Ariane rockets for two of its own units.

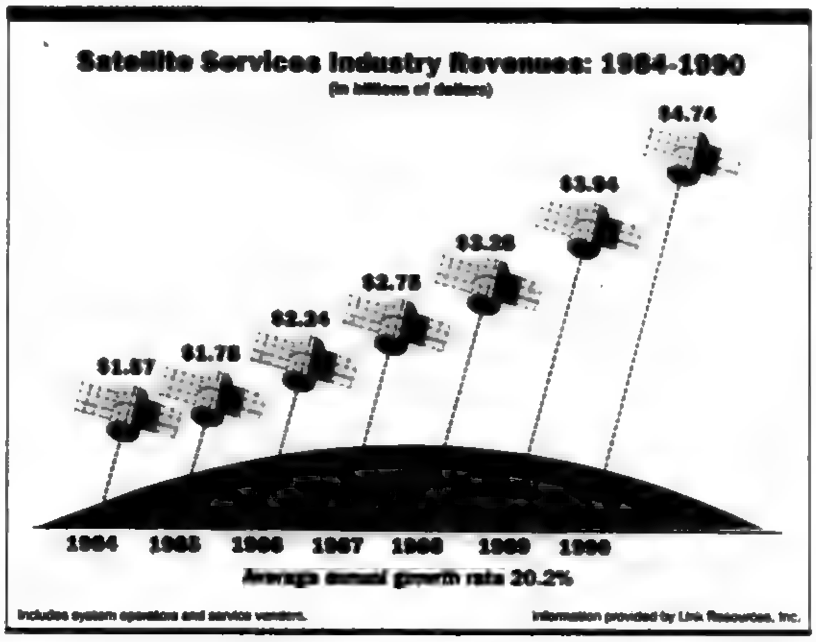
Privatization is good news

The potential privatization of launches is good news to the insurance industry, Tirone says. "It is easy to speculate on the success, the safety and reliability of these companies because they have a proven track record." Up to now, these companies have been producing launch vehicles for military applications.

Tirone claims that if an independent launch vehicle industry is established, the satellite insurance industry, within a two-year time period, will regain confidence and expand. "I think we'll see stability somewhere below the rates that were in existence prior to the shuttle disaster — which was about 30% of the insured value — but nowhere near 1983 rates of 5% to 6% of the insured value," he says.

The cost of satellite services to end users depends on how the space industry rates stabilize, the available amount of satellite transponder capacity, demand for service and how competing communications technologies shape up.

While the cost for satellite services today has not reflected the upheaval in the space industry, end users can expect to see higher service costs as new satellites are launched to replace old ones.


Satellite Services Industry Revenues: 1984-1990
(In billions of dollars)

Average annual growth rate 20.2%

Includes system operators and service vendors.

Information provided by Link Resources, Inc.

Another important cost factor is the availability and use of satellite transponders — devices that receive and transmit signals. Older satellites have 12 transponders whereas newer ones have 24.

According to Link, at the beginning of 1986 nearly 600 total transponders were in operation. Link estimates that by 1990 there will be approximately 960 total transponders available.

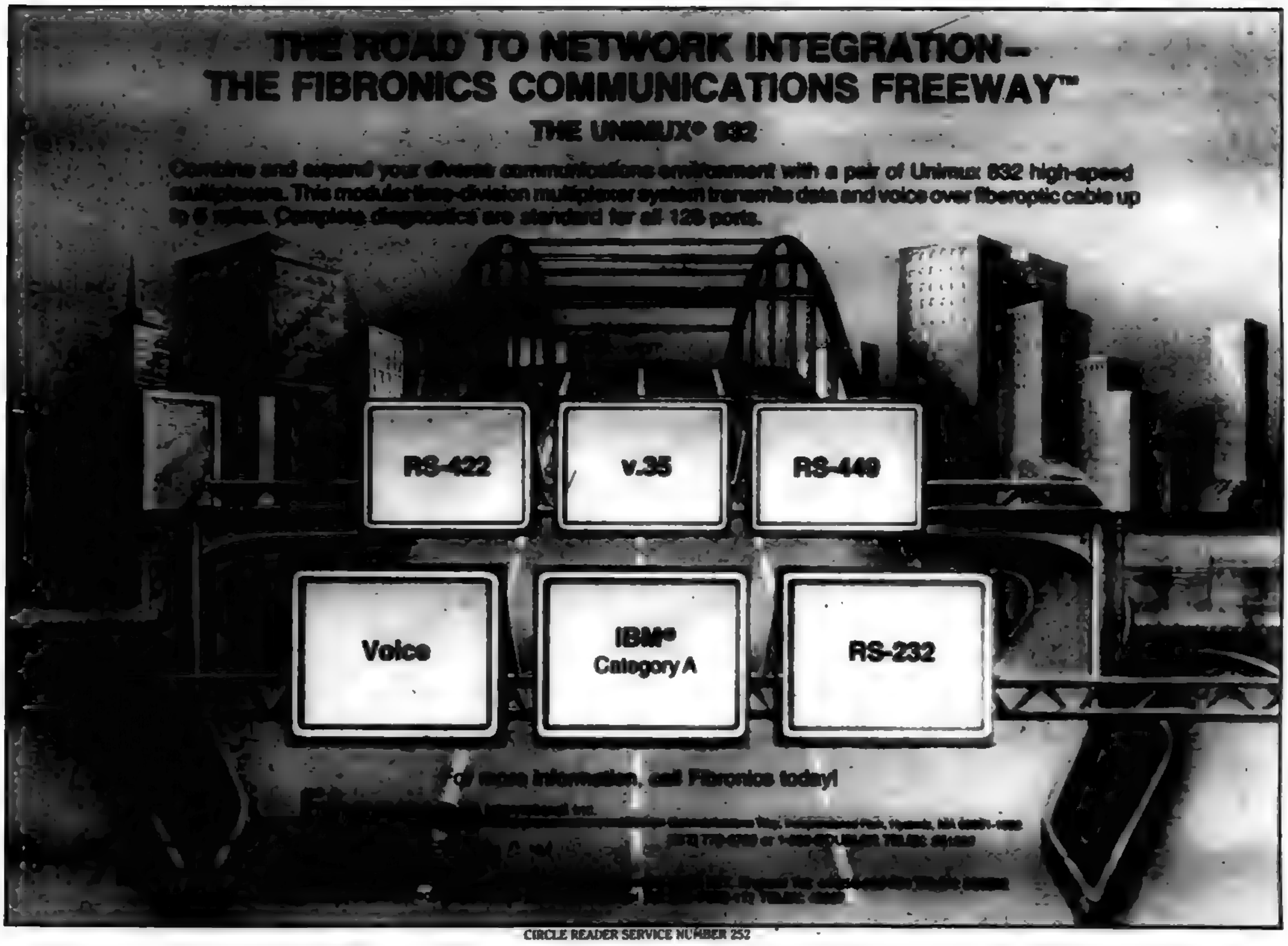
Transponder capacity and cost vary. There are C-band transponders with frequency ranges of 4 GHz to 6 GHz and Ku-band transponders with ranges from 12 GHz to 14 GHz. Originally, C-band was a more popular technology for satellite systems, but recently, Ku-band technology has been gaining favor. One reason behind its growing popularity is that low-cost Ku-band VSAT technology has become available, encouraging user interest. Another contributing factor is that there is a greater risk of interference on the C-band frequency because terrestrial communications services, such as microwave, also operate in C-band.

By year-end 1984, there was an overall transponder glut, largely due to overzealous predictions for transponder need. According to Link, the cost of a Ku-band transponder in 1985 ranged between $130,000 and $150,000 per month. Link analysts do not expect demand to catch up to supply, and they predict that prices will stay about the same and stabilize in 1987 to 1988 in anticipation of huge increases in capacity expected for the 1989 to 1990 period.

This increase in transponder capacity will result from the launching of more Ku-band satellites improving the ability to utilize bandwidth more efficiently and using multiplexing techniques.

C-band transponders are already priced between 10% to 20% below Ku-band ones and are suffering more than Ku-band from overcapacity. They are expected to experience further price declines as more data and video applications are moved to the more efficient Ku-band technology, Link reports.

Another area that will affect satellite service costs to users is competition from other communications vendors, most notably those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CIRCLE READER SERVICE NUMBER 252

offering long-haul, fiber-optic networks.

While satellite network services and fiber-optic networks will compete in certain application areas, service vendors say they believe these two technologies will, in fact, complement each other.

A question of need

If they were not complementary, AT&T, a vendor of both satellite and optical fiber networks, would then appear to be competing with itself. "From our perspective, whether a company opts for fiber or satellite is a question of application need," AT&T's Aussen says.

AT&T's strategy is to be a full-supply vendor, giving customers the option to choose the transmission media that is most appropriate for their applications, Aussen contends.

Industry analysts and participants agree that satellites have an important role to play in a corporation network strategy and that the technology can offer application-specific services more cost-effectively than other communications methods.

Provide voice, data, video

Satellites can provide voice, data (such as facsimile) and video (teleconferencing, broadcast and CATV). Analysts agree that data transmission will experience the most rapid growth through the end of the decade, due, in part, to the demand for high-speed data transmission by businesses. Corporate users are also expected to use videoteleconferencing capabilities.

James H. Brown, vice-president and general manager of Satellite Transponder Leasing, says that every MIS manager should be aware of new applications that satellite technology can bring. "For example, VSAT networks are a way to replace multidrop leased lines," he says. Point-to-multipoint networks (star topology), where a central hub transmits to numerous sites or distant locations, is seen as an ideal application for satellites.

In addition to the increased need for data networks, VSAT networks are attractive because both VSATs and satellite transmission costs have come down dramatically in the last two to three years.

Last-mile access

Also, fiber-optic networks suffer from a problem known as last-mile access. Whereas fiber-optic networks extend between most major cities, these networks often do not extend to less populated or remote areas where businesses may require data transmission services.

Today, VSATs are capable of two-way transmission at up to 56K bits. However, Brown reports, most are used at lower speeds such as 4.8K bits and 9.6K bits.

When should a corporation consider a VSAT network? Industry participants throw out a standard scenario that says when a company's data communications costs reach $350 per month per site in a network with more than 25 locations, it's time to consider a VSAT network.

Another, although limited, satellite application is in voice transmission. David Rubin, senior telecommunications consultant with Arthur D. Little, Inc. in Cambridge, Mass., says that while users learned years ago that satellites are not good transmitters of voice due to time delays and inferior transmission, for certain voice applications satellites can be a cost-effective solution.

"For internal communication or for communication to out-of-the-way places where a user might want to quickly set up a network, satellites can be utilized," he says. "They should not, though, be used for premium applications."

Whichever application a company decides is right for satellite transmission services, it should know that there are time and cost options for satellite service.

These options include full-time usage, occasional usage or what is called hot-slot usage. Hot-slot usage is second-class use in which, for a lower service cost, there is the risk of being bumped off a network if the vendor needs a firm's transponder.

The bottom line is that network managers must understand that satellite technology is just one more transmission alternative they need to know about to make the most effective and efficient use of their own networks. ■

Haber is a Boston-based, freelance business writer specializing in computers and communications.

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COMMUNICATIONS PRODUCTS

Applitek Unwraps Gateways To Unisys Machines

WAKEFIELD, Mass. — Local-area network (LAN) vendor Applitek Corp. has introduced two gateway products, Burroughs NI10/G gateway and Sperry NI10/G gateway, to connect asynchronous terminals to host computers from Unisys Corp.

Burroughs NI10/G gateway allows communication over Applitek's Unilan network between Burroughs host computers and terminals. The product also provides protocol conversion between asynchronous terminals and Burroughs hosts.

Sperry NI10/G gateway allows communication between Sperry line hosts and terminals as well as protocol conversion between asynchronous terminals and Sperry hosts over Unilan.

In addition, the NI10/G gateways support procedures for poll select, a multidrop protocol used for connecting terminals to host computers, according to the vendor.

Support up to 64 virtual circuits

The NI10/G gateways support up to 64 virtual circuits at a maximum line speed of 9.6K bit/sec. and perform both master and slave site evaluations. The gateway is controlled remotely by a network manager using the standard Unilan mode functions. These include enabling and disabling the gateway, displaying and initializing the unit's field history file, renaming the gateway, updating the unit's network parameters and gathering statistics on its operation.

With the Burroughs NI10/G, the poll-select link interconnects the gateway to a Burroughs B874, CP3680 or CP2000 front-end processor. The gateway then appears as the processor to any Burroughs ET1100, MT980 or TD830 terminals or any another host connected to the NI10/G gateway.

With the Sperry NI10/G, a bisynchronous poll select link interconnects the gateway to either a Sperry DCP 10/30/30 network controller or to a Sperry Group Controller Secondary. For remote connection, the Sperry gateway appears as a Sperry host to UTS-20 terminals or another host.

The connection is supported on a synchronous link using Sperry's Uniscope central site line procedures.

In a slave environment, the Sperry gateway also connects to a Sperry host via a synchronous link using Uniscope. The Sperry gateway emulates Sperry's TMux terminal multiplexer to the Sperry host. Ansynchronous terminals then connect across Unilan to the NI10/G, which performs UTS-20 or DCT-1000 emulations.

Both gateway products are available. Prices start at $600 per connection.

For further information, contact Applitek Corp., 107 Audubon Road, Wakefield, Mass. 01880.

Circle Reader Service Number 311

Xerox Enhances Faxmaster Product

ROCHESTER, N.Y. — Xerox Corp. introduced Image On Screen, an enhancement to its Faxmaster personal computer ASCII-to-facsimile conversion software that allows users to view incoming facsimile transmissions on a CRT screen. Users can then print out only those pages they want, reducing paper costs.

Previously, Faxmaster users could use their IBM Personal Computers or compatibles to transmit or receive documents, but they could only view documents that had been keyed into the Faxmaster PC. Users could not view a document that had been scanned in from a central facsimile unit or from a remote terminal.

With Image On Screen, users can view transmissions from other faxes on their terminals. Image On Screen also allows an operator to scan a file containing both text and graphics into a PC and add it to another file for viewing, transmission or storage.

Resides on AT or compatible

Faxmaster software resides on an IBM PC AT or compatible that is directly connected to a Xerox Telecopier 495-1 facsimile terminal. The 495-1 functions as the central unit on a fax network.

Faxmaster with Image On Screen is available for $695 per copy. The Image On Screen feature will be delivered free to current Faxmaster users.

For further information, contact Xerox Corp., Xerox Square 006, Rochester, N.Y. 14644.

Circle Reader Service Number 313

Corvus Unveils Omninet LAN Operating System

SAN JOSE, Calif. — Corvus Systems, Inc. has introduced PC/NOS, a network operating system for its Omninet local-area network.

Corvus claimed PC/NOS can reduce the cost per network system user by a factor of five over competitive network systems. The company said PC/NOS achieves its dramatic cost reductions from the use of advanced design techniques that permit networks to be created without file servers.

PC/NOS software features file server support of IBM PC-DOS 3.1 file and record-locking calls as well as access security control for nodes, peripherals, disk directories and files.

Will support multiple servers

The company added that when file servers are required for performance reasons, PC/NOS will support multiple servers, avoiding the user's loss of upper end performance.

Corvus claimed that in a 10-user system comparison of PC/NOS with 3Com Corp.'s Etherseries and Novell, Inc.'s G-Net, the cost per user of these systems was more than four times that of the equivalent Corvus system. In a five-user system, according to Corvus, the cost per user of competitive systems is more than five times that of a Corvus system.

PC/NOS is priced at $695 for 64 users.

For further information, contact Corvus Systems, Inc., 2100 Corvus Drive, San Jose, Calif. 95124.

Circle Reader Service Number 312

Netlink Datacom Interface Out

RALEIGH, N.C. — Netlink, Inc. introduced SNA Gate, an advanced data communications interface that allows corporate networks using IBM's Systems Network Architecture (SNA) to accommodate a range of non-SNA devices.

SNA Gate is said to be a multifunction protocol controller that concentrates as many as 16 lines using mixed protocols at speeds up to 64K bit/sec. These protocols can include various bisynchronous devices such as IBM's 3270 and 3780, asynchronous terminals and personal computers.

The gateway product provides full IBM SNA terminal emulation via dial-up or leased-line connections to remote asynchronous devices such as personal computers, printers, plotters, portable data communications terminals and graphics devices.

SNA Gate handles multiplexing and protocol conversions while preserving SNA's end-to-end integrity and path control, Netlink said. This ability frees the host and front-end systems for other computing tasks and eliminates the need for a separate host access method to support non-SNA devices, according to the vendor.

SNA Gate is available in two versions. Model 3703-1 supports asynchronous and bisynchronous devices and is priced from $7,500 for two ports to $13,800 for 16 ports. Model 3703-1A supports only asynchronous devices and is priced from $4,500 for 10 ports to $7,200 for 16 ports.

Both models are available now and include a three-year warranty.

For further information, contact Netlink, Inc., 3214 Spring Forest Road, Raleigh, N.C. 27604.

Circle Reader Service Number 314

HP Offers Tools To Integrate PCs Into OA Systems

PALO ALTO, Calif. — Hewlett-Packard Co. announced two software products, HP Resource Sharing and HP Information Access, that allow users to integrate personal computers into office systems.

HP Resource Sharing allows PC users to share access to files, disk space, printers, applications and tape drives. The software package stores key documents and other data in a Microsoft Corp. MS-DOS format on a common HP 3000 disk drive, allowing users with the proper clearance to access the data. Only one copy is stored to prevent inaccurate, outdated or redundant files, but the HP 3000 computer permits several users to access central files concurrently

HP Information Access is an enhanced version of HP Access that reportedly provides a 40% performance improvement. Information Access enables PC users to choose and format local and remote HP Image data using simple menu commands. These users do not need to know the data base location or structure. Once the data is retrieved, it can be organized, formatted and transparently downloaded into PC applications such as Lotus Development Corp. 1-2-3.

Pricing for HP Information Access, supporting 10 PCs, ranges from $5,900 for the HP Micro 3000 to $12,500 for larger processors. HP Resource Sharing, supporting 10 PCs, is priced from $4,800 for the Micro 3000 to $9,500 for higher end processors

For further information, contact Hewlett-Packard Co., 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Circle Reader Service Number 316

Novell Netware Touts Greater Data Protection

OREM, Utah — Novell, Inc. has introduced System Fault Tolerant (SFT) Netware Level II, an operating system aimed at providing a higher level of data protection for local-area networks (LAN).

Novell said SFT Netware Level II contains two options beyond Level I that protect shared LAN data against loss or contamination due to system hardware failure.

The first option is disk mirroring, which enables the user to duplicate disk drives containing critical data that must be ensured against loss or contamination.

With disk mirroring, if data cannot be read from one disk drive it is read from its mirror disk drive while the problem is corrected on the original drive. If a disk drive fails completely, it is shut down and the other drive takes over, the company said.

Transparent to the user

Novell said all this activity is transparent to the user and to the application software.

The second option is the Transaction Tracking System, a product that the company said ensures against interruptions or failures in LAN hardware from causing partially updated portions of data to contaminate or destroy the LAN data base.

In some network installations, according to the company, users may choose to use both disk mirroring and the Transaction Tracking System, the level of necessary protection being determined by the specific needs of each particular network installation.

SFT Netware Level II is priced at $3,995.

For further information, contact Novell, Inc., 748 N. 1340 W., Orem, Utah 84057.

Circle Reader Service Number 315

Gateway Ties Mainframe VM With DEC Units

FREMONT, Calif. — Interlink Computer Sciences, Inc. has introduced IBMVM/Decnet Gateway, which integrates mainframes running IBM's VM operating system with Digital Equipment Corp. computers.

IBMVM/Decnet Gateway enables users to access data residing on a DEC computer from an IBM CMS interactive, CMS batch or ISPF environment. It allows the mainframe user to send and retrieve sequential files to and from Decnet nodes, submit jobs to DEC batch and print queues, display data from DEC systems on a CMS terminal and change and delete files.

For bidirectional communications, Decnet users can access CMS minidisk files, VM batch subsystems and printer spool queues through the gateway's Digital-Initiated File Transfer (DFT) utility. Users can access IBM data at the record level to edit specific information or the entire file. File creations, updates and deletions reportedly appear to the Decnet user as if they were being executed in a native Decnet environment.

IBM Remote Spooling Communications Subsystem (RSCS) functionality grants peer-level-compatible access to nodes within a Decnet environment from the RSCS network for store-and-forward file transfers. IBMVM/Decnet Gateway also supports on-line command and message passing as well as electronic mail.

IBMVM/Decnet Gateway is currently available in two versions. A low-end 100K bit/sec. gateway with eight logical links is priced from $40,000 to $60,000. A high-end 500K bit/sec. gateway with 16 to 32 logical links ranges from $65,000 to $130,000.

For further information, contact Interlink Computer Sciences, Inc., Suite 203, 39055 Hastings St., Fremont, Calif. 94538.

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CIRCLE READER SERVICE NUMBER 242

Modem Connects IBM PCs To Minis

BILLERICA, Mass. — Ideassociates, Inc. announced the Ideacomm 5250/Modem software communications package and enhancements to Ideacomm 3278 and 5251.

Ideacomm 5250/Modem links IBM Personal Computers, PC ATs, XTs and portables to remote IBM System/34, 36 and 38 installations via an internal synchronous modem.

To make the PC-to-minicomputer connection, users need the 5250/Modem software and either a 2,400 bit/sec. UDS Sync-Up 201 or 4.8K bit/sec. UDS Sync-Up 208 internal synchronous modem from Universal Data Systems, Inc.

Ideacomm 5250/Modem supports a range of file transfer options including IBM's PC Support/36 and 38 and third-party packages.

Emulates IBM controllers

The product also emulates several IBM products including IBM 5251 Model 12 or 5294 cluster controllers and the IBM Enhanced Keyboard.

In addition, it provides complete monochrome or color 5250 terminal emulation for IBM 5251 Model 11, 5291 and 5292 Model 1 terminals.

The package also includes a documented programmatic interface that allows users to customize software for use with Ideacomm 5250/Modem as well as diagnostics and status utilities to verify proper functioning of the link. Ideacomm 5250/Modem is available now for $695.

Enhancements

Ideassociates also introduced enhancements to its Ideacomm 3278 local PC-to-mainframe communications package, including support for IBM 3278 Model 5 terminal emulation.

Ideacomm 3278 allows the PC to duplicate the functions of an IBM 3278 or 3179 terminal through local access to an IBM mainframe.

The enhanced version of Ideacomm 3278 provides 132-char. by 28-line full-screen support for 3278 Model 5 terminal emulations and full seven-color support for IBM 3170 terminal emulation.

It allows users to choose among several keyboard layouts including the IBM Enhanced Keyboard, Digital Communications Associates, Inc.'s Irma keyboard and Ideassociates' Idea keyboards. Ideacomm is immediately available for $995.

The company also announced enhancements to its Ideacomm 5251 board for PC-to-IBM System/34, 36 and 38 communications.

The enhancements include IBM 5292 Model 2 terminal support and 132-char. by 28-line full-screen support for its existing 3180 terminal emulation as well as a screen capture feature.

In addition, enhancements to Ideacomm 5251/Share, a software package that allows four PCs to access the System/34, 36 and 38 through one emulation board installed on a server PC, permits users to access terminal and printer emulation sessions.

Ideacomm 5251 retails for $895, and 5251 is priced at $495. Both are immediately available.

For further information, contact Ideassociates, Inc., 29 Dunham Road, Billerica, Mass. 01821.

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Applications Solutions	June 3	May 1	NCC
Software**	July 8	May 29	Siggraph
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Communications	September 2	July 31	TCA & Info '87
Information Centers**	October 7	September 4	
PC's	November 4	October 2	Comdex/Fall
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For more information, contact Ed Marecki, Vice President/Sales, *Computerworld Focus,* 375 Cochituate Rd., Box 9171, Framingham, MA 01701-9171 (617) 879-0700. Or contact your local *Computerworld* sales representative.

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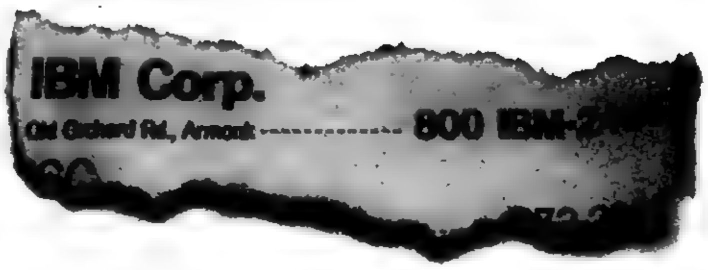

For the next generation of 3X communications, call the number on the right.

When you want to connect your IBM PC to your System 34/36/38, whom should you call?

Call the people on the right and you can emulate the most terminals, including the 5250 (with all 32 display attributes) and the 3180. You can support the latest laser-jet printers, the largest range of system printers, and the most up-to-date file transfer packages on the market—even IBM's. You can do windows and cluster with three other IBM PC's from your workstation. Most important, should you ever need help, the toll-free number on the right will put you in touch with a technical support team whose sole priority is to master PC based products.

Now call the people on the left, and you can emulate some terminals, a limited number of system printers, and not all of the 5250 display attributes. Of course you'll be able to work with IBM file transfers, but once the goods are delivered, can you work with virtually no support of PC based products?

So before you call the number on the left by force of habit, consider who's really giving you the best solutions in 3X communications. And ask yourself this.

Who should be emulating whom?

IDEAssociates™

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CIRCLE READER SERVICE NUMBER 238

COMMUNICATIONS PRODUCTS

Telenet Announces PC Telemail Package

RESTON, Va. — Telenet Communications Corp. has introduced PC Telemail, an electronic messaging software package for personal computers.

PC Telemail uses pop-up menus and function keys and, according to Telenet, can be learned quickly by novice users, with real-time help available at every point in the program. The package enables users to compose messages interactively or off-line using a built-in word processor. Users can also compose batch messages and place them in an electronic out box to be sent at a predetermined time.

Telenet added that PC Telemail allows users to send spreadsheets, documents, software files and graphics files that, when received, can be edited and revised. File transfer is done with local error detection and correction through the local Microcom, Inc. MNP networking protocol. The local MNP works in conjunction with the MNP protocol within Telenet's Public Data Network.

Documents created on PC Telemail can be sent by a variety of means, including Telenet's Telemail electronic messaging service, Telemail Telex and Telemail Xpress.

PC Telemail was designed to run on IBM and IBM-compatible Personal Computers. It requires a minimum of 256K bytes of main memory and can be used with monochrome or color graphics.

PC Telemail is priced at $150 for a single diskette, including documentation.

For further information, contact Telenet Communications Corp., 12490 Sunrise Valley Drive, Reston, Va. 22096.

Circle Reader Service Number 319

DA Systems Rolls Out Network Tools

CAMPBELL, Calif. — Three software packages that are aimed at making computer communications simpler and more cost effective have been introduced by DA Systems, Inc.

The Isobridge, the Hub and the Node software packages run on DA Systems' Dasnet wide-area network, a distributed, peer-to-peer network of IBM Personal Computers, IBM PC ATs and compatibles. According to the company, Dasnet makes it easy to send electronic mail and ASCII or binary files to other users running Dasnet software.

The three new software packages run on QNX, which is a Unix-based multiuser operating system, IBM PC-DOS or Microsoft Corp. MS-DOS.

The company said the Isobridge software and Dasnet local loop can communicate with one another, while the Node packages communicate with other Node software and the rest of the Dasnet through the Hub software.

Directory guides users

The software packages enable anyone on Dasnet to be addressed by computer name and user name, which can be found in a directory published by DA Systems.

After entering an E-mail message or file transfer request, the software handles the transmission without manual intervention, according to preset user specifications.

DA Systems added that built-in security measures protect data from unauthorized access or transmission on the network, and Dasnet commands and control files can be used to implement networked software applications.

Prices for the software packages range from $39.95 (requiring Hub access) through $1,390.

For further information, contact DA Systems, Inc., 1503 E. Campbell Ave., Campbell, Calif. 95008.

Circle Reader Service Number 320

Fiber-Optic Line Out For Fox LAN

DAYTON, Ohio — Fox Research, Inc. unveiled a line of fiber-optic products for the Fox 10-Net local-area networking system.

The 10-Net Fiber Optic Board was designed for 1M- or 2M-bit transmission speeds and uses the Ethernet protocol. It can be used either with the traditional 10-Net fiber-optic cabling or standard 10-Net twisted-pair wiring. Running with 10-Net networking software, the board reportedly provides all the 10-Net 3.1 local-area network functionality, the vendor said.

The 10-Net Fiber Optic Hub, a central processor that houses the network software and directs communications, resembles an AT&T Starlan hub and accommodates up to eight nodes. The hub also has a ninth connection that allows users to link hubs together. It operates at distances of two kilometers.

Links to fiber-optic cabling

The 10-Net Fiber Optic Repeater enables users to connect an established 10-Net cluster to fiber-optic cabling. It contains one connection each for fiber-optic and twisted-pair cabling.

The 10-Net Fiber Optic Repeater is currently available on a custom-order basis for $795. The 10-Net Fiber Optic Board, priced at $995, and Fiber Optic Hub, which sells for $1,995, are scheduled for general distribution in the first quarter of 1987.

For further information, contact Fox Research, Inc., 7016 Corporate Way, Dayton, Ohio 45459.

Circle Reader Service Number 321

Voice Computing Launches Voice Mail System

MADISON, Wis. — Voice Computing, Inc. rolled out Voiceline, a voice mail system for IBM Personal Computers or compatibles.

Voiceline automatically records messages if the user is out, selectively screens and forwards calls, monitors two telephone lines and operates continually even when the power to the computer is turned off. Users can also use Voiceline to record a message to someone; Voiceline then delivers the message at a predetermined time.

Voiceline runs on an IBM PC or compatible running Microsoft Corp. MS-DOS 2.1 or above. While Voiceline runs with a minimum memory of 256K bytes, the vendor recommends using 512K bytes. Voiceline is available at a suggested retail price of $1,295.

For further information, contact Voice Computing, Inc., 1250 Femrite Drive, Madison, Wis. 53716.

Circle Reader Service Number 322

Voiceline mail system features a directory and built-in clock.

CSI Offers SNADS Interface Product

SAN JOSE, Calif. — Communications Solutions, Inc. (CSI) added IBM Systems Network Architecture Distributed Services (SNADS) to CSI's Access line of communications software.

The product is a portable implementation of IBM's SNADS, an architecture for asynchronous or delayed program-to-program communications.

Access/SNADS interconnects IBM and non-IBM systems with IBM's electronic mail and offers document distribution that supports IBM's Document Interchange Architecture.

Tailored to Unix environments

Written in C for AT&T Unix System V, the software reportedly can be tailored to other Unix proprietary multiuser and local-area network environments.

Access/SNADS provides the basic software interface required to implement the document distribution function of an office system node such as IBM's Distributed Office Support System, System/36, System/38 and 5520 administrative system. It supports E-mail, document distribution, data base updates and software distribution.

Priced at $350 to $400 per node, Access/SNADS will be available by the end of the first quarter in 1987.

For further information, contact Communications Solutions, Inc., 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

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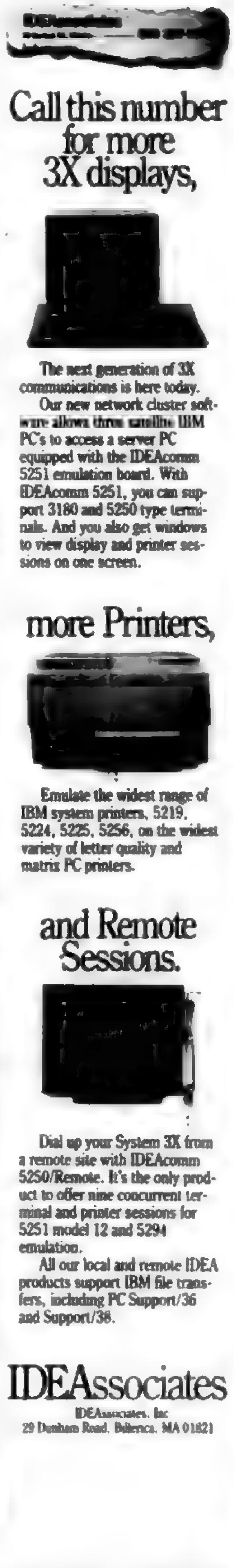

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Emulate the widest range of IBM system printers, 5219, 5224, 5225, 5256, on the widest variety of letter quality and matrix PC printers.

and Remote Sessions.

Dial up your System 3X from a remote site with IDEAcomm 5250/Remote. It's the only product to offer nine concurrent terminal and printer sessions for 5251 model 12 and 5294 emulation.

All our local and remote IDEA products support IBM file transfers, including PC Support/36 and Support/38.

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DON'T LET AT&T AND IBM STUNT YOUR GROWTH.

Expanding an SNA network requires scheduled outages. And leased multidrop lines can take weeks to install. No one should have to wait to grow. Especially when Telenet can expand your network fast and keep it available 24 hrs. a day.

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Telenet's dynamic alternate routing provides greater reliability than single-path leased lines. Our superior diagnostics facilitate fast problem isolation and repair. Plus monthly reports allow you to cost out departmental usage. And our built-in error checking assures data accuracy. Telenet has developed and installed more than 70 dedicated networks. We operate the world's largest public data network supporting over 1000 virtual private networks. And we're ready to help your company grow. For more information, have your computer call ours today.

TO REACH TELENET VIA TELEMAIL®:

- With a PC or terminal supporting asynchronous communications, using your modem, dial 1-800-424-9494.
- Wait for connection, then press carriage return (CR) twice.
- At TERMINAL=press CR.
- At @ type MAIL press CR.
- At USER NAME? type IBM.ACCESS press CR.
- At PASSWORD? type TELEMAIL press CR.

Or call us at 1-800-TELENET. Or send us your name and address via Telex: 248419.

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CIRCLE READER SERVICE NUMBER [illegible]

Systems Strategies Releases Portable IBM DIA, DCA Versions

NEW YORK — Systems Strategies, Inc. has announced CDIA and CDCA, document distribution and text formatting software packages.

The firm said CDIA and CDCA are portable implementations of IBM's Document Interchange Architecture (DIA) and Document Content Architecture (DCA) that let non-IBM systems access IBM's Distributed Office Support System (Disoss) to perform electronic mail, document distribution, library services and remote application services.

Systems Strategies said that with CDIA, non-IBM systems are able to send, receive and exchange documents as a source/recipient node with IBM office automation systems and also request task execution. Systems using CDIA can communicate with either a mainframe running Disoss/370 under IBM CICS or with an IBM System/36 running Personal Services/36 software. Documents are transported between systems in a program-to-program manner using Systems Strategies' CSNA/LU6.2 products.

Written in C

The company added that both CDCA and CDIA are written in the C programming language. The software reportedly can be rapidly ported to Unix-based systems and easily adapted for other operating systems.

Both CDCA and CDIA are packaged together in one unit. Units are priced at $220 each.

For further information, contact Systems Strategies, Inc., 225 W. 34th St., New York, N.Y. 10001.

Circle Reader Service Number 324

HERE'S HELP

Attachmate has answers to your questions about micro-mainframe communications. Hardware answers, software answers and now a guide packed full of answers to some important questions—questions worth asking *before* you make long-term decisions.

What should you know about IBM® standards, multiple sessions, windows, file transfer, API, and graphics?

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CIRCLE READER SERVICE NUMBER 250

Pcox Brand Gateway From CXI Bows

PALO ALTO, Calif. — CXI, Inc. has introduced its Pcox/GW-5250 Gateway, which connects an IBM Token-Ring or any other IBM Netbios-compatible local-area network (LAN) to IBM System/34, 36 and 38 minicomputers.

The product enables LAN-attached personal computers to function as IBM 5250 display stations or host-addressable printers.

CXI said the Pcox/GW-5250 Gateway emulates a remote IBM 5251 Model 12 display station operating via an IBM Systems Network Architecture/Synchronous Data Link Control (SDLC) link. The product supports concurrent emulation of a combination of up to nine host display and printer sessions, the vendor said.

The company claimed that as many as five of the nine sessions may be accessed concurrently from a single IBM PC situated on the LAN. Multiple gateways may also be installed on the same LAN to provide access to more than one System/34, 36 or 38 host.

No location restrictions

Because the Pcox/GW-5250 is connected to the minicomputer via synchronous modem, it eliminates location restrictions, CXI claimed. A gateway-equipped LAN may be located, for example, in the same room as the minicomputer or wherever telephone service is available. The company added that Pcox/GW-5250 also supports an optional file transfer facility for users who need to upload and download data between the PC and the host.

The Pcox/5250 package includes the SDLC adapter board, gateway software and user documentation. Four Pcox/5250 Gateway-WS workstation software kits are also included.

Pcox/GW-5250 is priced at $1,725, and additional workstation software kits are priced at $200 each.

For additional information, contact CXI, Inc., 3606 W. Bayshore Road, Palo Alto, Calif. 94303.

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5	25	45	65	85	105	125	145	165	185	205	225	245	265	285	305	325	345	365	385
6	26	46	66	86	106	126	146	166	186	206	226	246	266	286	306	326	346	366	386
7	27	47	67	87	107	127	147	167	187	207	227	247	267	287	307	327	347	367	387
8	28	48	68	88	108	128	148	168	188	208	228	248	268	288	308	328	348	368	388
9	29	49	69	89	109	129	149	169	189	209	229	249	269	289	309	329	349	369	389
10	30	50	70	90	110	130	150	170	190	210	230	250	270	290	310	330	350	370	390
11	31	51	71	91	111	131	151	171	191	211	231	251	271	291	311	331	351	371	391
12	32	52	72	92	112	132	152	172	192	212	232	252	272	292	312	332	352	372	392
13	33	53	73	93	113	133	153	173	193	213	233	253	273	293	313	333	353	373	393
14	34	54	74	94	114	134	154	174	194	214	234	254	274	294	314	334	354	374	394
15	35	55	75	95	115	135	155	175	195	215	235	255	275	295	315	335	355	375	395
16	36	56	76	96	116	136	156	176	196	216	236	256	276	296	316	336	356	376	396
17	37	57	77	97	117	137	157	177	197	217	237	257	277	297	317	337	357	377	397
18	38	58	78	98	118	138	158	178	198	218	238	258	278	298	318	338	358	378	398
19	39	59	79	99	119	139	159	179	199	219	239	259	279	299	319	339	359	379	399
20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400

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VIDEOTEX from page 7

management systems."

According to Bernell Wright, vice-president of the electronic services practice at Link Resources, "Videotex is part of the whole [corporate computing] trend toward distributed data bases and processing, away from remote data bases," Wright explains. "Half of the U.S. corporate videotex market consists of [IBM] Personal Computer owners who are not using their machines because they have trouble getting the right information from data bases."

Painless interaction

Wright explains that one of the major attractions of videotex is its ease of use and the simple dialogue established between user and data. He adds that videotex is part of a current movement, which includes artificial intelligence and expert systems, trying to make the interaction between management users and data as painless as possible.

VIA's Smith says another push behind videotex is a new awareness on the part of Digital Equipment Corp. and IBM of the potential of videotex for corporate clients. DEC, with its VTX videotex product, is leading the U.S. videotex vendor pack with about 85% of the current corporate videotex market, according to Link Resources.

In response, IBM has stepped up its own videotex offerings, providing color videotex support across its PC and 3270 terminal lines.

Moody's videotex system

"We use videotex to create and update on-line credit reports on municipal bonds for our clients," explains John Hegner, director of systems development at New York-based Moody's Investors Service. "It's important that the reports be updated quickly before the bonds are posted in the marketplace."

Hegner says Moody's clients use DEC's VTX videotex facility running on a DEC VAX-11/785 minicomputer over an Ethernet network and accessed through DEC VT100 terminals and IBM PCs. Moody's credit report software, which provides updated videotex data, was purchased from a third-party software house. Through DEC protocol conversion software, videotex users can also extract data from the IBM 4381 mainframe. "Videotex is letting us do in half an hour what used to take five to 10 days," Hegner says.

Link Resources' Wright adds one final but important attraction with videotex: "It's an application that cuts across all functional boundaries. Anyone can use it."

S.K.

• • • • • • • • • •

News section compiled by Computerworld Focus *staff members Stan Kolodziej, Michael Tucker and Rebecca Hurst.*

UPDATE from page 7

products like Macnix and Tops is likely to be in research, engineering and design departments in which users work on Macintoshes to off-load the Unix host.

Report Studies Overseas Telecom

Users should be able to take advantage of lower transmission costs in some overseas telecommunications but may face rising costs in others, a Diebold Group, Inc. study concluded.

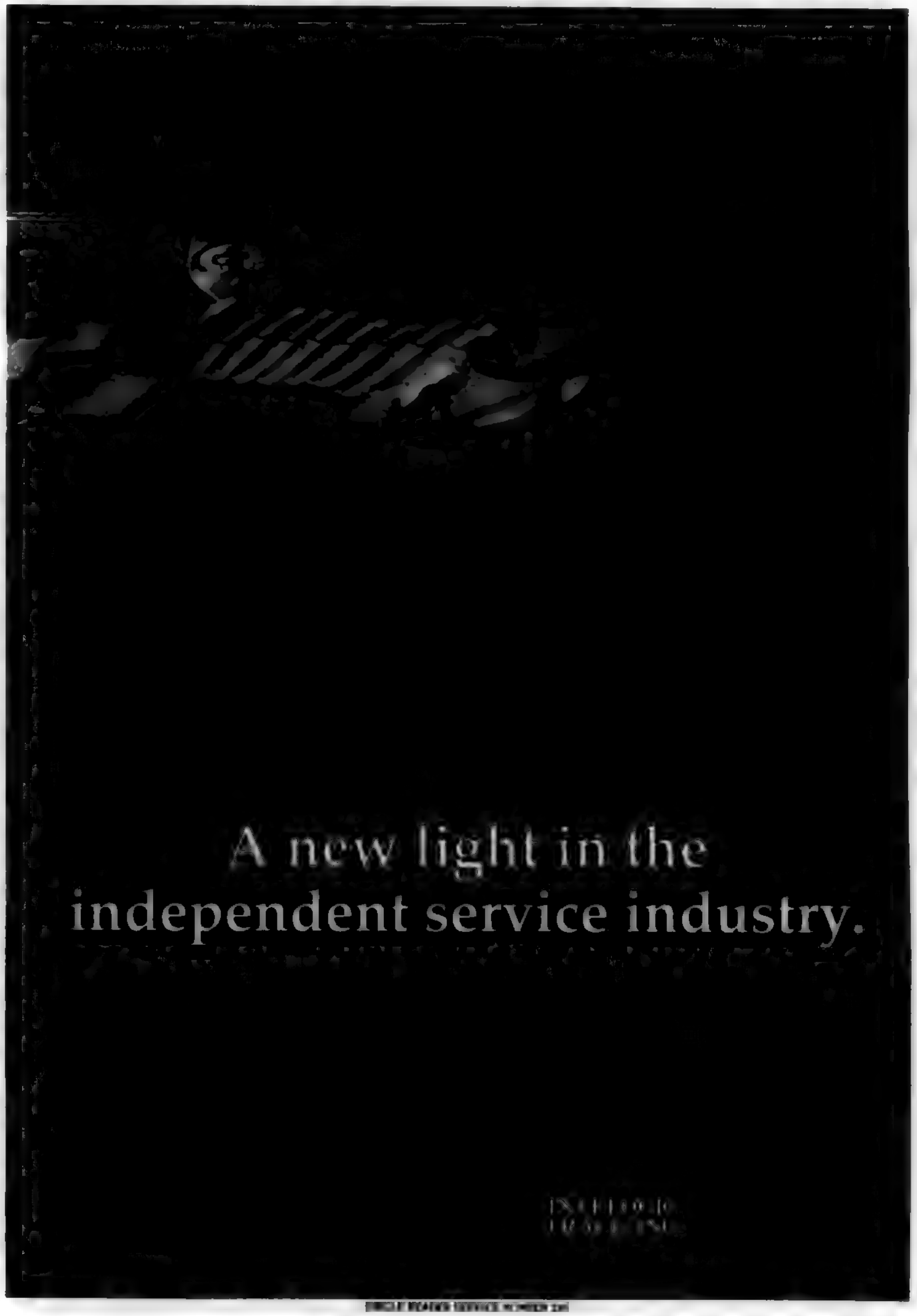
The breakup of the Bell system in the U.S. and deregulation of telecommunications services appears to have started a trend toward deregulation and privatization around the world, Diebold reported. Japan and the UK have already begun rewriting the rules that regulate their telecommunications services. In addition, firms such as MCI Communications Corp. and GTE Sprint Communications Corp. have been offering cut-rate international phone service, the Diebold report said.

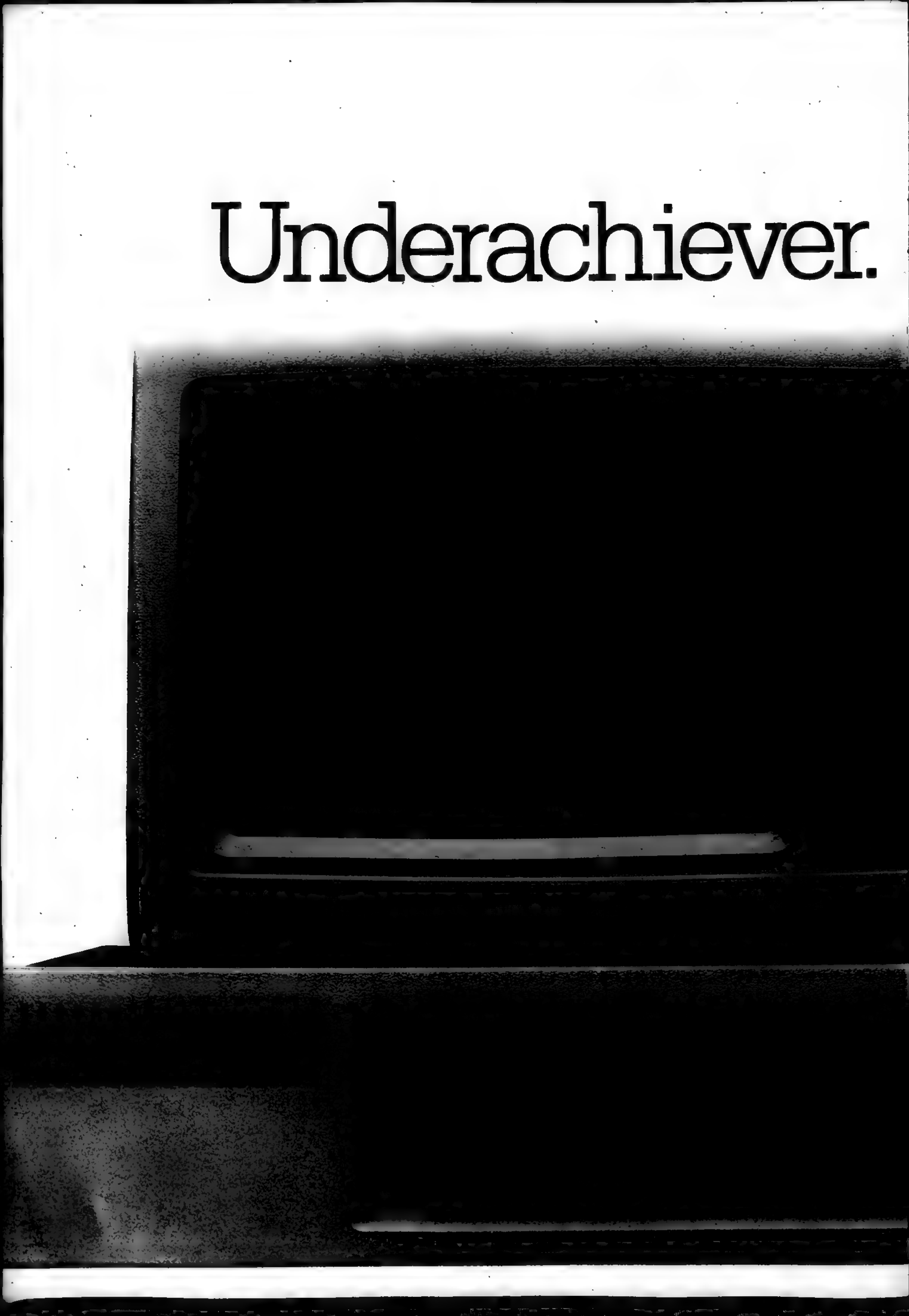
However, such rate tactics are expected to have little effect at the international level where there is a controlled monopoly, the research company asserted.

Many countries have made no effort to deregulate their telecommunications services, and rates in these nations are expected to rise.

In addition, countries such as West Germany continue to protect their national Postal Telegraph and Telephone (PTT) organizations, providing laws that give PTTs a monopoly on providing services, the report said. At times, the PTTs may hinder technological progress and inhibit growth by preventing firms from using the newest technologies, Diebold stated.

R.H.





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Feb. 2-5, Dallas — **Software Trends for Executive Planning and Strategy.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Feb. 9-12, Washington, D.C. — **Communications Networks.** Contact: CW/Conference Management Group, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Feb. 9-13, San Francisco — **James Martin Seminar.** Also being held March 16-20, New York; March 23-27, Chicago; April 27-May 1, Dallas. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Feb. 10-12, London — **Optical Memory Technology and Applications.** Contact: Rothchild Consultants, 256 Laguna Honda Blvd., San Francisco, Calif. 94116.

Feb. 11-13, Dallas — **Network Management, Control and Problem Determination.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Feb. 12-13, Chicago — **Understanding and Selecting Voice Messaging Systems.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Feb. 19-20, New Brunswick, N.J. — **Understanding Personal Computer Local-Area Networks.** Also being held Feb. 26-27, Boston. Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015.

Feb. 23-24, Washington, D.C. — **Metropolitan-Area Networks.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Feb. 23-27, San Francisco — **Data Base: A Builder's Guide.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Feb. 24-25, New York — **IBM: The Transition 1987-1992.** Also being held March 3-4, San Francisco. Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114.

Feb. 24-26, Atlanta — **Computer-Aided Software Engineering Symposium.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

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Information Technologies Inc. *800-431-3460;602-998-1033*	5
The Interface Group	46
Intelogic Trace, Inc. *800-531-7186*	57
Lachman Associates *800-LAI-UNIX; in IL, 312-505-9100*	41
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PCC/Systems *415-321-0430*	38
Technology Transfer Institute *213-394-8305*	36
Telenet *800-TELENET*	54-55
Teltone Corp. *800-426-3926; in WA, 206-827-9626*	44
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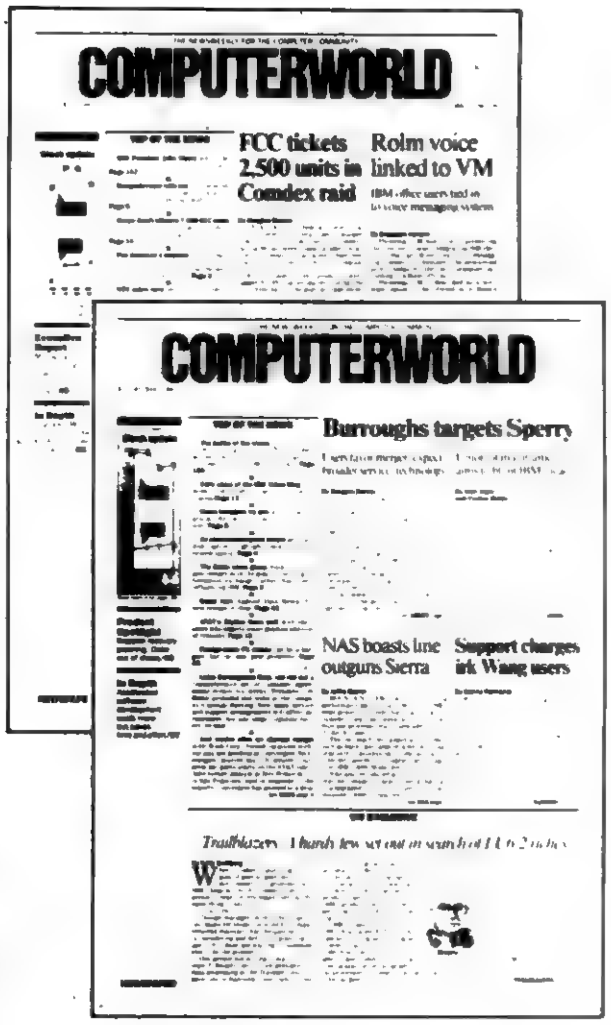

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INSIDE

In Depth: Maintenance: Can you control programming and keep users happy, too? **Page 61**

Executive Report: Users groups: Do they have influence? **Page 77**

- GOVERNMENT AGENCY demands data on airline reservation systems. Page 8.
- THE SECTION 1706 SAGA continues with the filing of a Senate bill that proposes to scrap the contractor tax provision entirely. Page 2.
- PACKET SWITCHES GO MICRO with the expected debut of a personal computer-based system that could make data networks much more affordable. Page 12.
- SPRING MUST BE COMING when 3Com undergoes its annual rite of being jilted at the altar. Page 132.
- THE MAINFRAME SALES slowdown shows up in IBM Credit Corp.'s 1986 financial report. Page 101.
- STILL WAITING FOR ALL THE Vaxmate pieces, DEC customers hope the microcomputer will live up to promises. Page 27.
- "ROCKET SCIENTISTS" DESERT RCA to launch Merrill Lynch management science group. Page 91.
- CHICAGO MEDICAL CENTER stays with Unisys after considering IBM dual processor. Page 49.
- WEST GERMANS GET AN EARLY look at enhancements to Software AG's Natural 2. Page 15.
- TAKEOVER OF SOFTWARE International takes its toll as executives jump or get pushed from the Computer Associates battlewagon. Page 10.

Feds drive to unleash Bells

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Department of Justice last week recommended that U.S. District Court Judge Harold H. Greene unleash the seven regional Bell holding companies and allow them to enter the fields of information processing services, equipment manufacturing and, to a limited extent, long-distance service.

If Greene agrees to remove the restrictions imposed by the AT&T divestiture judgment in 1982, the companies could provide electronic mail, voice mail, videotext, access to on-line data bases or any other information processing service. They also could undertake joint ventures with equipment manufacturers and offer long-distance service outside their regions.

The sweeping deregulation proposal would provide end users with seven new vendors to consider — each of which had greater 1986 revenue than Digital Equipment Corp. and whose combined profits of more than $7 billion exceeded IBM's — but users greeted the proposal with a mixture of skepticism and apprehension about another overhaul of the nation's telecommunications marketplace.

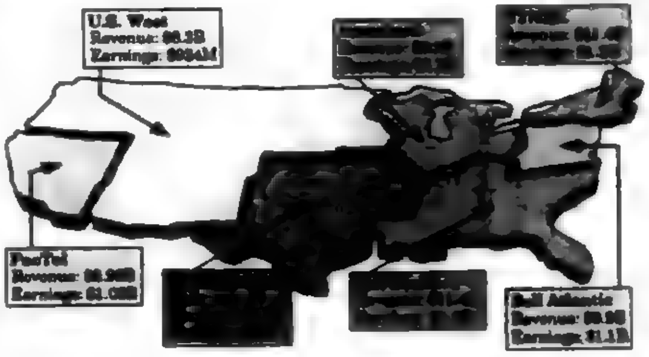
The International Communications Association, a major users group for communications managers, along with vendors of data communications products, criticized the proposal on the grounds that it relies too heavily on having the Federal Communications Commission prevent monopolistic behavior by the regional holding companies.

"I don't like to rely on the FCC. The FCC had a hell of a time regulating AT&T five years ago," which led to the AT&T divestiture, said Bob Bennis, ICA's director of telecommunications public policy. Bennis recently retired as corporate manager of

Continued on page 6

The thunder of seven Bells

Wealthy regional holding companies eye new markets



CW CHART: MITCHELL J. HAYES

Is FCC willing to bar abuse?

BY ELISABETH HORWITT
CW STAFF

ANALYSIS

The chorus of objections from the telecommunications industry to last week's Department of Justice proposal centers on one question: How is the Federal Communications Commission going to prevent the local exchange carriers from running roughshod over their competitors if the Justice Department resigns its role as regulatory watchdog?

Telecommunications vendor and users group spokesmen claim the proposal gives the regional carriers unwarranted new freedom and, at the same time, abolishes the regulatory framework that would keep them from abusing that freedom. "The [regional holding companies] don't need federal relief; they are large, powerful companies," says Robert Aldrich, an attorney

Continued on page 7

DEC to fill VAX low end with $10,000 workstation

BY NINAMARY BUBA MAGINNIS
CW STAFF

Digital Equipment Corp. is expected to round out the low end of its VAX minicomputer line tomorrow by announcing its single-user Vaxstation 2000 and multiuser Microvax 2000 systems and the ability to cluster them in a local-area environment.

The company is also expected to introduce enhancements to its low-end local-area Vaxcluster technology that was announced last November.

The announcement, analysts say, will strengthen DEC's strategy to provide a common architecture, operating system and networking capability that covers low-end, intermediate and high-end computing.

The 2000 series systems, known as Vaxstar, will be monochrome and run under both VMS and Ultrix, DEC's version of Unix, operating systems. Performance estimates for the new machines are as high as 0.9 million instructions per second, according to sources close to DEC. That is equal to the performance of the Microvax II and almost equal to the one-time high-end DEC system, the VAX-11/780.

The Vaxstation 2000 workstation, aimed at the engineering and scientific markets, will run the DEC QVSS graphics system and will be Q-bus compatible so that it can run Microvax peripherals. An entry-level configu-

Continued on page 134

Screws tighten on 4381

Growing power needs pressure aging CPU line

BY STANLEY GIBSON
CW STAFF

The coming year promises to be a fateful one for users of the IBM 4381, a machine that is in jeopardy because it is surrounded by 9370s from below and 3090s from above.

Having received a mid-life kicker last year, the 4381 could be heading into its final months of production, or it could be due to get a new lease on life, according to industry watchers.

Opinion diverges into two paths: IBM must either carry a separate 4381 line with a relatively small range of performance options, or it must migrate current 4381 users to the low end of the 3090 series or to an expected higher end of the 9370 series.

"I'm in some doubt if it will be an extension of the 9370 or a new 4381. I don't think IBM knows. They do the development and then decide a week before the announcement date," says Per Flaatten of Arthur Andersen & Co. in Chicago.

The issue is becoming a pressing one in the 4381 community, because many users say they are running out of breathing room and will need a new machine within the next year.

"We're going to need something within 10 or 12 months, or we might have to replace the 4381 with a small 3090," says Bob Smith, data center manager at Rosemount, Inc. in Eden Prairie, Minn. Smith says he and his friends in the user community anticipate two larger models coming out shortly.

Doug Murphy, director of

Continued on page 132

The 3090 shuffle

Surveyed users plan to buy fewer 3090s; the industry debates upgrades. Page 4.

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IN THIS ISSUE

Big things in little packages. As DEC increases disk drive power for MicroPDP-11 minis, users wait patiently for the elusive Vaxmate PC AT-compatible, and computer-aided software engineering comes to VAX/VMS processors. **Pages 19,27,49**

Network security. Controlling and managing access to network resources is the aim of vendors and users alike. **Page 39**

NEWS

4 Interest in 3090s takes a dive, but the older line is more popular, survey finds.

4 IBM says horizontal 3090 upgrade technically possible.

6 Regional holding companies hail lifting of restrictions recommendation.

6 Long-distance companies worry about implications of Justice Department's regional holding company ruling.

8 National airlines' automated reservation systems queried.

8 Return to sender: Managers don't want mail-order PCs.

8 Artificial Intelligence link ties mainframes, personal computers.

8 MAP/TOP Users Group, Corporation for Open Systems merge minds.

10 Software International undergoes staff changes as Computer Associates takes over.

12 Rolm fills hole in PBX line.

12 Amnet adds full-function packet switch.

13 Rollout blitz expected as vendors meet at Comnet this week.

14 Xerox combines Ventura software in desktop systems.

15 Volume discounts, corporate support seen for Q&A users.

15 West Germany's Software AG revs up its 4GL.

132 Sun makes Centram an offer too good to resist.

132 Jilted 3Com rebounds with product intros.

134 Equipment leasing lessens risk of obsolescence, users say.

Executive Report *They remain forums for sharing ideas and are good excuses for junkets to San Francisco, but do users groups have influence? By Glenn Rifkin. Page 77.*

SOFTWARE & SERVICES

19 BST's Endevor-DB software imposes change control on Cullinet's IDMS/R.

19 DEC VAX/VMS environment to gain CASE products.

MICROCOMPUTING

27 Users await release of DEC Vaxmate expansion box.

27 Kaypro slashes prices on AT-compatibles.

27 Document Description Language comes to existing applications software.

NETWORKING

39 CDC brings gateway software and integration services to users.

39 Proteon enhancements add network management, internetworking capabilities to LANs.

39 AT&T proposes lower interstate rates.

SYSTEMS & PERIPHERALS

49 IBM offers credit on disk drive replacements.

49 Chicago medical center chooses Unisys over IBM for system upgrade.

49 DEC boosts Micro-PDP-11 drives.

MANAGEMENT

91 Merrill Lynch grabs RCA scientists in hopes of expanding global marketplace.

91 Study says software maintenance backlogs, budgets will grow.

91 Study says software maintenance backlogs, budgets will grow.

91 SRI launches security information institute.

COMPUTER INDUSTRY

101 Banyan pins hopes on users' multitude of dissimilarnetwork solutions.

101 Compaq reports prosperous 1986.

101 Migent turns the tables, hits Ashton-Tate with lawsuit.

101 Business not booming for IBM Credit Corp.

IN DEPTH

61 Good guy, tough guy: Maintenance managers face a greater challenge than managers of new projects. An on-line management system can help keep both programming work and users under control. By Richard Lefkon.

OPINION & ANALYSIS

17 Newquist talks back to his computers.

19 Morton compares IBM with a wagon maker offering square wheels.

27 Zachmann examines a 3-D program for PCs.

39 Horwitt stands up for Bellcore.

49 Raimondi says scientific systems are a hot market.

91 Packer aligns the information systems exec with the top brass.

101 Alper reports on AI's coming of age.

DEPARTMENTS

16 Editorial

91 Book Review

92 Calendar

Contractor tax repeal pushed in Senate

BY DAVID A. LUDLUM
CW STAFF

WASHINGTON, D.C. — U.S. Sen. Alfonse M. D'Amato last week introduced a bill to repeal Section 1706 of last year's tax reform act, which has forced many free-lance computer professionals to give up their independence.

D'Amato (R-N.Y.) was joined in sponsoring the bill by Democratic Sen. Christopher J. Dodd of Connecticut. Their proposal calls for retroactive repeal of Section 1706 and reestablishment of the 1978 "safe harbors" that have allowed most free-lance technical contractors to be taxed as independent businesses.

"Section 1706 is an inequitable law that unfairly punishes men and women in arbitrarily selected occupations," said D'Amato, adding that no public rationale has been established for targeting computer and engineering contractors.

"It is bad enough that the independent contractor issue was never studied [as Congress intended], but Section 1706 was neither the subject of a hearing nor any meaningful floor debate," D'Amato said.

Section 1706, which took effect Jan. 1, was slipped into the tax overhaul act by Sen. Daniel Patrick Moynihan (D-N.Y.) in June. The law has prompted strenuous lobbying by trade groups seeking to eliminate it.

Many independent computer professionals have been outraged since late last year as they learned that Section 1706 might require them to become an employee of the broker through which they work, necessitating that taxes be withheld from their pay and forcing them to give up a variety of tax deductions.

Last month, the Internal Revenue Service issued a clarification of Section 1706 that said the law applies to subcontractors working through a broker but not to free-lancers contracting directly with clients.

IBM woos top MIS execs

Shares product strategy with major accounts

BY JEAN S. BOZMAN
CW STAFF

IBM shared some of its future product strategy with 150 of its best customers last week in a special meeting designed to kick off what the company has termed "The Year of the Customer."

At a time when IBM has been faced with criticism of its multifaceted array of products, the meeting gave the information directors who spend the most on IBM's products a chance to speak directly to IBM's highest executives. Among the latter were Chairman John F. Akers, Edward E. Lucente, vice-president and group executive of the Information Systems Group, Ralph E. Gomory, IBM senior vice-president and chief scientist and Edward B. Altman, vice-president of the Data Systems Division and general manager of the Kingston, N.Y., facility.

IBM's Akers

Among the users who attended were representatives of: Merrill Lynch & Co.; Metropolitan Life Insurance Co.; Texaco, Inc.; Travelers Insurance Co.; and Mellon Bank, N.A.

The information presented was different more in kind than in specifics. It struck listeners as somewhat unusual for IBM to be stating outright its directions in network architecture, office strategies, hardware and operating systems for the next few years. Among the topics covered, attendees reported, were standard user interfaces and audio-response office automation software.

However, IBM was also looking for feedback from its valued customers. "We wanted to listen to these customer executives and to give them information on building their strategies for the future," a company spokeswoman said. The initial response was quite favorable, an informal survey showed. "Something that hit home with me was that the top executives were participating," said Daniel Cavanagh, senior vice-president of data processing at Metropolitan Life.

There will be more such meetings in the future, IBM said. Users who attended seemed pleased with the trend. "This is the first step in allowing customers to see into the secret world of IBM product strategy," George DiNardo, executive vice-president of Mellon Bank in Pittsburgh, said.

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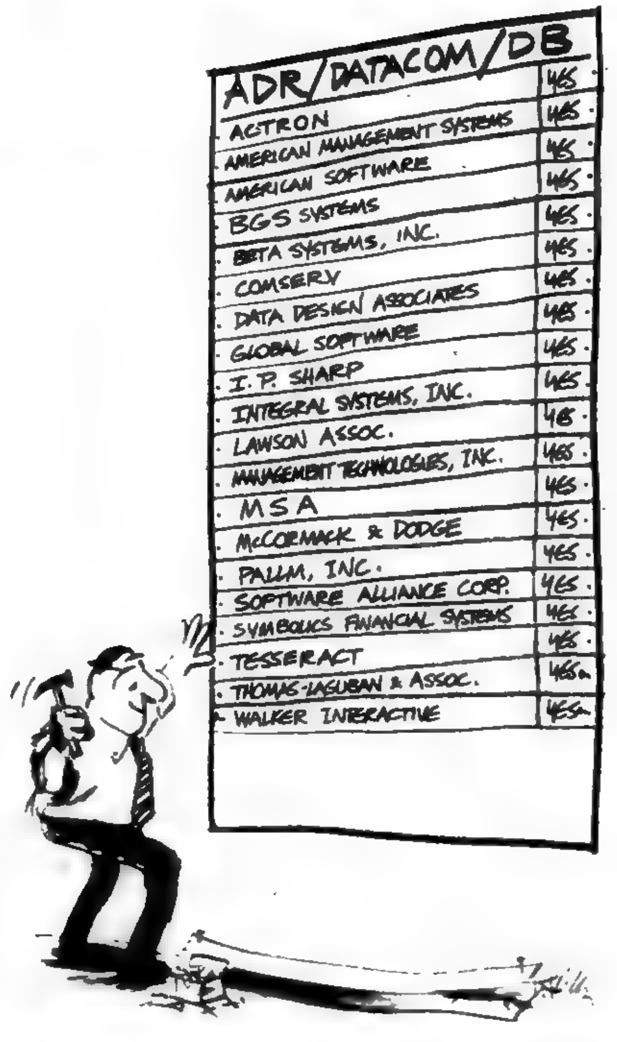

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Interest in IBM 3090 dove since June

BY JAMES CONNOLLY
CW STAFF

FRAMINGHAM, Mass. — Interest in IBM's 3090 mainframes plummeted, while the older 3080 processor line grew in popularity during the six months leading up to IBM's restructuring of the 3090 family, according to a survey recently completed by a market research firm here.

The products suffering the most are those in the lower half of the 3090 family — the 3090 Model 150 and 180 uniprocessors — while the greatest gains were recorded by the older 3084 four-processor systems, according to International Data Corp (IDC). IDC based its projections on quarterly telephone surveys of 500 IBM mainframe sites. In each survey, managers were asked about their acquisition plans for the next six months.

Where 331 customers surveyed said they expected to buy 3090 uniprocessors in June, planned acquisitions slipped to 53 in January, only days before IBM enhanced the 3090s. About 300 Model 150s and 180s have been installed since last spring.

Meanwhile, the IBM 3081 and 3084, which reportedly are available on the used market for 40% of their list price or less, showed gains in acquisition plans. Planned 3084 installations more than quadrupled, from 14 in June to 83 for the first half of 1987.

Plans for 3090 Model 400 four-CPU systems rose from 49 in June to 145 in September before slipping to 98 in January, according to the survey. Analysts at IDC and other research firms have said the price/performance ratios of the enhanced systems made them more competitive with used 3080s.

Ken McPherson, director of market analysis for IDC's Market Analysis and Statistics Group, said the published results relate to full systems and that consideration of upgrades, such as conversion of 3090 Model 200s into Model 400s, would add to the number of 3090 orders.

'Looking for alternatives'

"What it all means to me is that there are a lot of people looking around for alternatives," McPherson said, noting there is no sign that IBM competitors such as Digital Equipment Corp. are having a major impact on 3090 sales.

He said the surveys asked why customers are not buying. "Six months ago, 70% to 80% were saying they had plenty of power, with about 20% saying they were considering their options. Now, 60% are considering their options. It means that for a year or a year and a half, people had plenty of power, and now they are running out," he said.

McPherson theorized that the problem with the 3090 uniprocessors is that customers can get comparable performance for less money with a used 3080.

When asked about the IDC report, an MIS manager who plans to acquire a Model 150 said he was disappointed with the performance improvements and the $50,000 price cut in the 3090 Model 150E. He still plans to order the 3090, although he said an upgrade to a 3081 would be slightly cheaper. He said a barrier to his opting for a 3081 was the fact that he would have to return to his superiors to justify the change in plans.

A second manager reported his company is largely unimpacted by the 3090 announcement because the firm has adequate computing power for this year. However, he added that if he were faced with the decision, he would give serious consideration to ordering a used 3080 instead of a new 3090 uniprocessor.

IBM 3090 upgrade path

Feature	180E Direct Purchase	180E-200E Upgrade Costs	200E Direct Purchase
Processor (memory)	$2,200,000 (32M bytes)	$1,370,000	$4,100,000 (64M bytes)
Additional Memory	-	[illegible]	-
Channels	16	-	32
Additional Channels	-	[illegible] (16 channels)	-
3089 Power Source	One Included	$38,000 (one additional)	Two Included

CW CHART

Enhancements possible on current 3090 models

BY STANLEY GIBSON
CW STAFF

IBM revealed that it is "technically possible" to upgrade a 3090 model to an enhanced version of the same number, despite the fact that the company said it would only sell upgrades to the next highest model. Following the announcement last week, some users said they would like to see such an upgrade.

When IBM announced upgraded versions of all existing 3090s [CW, Feb. 2], it stipulated that current 3090 users could only upgrade their machines to the enhanced — or "E" — version of the next most powerful machine. For example, a 150 cannot be upgraded to a 150E; it can only be upgraded to a 180E or higher.

Several consultants last week said IBM will not sell a horizontal upgrade because it wants to sell more "iron" to beef up its bottom line.

"From a business point of view, they have constrained the upgrade path to maximize profit. It will mitigate the difficulty of first-quarter results. But it also keeps the factory busy on a longer term. A subsidiary benefit is to spread revenue over a longer period," offered Mike Geran, vice-president of research at E. F. Hutton & Co.

Dale Kutnick, an analyst with the Gartner Group, Inc., a Stamford, Conn., research firm, said, "It's straight marketing. It has nothing to do with technology."

'No significant difference'

Also in its announcement, IBM said users who order an enhanced version now must receive the computer in two stages, the first stage being equivalent in power to an existing 3090. An IBM spokesman elaborated to say that there is "no significant difference" between a stage one E model and the 3090 it replaces.

Although IBM said that full E-model power will be added after the date of May 1, an IBM spokesman revealed that during the first months of the 3090E model production run, which is currently in progress, more powerful components will be gradually added.

As a result, a stage-one 3090E produced in February, for example, will have few of the new components, while a machine produced later in the run will have almost all new components.

The components in question are denser thermal conduction modules and 4M-byte cards containing more powerful 1M-bit chips.

After May 1, IBM maintenance personnel will bring the machine up to full E-model power through the addition of the remaining components.

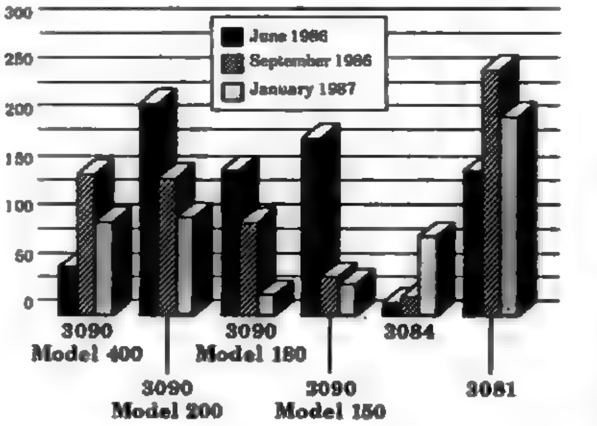
The procedure raises a question: How much added power would be available to a user before the full upgrade is performed? An IBM spokesman was unsure as to whether the increased power of the new components would be available to users prior to the full upgrade.

However, computer industry analyst Bob Djurdjevic, president of Annex Research, Inc. in Phoenix, said, "If the new chips are built-in, it's going to be reflected in performance." Looking at it from the standpoint of a buyer who must buy now, it is all to the better, because he will get increased power, Djurdjevic added.

"But if you don't need to get [a new 3090] now, chances are you will do better to put it off until after May 1," despite the $25,000 to $125,000 discounts IBM is offering to buyers who purchase now, Djurdjevic said.

The 3080 revival

Poll tracking 500 IBM users shows new strength for old machines



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CW Communications International
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Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
617/879-0700

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Holding companies hail proposal

BY DONNA RAIMONDI
CW STAFF

The Department of Justice's recent recommendation to lift restrictions from the Bell regional holding companies met with swift approval and cries of "More!" from the holding companies.

Nynex Corp. Chairman Delbert C. Staley called the recommendation for relief from the restrictions of the Modified Final Judgment an important first step toward bringing information-age services to its customers.

Echoing Staley's comments was Thomas Bolger, chairman and chief executive officer of Bell Atlantic Corp., who added that he was greatly encouraged. A spokeswoman for Pacific Telesis Group said it was "generally pretty pleased" with the report's recommendation.

While AT&T and the Competitive Telecommunications Association (Comptel), which includes U.S. Sprint Communications Co. and smaller long-distance companies, protested vigorously, the holding companies urged U.S. District Court Judge Harold Greene to heed the Justice Department's recommendation and to lift all restrictions now placed on them.

"We feel [the Department of] Justice has taken a major step in the right direction, but they didn't go far enough," said a spokesman for Ameritech, which is the Chicago-area holding company.

The most glaring issue is the continuation of long-distance restrictions under the Justice Department's recommendation, the spokesman said. Currently, the holding companies are not allowed to engage in long-distance services.

Under the proposed changes, a holding company could offer long-distance service only outside of its own region.

Preventing exploitation

The long-distance restriction was designed to prohibit holding companies from exploiting their local monopolies by discriminating against potential long-distance competitors that must hook up to the holding companies' exchanges, the Justice Department report said.

"Many of our customers would prefer a single point of contact for all of their telecommunications needs, and we are simply not allowed to do that now," Ameritech's spokesman complained.

The services package Ameritech wants to offer includes selling customer-premise equipment, local and long-distance service and specialized data services such as forming, installing and maintaining networks for corporate customers.

Complete services

The only way holding companies could offer complete long-distance service in the future, according to the 210-page Justice Department document, would be if the individual state public utilities commissions or legislatures decided to open local telephone monopolies to competition.

Even so, the long-distance suggestions met with harsh words from Comptel.

"The [holding companies] are intentionally and aggressively providing a preferential arrangement to themselves" in areas like intra-local access and transport area (LATA) toll services, a Comptel statement said.

The association claims that the holding companies deny smaller telephone companies access to ease of dialing and engage in price discrimination for intra-LATA access services.

Senior Editor Patricia Keefe contributed to this report.

Feds drive

FROM PAGE 1

communications systems at Westinghouse Electric Corp. in Pittsburgh.

Although the regional holding companies still have monopoly power over phone services within their individual regions, Justice Department officials said the restrictions can be lifted because the FCC now requires the companies to provide competitors with equal and fair access to the local network, via the Comparably Efficient Interconnection and Open Network Architecture rules.

According to Brian R. Moir, the ICA's Washington, D.C., counsel, ICA members and many vendors are troubled that the major antitrust safeguard embraced by the Justice Department is Open Network Architecture, an undefined and untested concept.

Concerning long-distance service, the Justice Department said a regional holding company should be permitted to offer long-distance service that is entirely outside its region, because there the companies do not control the local exchange monopoly and cannot unfairly disadvantage long-distance rivals.

However, the department said the holding companies should be prohibited from offering long-distance service that originates or terminates inside the company's region.

For example, Nynex Corp., the regional holding company serving New York and New England, could offer long-haul service between Los Angeles to Atlanta but not between New York and Boston.

The Justice Department said this last restriction, against in-region long-distance service, could be waived if state regulators allow competition in the local exchange market (see story page 7).

Bennis, the ICA official, warned that it is premature to let the regional holding companies enter the long-distance market, given the shaky condition of MCI Communications Corp. and U.S. Sprint Communications Co.

"I'm really worried about whether three years from now you'll have a viable, competitive [long-distance] market out there. You may have seven regional companies and AT&T and no one else," he said.

Freeing the Baby Bells
Department of Justice recommendations

LINE OF BUSINESS	JUSTICE DEPARTMENT RECOMMENDATION
Long-Distance Service (Metropolitan, regional, national networks)	Allowed only outside AT&T Bell region. In-region networks allowed after state opens local exchange to competition.
Information Services **(Electronic mail, voice mail, videotex, on-line data bases)**	**Must comply with FCC's Open Network Architecture rules to give other vendors equal access to the local exchange.**
Equipment Manufacturing (Central-office switches, transmission equipment, private branch exchanges, terminal equipment)	Subject to FCC's rules against anticompetitive behavior.
Nontelecommunications **(Real estate, financial services, foreign businesses)**	**Completely deregulate. Abolish the line-of-business waiver process.**

CW CHART

Consumers fear plan will push rates higher

BY DONNA RAIMONDI
and PATRICIA KEEFE
CW STAFF

As the regional holding companies exult at the business possibilities opened by the Department of Justice recommendation to abolish restrictions against them, other groups wonder who will pay for holding company forays into new, unregulated ventures.

The Competitive Telecommunications Association (Comptel), an association consisting of U.S. Sprint Communications Co. and a number of small long-distance companies, is worried. Although the regional holding companies are prohibited from using ratepayers to subsidize unregulated businesses, spokesmen for three holding companies refused to dismiss concerns that user rates will rise if the Justice Department's recommendations are adopted.

Pressed on this issue, a spokeswoman for Pacific Telesis Group (Pactel) said the fears voiced by consumer groups are premature. "We all have to wait and see what the courts are going to do," she observed.

'A lot of regulation'

Conversely, a spokeman for Bell South Corp. said that regulations against cross-subsidies will not go away. "There would still be a lot of regulation from the Federal Communications Commission and from public service commissions in each of the nine states we service," he explained.

"The [divested Bell operating companies] have a vast ability to subsidize their competitive services from revenues obtained from their captive monopoly ratepayers," Comptel said. "Such cross-subsidies would be anticompetitive and would drive up rates for local telephone service." A report to the California Public Utilities Commission (PUC) charged that Pactel and its subsidiaries subsidized its competitive businesses with monopoly ratepayer funds. The PUC was concluding hearings on the charges last week and is expected to issue a ruling in four to six months.

Most of the holding companies have already entered a number of nonregulated ventures. Chief among them are credit, leasing and service support; real estate management and development; mobile cellular phones; computer retail stores; software; and the sale of telephone equipment. Few of the companies would elaborate on the new industries they are most likely to target should the Justice Department's recommendation be adopted.

One of the most aggressive holding companies is Bell Atlantic Corp., which has pursued a policy of acquisition to enter new markets. Among its purchases are Sorbus, Inc., the Compushop, Inc. retail chain and Tricontinental Leasing Corp.

"We will look at the markets open to us to determine where our participation allows us to meet customer needs," commented Bell Atlantic Chairman and Chief Executive Officer Thomas E. Bolger. A spokesman said the company did not want to "bare its strategy" concerning new ventures.

E-mail 'a natural'

A spokeswoman for Pactel was more forthcoming. "In the past, we have really focused our interests on the information-services businesses vs. manufacturing and long distance." Under its international division, Pactel operates an electronic mail service called One-to-One. "Electronic mail would be a natural. We are building up expertise in this area," she said.

One hotly contested area that the holding companies are likely to jump into is electronic Yellow Pages. "Obviously, that is one area we would move into almost immediately. Our planning could shift into high gear with [U.S. District Court Judge Harold] Greene's lifting the restrictions," an Ameritech spokesman said. Traditional newspaper publishing organizations like the American Newspaper Publishers Association have claimed for years that electronic Yellow Pages would be a threat both to competition and to the First Amendment — a claim the holding companies say is merely the newpapers protecting their ad revenues.

Nynex Corp., in addition to purchasing the IBM Product Centers last year, has exhibited a strong focus on software, purchasing three companies.

Bell South's Bell South Enterprises handles all of its nontelephone businesses. These include advertising and publishing services for its Yellow Pages and multitenant telecommunications services for convention centers. "It is premature to speculate on what we will be going into at this time, because we have no idea what the judge is going to do. But some information services that have been discussed a lot are voice messaging, electronic mail, home banking, credit card authorization by telephone and energy management systems by telephone," the spokesman said.

Proposal raises questions on jurisdiction

BY ELISABETH HORWITT
CW STAFF

A key area of concern for all segments of the telecommunications industry is how the U.S. Department of Justice, the Federal Communications Commission and state public utility commissions will divide up responsibility for implementing the new regulations — particularly those relating to the interexchange market.

The Justice Department has recommended that the local exchange carriers be allowed to offer interexchange transmission services anywhere outside their own local access transport areas. However, the department further suggests that "the prohibition on such 'in region' service be lifted only in those areas where the states remove the regulatory protection that guarantees the local Bell company a monopoly franchise for local telephone service."

Judge Greene

Carriers that serve several states have already run into the problem of local authority. For example, in December, the Massachusetts Public Utilities Commission (PUC) determined interexchange carriers would be allowed to offer local service within the state. A similar decision was made in New York, according to Nynex Corp. manager of public relations Richard Adler. Under the Justice Department's ruling, Nynex would probably be allowed to offer interexchange services in Massachusetts and New York but nowhere else within its region.

The PUCs, most likely, will also be among the regulators of the local exchange carriers' other business ventures, says Kevin Sullivan, one of the leading attorneys for the Justice Department in the AT&T antitrust case, because one function of their jobs is to guard their ratepayers against unfair charges. Here again, local carriers may be given more leeway in one state than in another.

The most important question, of course, is whether — and when — Judge Harold Greene will approve the Justice Department's proposal. Greene has several times gone against the department's recommendations — but always in the direction of leniency toward the local carriers, Sullivan points out.

Greene is likely to act quickly in this instance, Sullivan suggests. He estimates that a decision should be made by late fall or winter of this year.

Is FCC willing?

CONTINUED FROM PAGE 1

for vendor organization North American Telecommunications Association. "The Department of Justice wants to indulge their appetites without providing a curb."

Under fire are two FCC regulatory actions initiated last year. The FCC's Open Network Architecture (ONA) plan, scheduled to go into effect next February, permits the operating companies to offer enhanced telecommunications services only if their competitors and customers are guaranteed the same type of access to the local transmission services that carry such offerings. The FCC's recently announced accounting guidelines would ensure more detailed cost allocation among local carriers' regulated and deregulated businesses.

This is to prevent the local carriers from using the profits from their local telephone monopolies to finance business ventures in the deregulated markets.

Unevaluated guidelines

Telecommunications industry group spokesmen have complained that they have not yet had a chance to evaluate the effectiveness either of ONA, which local carriers claim is still in the planning stage, or the FCC's accounting guidelines, which were just released last Friday.

Another complaint is that the FCC has neither the resources nor the will to enforce its new regulations.

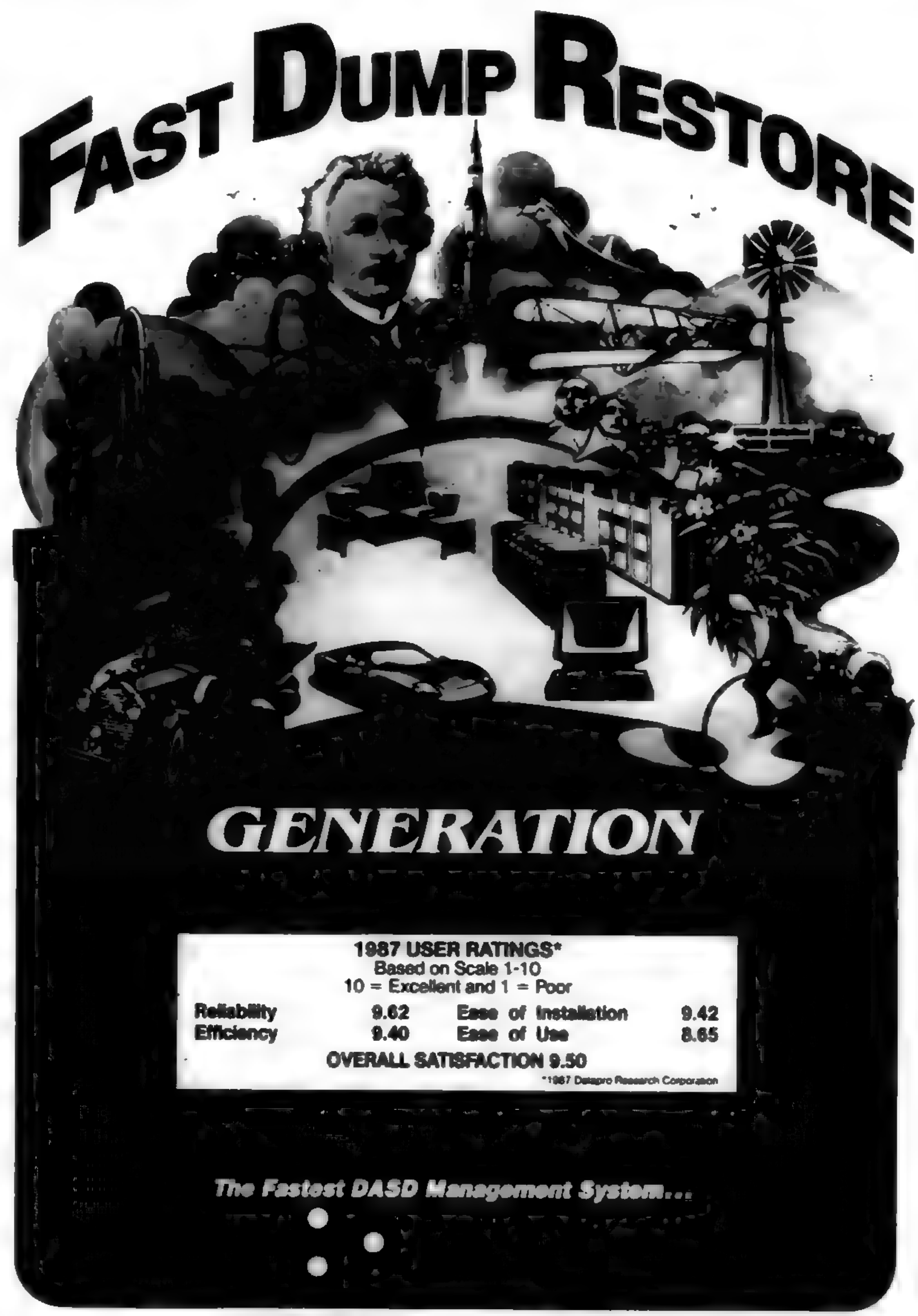
FCC staff attorney Jane Jackson admits that it is beyond the FCC's current resources to "monitor, audit and investigate cost allocations [among carriers' deregulated and regulated businesses] on an item-by-item basis."

Ill-suited permissiveness

Industry members also suggested that the FCC's past dealings with the local exchange carriers indicate a permissiveness ill-suited to its future role as watchdog.

In the past year or two, the commission has removed the separate subsidiary requirements applying to customer premise equipment and information service businesses.

Kevin Sullivan, formerly lead counsel for the Justice Department in the AT&T antitrust suit, vouches for the ultimate effectiveness of the FCC and its new regulations, adding that "the dangers of letting the local exchange carriers into the information services market are outweighed by the advantages of opening up the market and spurring technological development."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*1987 Datapro Research Corporation

DOT probes reservation systems

BY ALAN J. RYAN
CW STAFF

WASHINGTON, D.C. — The Department of Transportation (DOT) last week ordered five leading airlines to turn over information on the management of their automated reservation systems.

Following a request from the leaders of the U.S. Senate and House of Representatives Aviation Subcommittees, the DOT began an investigation into the use of computer reservation systems operated by American, Delta, Eastern, United and Trans World Airlines.

The order calls for information on the fees paid by airlines whose flights are displayed on computer reservation systems but who do not own the systems, how they list the flights of competitors and the prevalence of restrictive clauses in the vendors' contracts with travel agent subscribers.

American leads market

All five airline's use computer reservation systems. American leads the market in number of systems in use, followed by United, Eastern, Trans World and Delta, respectively.

Competing airlines that contract with the five carriers for reservations services claim they have been charged high fees to use the service and say the way some of the flights are listed are biased toward the owner of the system. Travel agents have also complained that restrictive clauses prevent them from switching freely to a competing computer reservation system without facing penalty fees.

Joe Stroop, manager of corporate communication at American Airlines in Fort Worth, Texas, said that travel agents using American's Sabre system could be penalized if they try to break their contract before it expires, whether or not they plan to use a competing computer reservation system.

Mark Brand, director of communications at United, said he did not know the specifics of the contracts United has with travel agents using its Apollo computer reservation system, but he did say that the Apollo data base is compiled with time of departure as its first priority, followed by service, including nonstop or one-stop flights or change of plane.

With the time of departure listings, Brand said, competing airlines' flights often appear before United flights on the computer reservation system screen. "We believe our system is a neutral one whose data base is based upon time of flight departure," he said.

Some travel agents say the concern over biased listings in the computer reservation system stems from the fact that travel agents are more likely to select the airline that first appears on the screen rather than turn pages in the computer.

"In some situations, if the circumstances fit, whatever the screen displays is going to influence you," said Stephen Baldi, director of finance at Crimson Travel Service in Cambridge, Mass. "If the client is satisfied, you don't have to go any further.

"However, I think a lot of the bias is overplayed," Baldi said, adding that ultimately the consumer makes the decision on what flight, airline and fare he wants.

Unfair competition

In 1984, the now-defunct Civil Aeronautics Board issued rules on unfair competition dealing with computer reservation systems.

At that time, the rules said in effect that it would be an unfair method of competition for a reservation system vendor to charge one carrier more than another for the same service.

"We have nothing to hide. We run our system in a fair, aboveboard manner," American's Stroop said. He explained that with the Sabre system, American acts as the supermarket and charges other carriers to rent space on its shelves. "There is a set fee . . . it's the same for everybody," which is regulated by the government, he added.

Natural language link ties mainframe DBMS to PCs

BY CHARLES BABCOCK
CW STAFF

WALTHAM, Mass. — A natural language-style link is being offered by the Artificial Intelligence Corp. to tie a group of mainframe data bases to personal computers.

Artificial Intelligence is the producer of Intellect, a natural-language query, analysis and reporting tool used on a mainframe that now includes an interface capable of translating English-language statements into SQL queries to IBM's DB2.

Intellect PC Link works in conjunction with Intellect on the mainframe to extract data from DB2, IBM's SQL/DS, Information Builders, Inc.'s Focus or Software AG of North America, Inc.'s Adabas and ship it to the personal computer. The link automatically reformats the data into a format compatible with Lotus Development Corp.'s 1-2-3 spreadsheet or ASCII format.

The link includes both a mainframe and personal computer parts. It costs $25,000 with an unlimited number of PC units allowed, site-license style, with the purchase,' said Frederick Lizza, vice-president of marketing for Artificial Intelligence.

The PC portion of the link runs on an IBM Personal Computer XT or AT, with the mainframe portion running on an IBM 4341 or larger mainframe or compatible.

The base price of Intellect itself is $60,000. Interfaces to particular data bases range from $15,000 to $35,000.

MAP/TOP group joins COS

Two of the computer industry's top communications standards promotion organizations have announced an alliance.

The Manufacturing Automation Protocol/Technical and Office Protocol (MAP/TOP) Users Group has accepted an invitation from the Corporation for Open Systems (COS) to participate in the "exchange of ideas and pursuit of common goals."

The move makes MAP/TOP COS's first Associate Alliance member — a newly created category of nonpaying, nonvoting membership designed to establish peer relationships with outside organizations that share mutual goals. COS is being granted reciprocal membership in the MAP/TOP Users Group.

Managers shun 'risk' of mail-order PCs

BY DAVID BRIGHT
CW STAFF

Despite pressure from users who have heard about amazing prices and positive experiences from mail-order personal computers, managers in large corporations are still saying no to requests for mail-order systems. The reasons usually given include the word "risk."

It is not uncommon to see IBM Personal Computer AT-compatible systems advertised by mail-order companies for just $1,000. That's less than 30% of the price of a comparably equipped AT, including the system with 256K bytes of memory, a floppy disk drive and a keyboard, even with IBM's recent price reductions.

IBM Personal Computer XT-compatible systems can be purchased for as little as $400.

But ordering systems through the mail from companies that have not demonstrated a track record in the computer industry through engineering and support is just too risky in terms of present and future compatibility and operation, many managers say. And shipping problematic systems back to the vendor for service instead of getting on-site service from a name-brand vendor is too risky in terms of lost productivity.

At Cleveland-based Eaton Corp., the corporate policy is to discourage users from buying mail-order systems in favor of higher priced, but proven, standard systems from IBM. Eaton occasionally buys Compaq Computer Corp. systems as well. This policy sometimes gets questioned by employees who do not realize that price is not the only issue, says Fred Zickert, manager of the PC support center at Eaton.

When volume-purchase agreements with big companies, service, compatibility and dependability are factored in, the cost differential on mail-order systems is not as dramatic as it might seem at first, Zickert explains. But the allure of low-priced, mail-order systems "has made the corporate responsibility a little difficult at times," he observes.

While many mail-order companies advertise 100% IBM PC compatibility for their systems, Zickert and other managers say they are not convinced. Zickert adds that software compatibility could become a problem for some mail-order firms when Microsoft Corp. brings out its new MS-DOS operating system for PC AT-compatible machines.

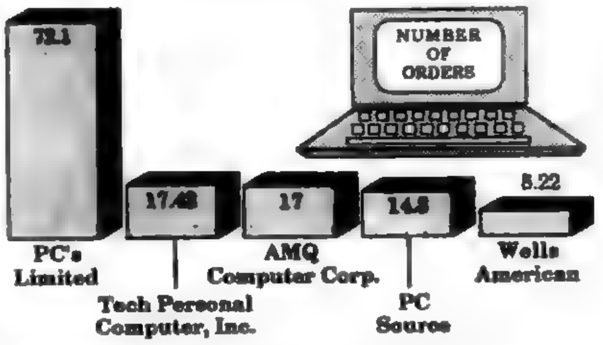
Also questioning the ability of mail-order companies to keep pace with IBM's technology is Greg Allman, senior consultant for management advisory services at Deloitte Haskins & Sells in New Orleans. For example, he says he feels confident that if IBM decides to change a read-only memory chip, Compaq — with its extensive resources — would be able to handle the change, while a mail-order company might have some trouble.

In addition, there is the service problem, Allman observes. If a hard disk drive has a head crash and the heads are parked on the platters, there is no way to protect the data while the system is shipped cross-country for service, he says.

Some mail-order firms do provide for on-site service through third-party service organizations.

Mail-order personal computers

1986 shipments of selected vendors



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART: MITCHELL J. HAYES

Because mail-order PCs sometimes need some fine tuning before they can be used, the systems are for hands-on people only, says Jeff Ehrlich, who is in charge of microcomputer evaluations at General Electric Co. in Bridgeport, Conn. "We normally don't recommend mail-order PCs unless the people are very knowledgeable and can fix problems by themselves."

For the future, some managers do not count out the likelihood of their firms making volume purchases of mail-order systems.

After testing a mail-order unit from PC's Limited, Rockwell International Corp.'s Cedar Rapids, Ill., office has gradually been buying more of the systems, says buyer Debbie Merritt.

PC's Limited has emerged as one of the most successful and respected mail-order system companies. Last year, the Austin, Texas-based company shipped some 72,100 systems, according to IDC. Unlike many other mail-order firms, the company makes its own read-only memory Bios and has its own manufacturing facilities.

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SOFTWARE ENGINEERING OF AMERICA SEA

Takeover toll rips Software International

BY CHARLES BABCOCK
CW STAFF

ANDOVER, Mass. — Software International Corp., the former General Electric Co. subsidiary acquired by Computer Associates International, Inc., is undergoing the trauma of a takeover: staff reductions, the merging of two different corporate cultures and a revised product direction.

In the process, it is losing a core of top planning and marketing executives who have guided the once-flagging mainframe software house back toward an improved product line and revenue flow since 1983.

According to accounts from company insiders and others, Computer Associates executives moved quickly after the Dec. 1 takeover, having already sized up who was essential. It consolidated as many administrative and support operations as it could in the first week of ownership, eliminating from 68 to 72 people at the 370-employee firm.

"We got 100 phones calls the next day. People were really shaken up," a vice-president of a major software company in the Boston area said.

Robert Healy

Despite the cuts, observers said Computer Associates succeeded in retaining the Software International sales force and development staff. The 40-person sales force was critical because Computer Associates plans to consolidate its accounting products into Software International's Masterpiece series.

In addition, Dick Dowdell, author of the Masterpiece accounting series underlying architecture, was retained by Computer Associates, sources said.

The reorganization led to a number of key management people going out the door, including Jeffrey Goodman, former Software International president and a fast-track young executive from GE. He assumed his post in October 1981 at a time when the firm was losing $9 million on revenue of $30 million, and "we had no choice but to get these bright, highly energetic people and let them run," according to Robert Healy, former senior vice-president for marketing at Software International.

Stefan R. Bothe, president of Computer Associates' Application Products Division in Garden City, N.Y., said most of the executive departures "were not people we had cut. You like to retain as much talent as possible."

Computer Associates has folded Software International into Bothe's young applications division; a 10% reduction in his staff in Garden City occurred at the same time that an 18% reduction occurred at the Andover site, Bothe said.

A Software International employee still in Andover said the Garden City reduction made the staff cuts in Andover more palatable. "It impressed people as a real business decision," she said.

But one of the departed executives, Regis F. Kaufman, was coordinating Software International's move into the Digital Equipment Corp. market and had built strong relationships with the Maynard, Mass., hardware manufacturer. Kaufman, who was not available to comment, resigned in early December and accepted a job with DEC, former associates said.

Healy, 44, said he found himself "a free agent for the first time in my life," after helping Computer Associates with a transition phase through December.

Frederick J. Lizza, formerly manager of small systems software at Software International, is now vice-president of marketing at Artificial Intelligence Corp. in Waltham, Mass.

Mass of departing executives

Other executives who have left include the following:

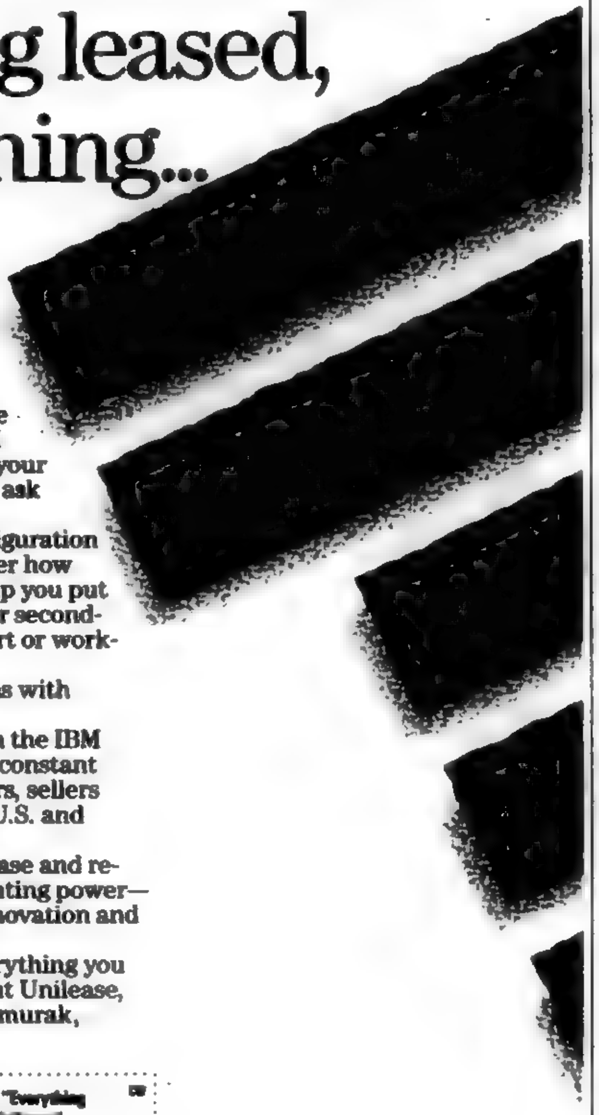
- Robert Migliorino, former chief financial officer, resigned to accept a similar position with the GE venture capital group in Fairfield, Conn.
- Richard Willey, vice-president of client services, resigned and could not be reached for comment.
- John Lyon, senior vice-president, technology, resigned and joined a GE operation in Bridgeport, Conn.

In a high-turnover business like the software industry, some of these departures were inevitable, even without a takeover, observers said. Last July, Jeff Papows left to become vice-president of marketing at Cullinet Software, Inc., the observers noted. But occurring as a group, as they have recently at Software International, the departures may hurt the company's prospects of carrying out its immediate business plan.

Bothe said consolidating staff is a necessary move for a sales and marketing-oriented firm like Computer Associates.

One decision already reached has been to fold Software International's push into the DEC market, formerly under Kaufman, into a General Systems Division that includes other minicomputer vendors served by Software International. An independent DEC sales force will be retained, but some departing executives question whether it will have the same effectiveness as a group focused on DEC.

Something old, something new, something leased, something...



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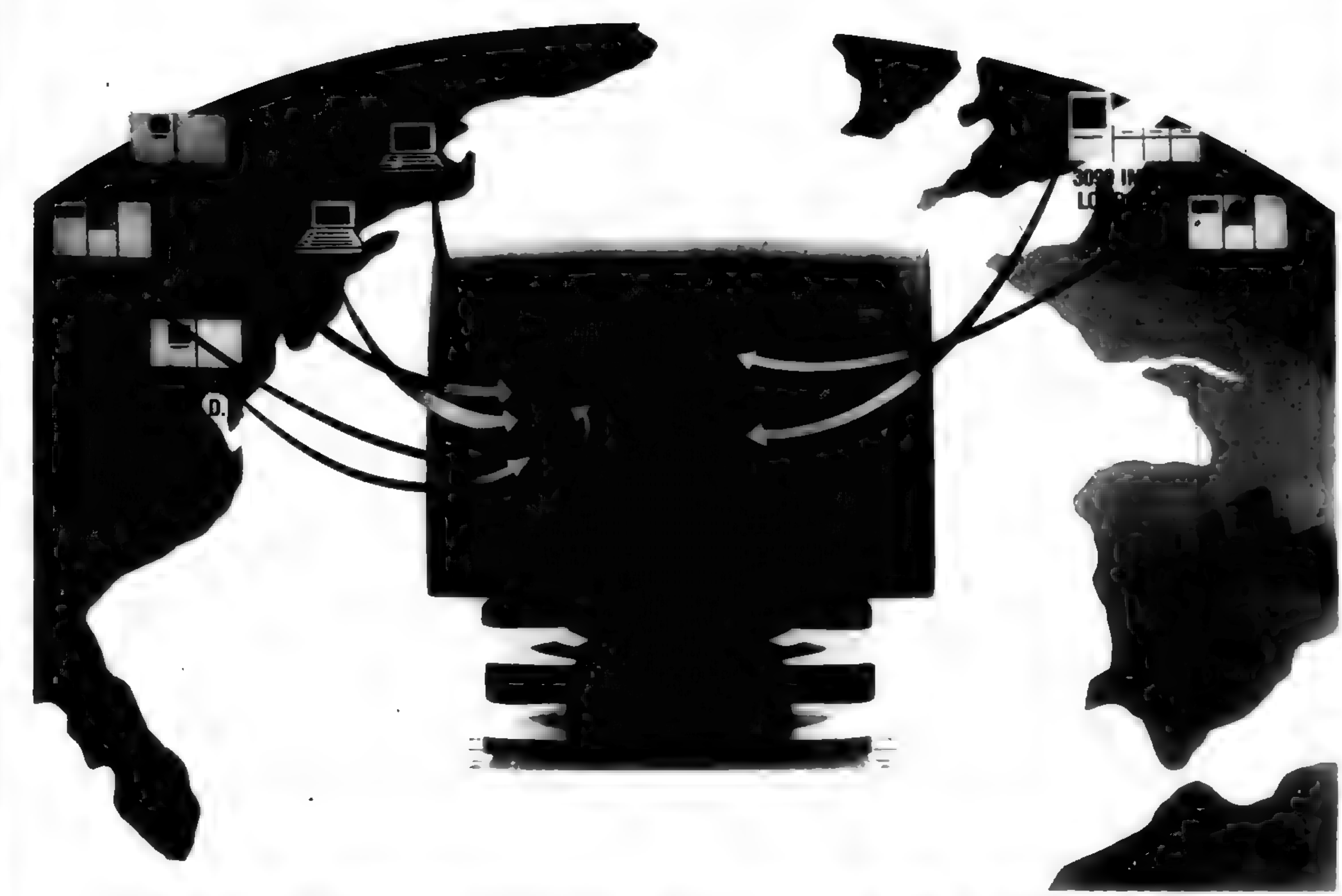

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Rolm adds capacity, fills hole in line of private branch exchanges

BY ELISABETH HORWITT
CW STAFF

SANTA CLARA, Calif. — Filling a crucial, long-standing gap in its CBX II product line, Rolm Corp. last week announced the CBX II 9600AE, a high-end private branch exchange (PBX) that can handle 20,000 lines — or twice the capacity of the existing high-end product, the CBX II 9000, the company said.

"This is a tremendously strategic announcement for Rolm, because now they can compete head-to-head with the major PBX manufacturers," commented William Felling, vice-president and group director at Cupertino, Calif., research firm Dataquest, Inc.

AT&T and Northern Telecom, Inc. have for some time offered PBXs with capacity comparable to that of the 9600AE, Felling said. "Rolm was at a real disadvantage because it couldn't bid for large accounts that needed at least one large PBX." The older CBX II 9000's Rolmbus 295, which the 9600AE also uses, had "enough bandwidth to carry the transactions but the 9000 didn't have a powerful enough processor," he explained. "The 9600AE does."

'Steadily growing' use

The new product incorporates a more powerful central processor than the CBX II, so it can handle more time slots and transactions for applications such as voice mail, call accounting and automatic call distribution, according to Rolm systems marketing manager William L. Martin. "We find that use of transaction-intensive applications is steadily growing; two-thirds to three-quarters of our customers perform data switching on the CBX, and half to two-thirds use phone mail."

The added processing power also fits the 9600AE for future Integrated Services Digital Network applications, "which we believe will make far more demands on the PBX switch," Martin said.

Existing Rolm PBXs can be field-upgraded to the 9600AE, Rolm claimed.

The CBX II 9600AE handles up to 23,000 time slots in its full 15-node configuration. It costs 3% to 5% more than a comparable configuration of the CBX II 9000. The 9600AE will begin production shipping in September.

Packet switch based on PC

BY ELISABETH HORWITT
CW STAFF

FRAMINGHAM, Mass. — Amnet, Inc. is expected to announce this week a full-function packet switch based on an IBM Personal Computer AT or compatible.

The N7400 is a "backbone-class packet switch" priced between $6,000 and $20,000 — one-tenth to one-third the cost of comparable devices, according to Amnet. "We have dropped the point at which private data networks become feasible from a cost-justification standpoint," Amnet director of marketing Peter Thornton said.

The product enables customers to create packet switches out of already installed PC ATs, Thornton said. Amnet is discussing possible OEM agreements with several AT clone vendors, he added. "The user is not stuck with proprietary hardware but can essentially buy a packet switch from IBM; that gets rid of a lot of objections from MIS departments in IBM shops," Amnet senior network consultant J. Michael Hennessy said.

The N7400 incorporates an AT-based version of Amnet's packet-switching software, which features dynamic routing table generation and fault-tolerant network management, according to Amnet. A real-time operating system running under Microsoft Corp.'s MS-DOS allows the N7400s to communicate with one another in order to dynamically reconfigure the network, bypass overloaded or out-of-service links and pass on diagnostic and traffic usage data to Amnet's proprietary network management system.

'Keep it simple'

"It's definitely a good strategy to reach clients that may already be subscribing to packet-switching services and can now justify a private packet net," said Kathryn Korostoff, senior market analyst for research firm International Data Corp. in Framingham, Mass. "The most important thing about the network management system is that it is simple, menu-driven software with nice graphics," she added.

Korostoff predicted that several other vendors would be introducing PC-based packet switches this year. Thornton said he welcomed this. "We still have an 18-month to two-year market window," he said.

The N7400 consists of a PC AT base unit with 640K bytes of memory, supporting up to five Amnet Line Processor Cards. Each card supports up to four 56K bit/sec. ports.

Trying with a single financial software system to meet the competing needs of two departments often comes down to a knock-down, drag-out brawl. Satisfying one group usually means compromising the needs of the other. In the end, neither group gets exactly what it wants.

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- 70 Mining/Construction/Petroleum/ Refining/Agriculture
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- 90 Computer/Peripheral Dealer/Distributor/Retailer
- 75 User Other ______________
- 95 Vendor Other ______________

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- 19 Vice President, Asst. VP
- 21 Dir. Mgr. Suprv. IS/MIS/DP Services
- 22 Dir. Mgr. Suprv. of Operations, Planning, Adm. Services
- 23 Dir. Mgr. Suprv. Analyst. of Systems
- 31 Dir. Mgr. Suprv. of Programming
- 32 Programmer Methods Analyst
- 35 Dir. Mgr. Suprv. OA/WP
- 38 Data Comm. Network/Systems Mgt

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- 11 President, Owner/Partner, General Mgr
- 12 Vice President/Asst. VP
- 13 Treasurer, Controller, Financial Officer

ENGINEERING
- 41 Engineering, Scientific, R & D, Tech. Mgt

SALES
- 51 Manufacturing Sales Reps., Sales/Mktg. Mgt

OTHER PROFESSIONALS
- 60 Consulting Mgt
- 70 Medical, Legal, Accounting Mgt
- 80 Educators, Journalist, Librarians, Students
- 90 Others ______________

(Please specify)

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- B Minicomputers/Small Business Computers
- C Microcomputers/Desktops
- D Communications Systems
- E Office Automation Systems
- F No Computer Involvement

3317-8766

Rollout blitz expected as vendors converge at Comnet

WASHINGTON, DC — More than a hundred vendors will introduce products at the ninth annual Communication Networks Conference and Exposition (Comnet) that opens here today.

Among the offerings will be the following:

- Tellabs, Inc. will unveil a family of products in its Crossnet System — a T1 switching system for local and distributed T1 networking. It includes multiplexing input from up to 128 data, voice or compressed video channels on the T1 facilities and provides intelligent DS1-level switching for up to 16 T1 links at each node.

The Crossnet 440 Network Multiplexer Node costs $14,150 for a nonredundant system with channel service unit (CSU), T1 interface and 12 channels of voice or data. A redundant 128-channel system is $91,200.

The Crossnet 445 Network Switching Node costs $14,200 for a nonredundant system with a CSU and T1 interface and four DS1 ports. A redundant processor, including 16 DS1 ports, costs $39,250.

- Symplex Communications Co. will roll out its Datamizer II SDC-4e and Datamizer II SDC-5664 data compression units. The SDC-4e, which costs $4,950, is intended for use on standard voice-grade or digital circuits at speeds from 1,200 bit/sec. to 19.2K bit/sec. It features statistical multiplexing, which allows up to four synchronous or asynchronous devices to use the additional line capacity.

The SDC-5664, which costs $3,500 with redundant power and logic or $2,000 without, is intended for high-speed circuits operating at 56K to 65K bit/sec. It also has statistical multiplexing that gives the unit a maximum aggregate input of 460K bit/sec.

The SDC-5664 can accommodate from six to 24 channels with network expansion cards. The simplest configuration is an SDC-5664 with six channels, which costs $6,700 without redundancy or $8,200 with redundancy.

- Spectrum Digital Corp. will announce its Integrated Services Digital Exchange (ISDX) high-speed T1 multiplexer, which ranges from $20,000 to $100,000 per unit. ISDX allows the user to monitor the status of any circuit, port or node. The user can manually intervene to distribute bandwidth, and the ISDX can automatically reroute or seek alternate paths.

Systems range from point-to-point versions that have monitoring capabilities and one port to versions with eight T1 circuits and 512 channels coming from various locations.

- Case Communications, Inc. in Columbia, Md., will unveil two feeder multiplexers for its DCX communications processor networks and an asynchronous-to-synchronous protocol conversion module for DCX communications processors.

The DCX 833 multiplexer can be configured with up to 12 asynchronous channels, one Case protocol link module and a single composite transmission line to a DCX 840 or DCX 850 communications processor. It feeds synchronous and asynchronous devices into DCX networks so users can mix communications protocols and link a wider range of computers in a single network. The starting price is $3,450. The DCX 842 with an RS-232 interface costs $2,350 and with a V.35 interface costs $2,750.

The S-Gate asynchronous-to-synchronous protocol converter serves as a gateway to IBM Systems Network Architecture/Synchronous Data Link Control systems for asynchronous terminal or PC users. It occupies a card slot in a DCX 840/850 communications processor and supports up to 32 asynchronous terminals or printers. S-Gate, which costs $6,750, emulates IBM 3277 and 3278 Model 2 terminals and IBM 3287 printers. It operates at speeds up to 19.2K bit/sec. in full or half duplex and has RS-232C and CCITT V.24 interfaces.

- Bridge Communications, Inc. will announce Etherterm/3270, a software package to give high-performance terminal emulation and file transfer capabilities between IBM Personal Computers and the IBM mainframe environment through a local-area network (LAN). It also offers Digital Equipment Corp. VT100 terminal emulation and file transfer with ASCII hosts.

Etherterm/3270 works on PCs equipped with 3Com Corp. Etherlink or Etherlink Plus network controller boards, which allow direct PC attachment to an Ethernet LAN. It costs $400 for a single-user version for a stand-alone PC and $2,000 for a network-server, multiuser version.

- TRW Information Networks Division, a division of TRW, Inc., will show the Advanced Connector Unit (ACU), a communications server based on a Motorola, Inc. 68000 processor with 512K bytes of memory, and the Operating System Connection to TRW Concept 2000 line of broadband, baseband and PC LAN products. Both feature support for Transmission Control Protocol/Internet Protocol.

The ACU is available in two-, four- and eight-port configurations and includes an Ethernet interface. Customers can select alternate interfaces such as various broadband, fiber or star-configured networks. The ACU costs from $1,695 to $2,395 based on configuration and will be available in the third quarter.

The Operating System Connection is a vendor-independent networking software package for interconnecting different processors, operating systems, network hardware and network protocols. The product costs $395 for IBM PCs and up to $9,000 for large DEC VAXs. It will be available in the second quarter.

- Western Union Corp. will introduce Easylink electronic mail service enhancements. One addition, On-Line Conversation, permits real-time exchange of messages or documents among subscribers. Also to be announced are features that allow users to determine if recipients have read messages and to track incoming and outgoing messages. On-Line Conversation costs 55 cents for each minute used, with a 30-sec. minimum usage charge.

This report was compiled by Computerworld *staff members Elisabeth Horwitt, Donna Raimondi and Patricia Keefe.*

THE CAMBEX
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Preserving corporate resources - it just makes good business sense. That is why many mainframe users are retaining the 308X system and upgrading main memory instead of changing to a 3090.

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Xerox aims to gird Ventura publishing line

BY ALAN J. RYAN
CW STAFF

ROCHESTER, N.Y. — Xerox Corp.'s announcement last week of seven Microsoft Corp. MS-DOS personal computer-based desktop publishing systems will reinforce the market strength of Ventura Publishing Edition software, according to industry watchers.

The Xerox Desktop Publishing Systems (XDPS) Models 601 through 607 are composed of Xerox personal computing, software and printing products. Each offers as its centerpiece the Xerox Desktop Publishing Series: Ventura Publisher Edition, Xerox's desktop publishing software for PCs. The hardware and software are combined in seven different packages.

The announcement is one analysts said they had been expecting to hear.

Selling the desktop publishing software through an exclusive worldwide distribution agreement with Ventura Publishing in Morgan Hills, Calif., was not all Xerox hoped to accomplish. "Obviously, Xerox would like to use their marketing agreement with Ventura as a pull to sell IBM Personal Computer-compatible PCs and printers," said consultant Amy Wohl, president of Wohl Associates in Bala-Cynwyd, Pa.

"We think that it is the desire of a significant part of the marketplace to buy desktop publishing products as part of an entire turnkey system. Therefore, it's important for Xerox to offer its product as part of the system," Wohl said. For Xerox, the systems packages will mean enhanced revenue while satisfying customer demand for complete bundled packages.

The Xerox personal computer products available for use in XDPS include the Xerox 6065 PC equipped with a 20M-byte rigid disk drive and 640K bytes of random-access memory; personal computer or word processing keyboards; an optical mouse; full-page, partial page or color monitors; MS-DOS operating software; Xerox Writer III word processing software; and Xerox Ventura Publisher. XDPS printers include the Xerox 4020 color ink-jet printer and the 4045 Model 50 laser printer and copier configured with 1.5M bytes of memory.

'A prior investment'

"Some packages contain all of the components necessary to set up and run a publishing operation," said Larry Spelhaug, marketing manager for Xerox Information Systems. "Others contain a subset of components and are based on the user having a prior investment in industry standard equipment, such as a PC or printer."

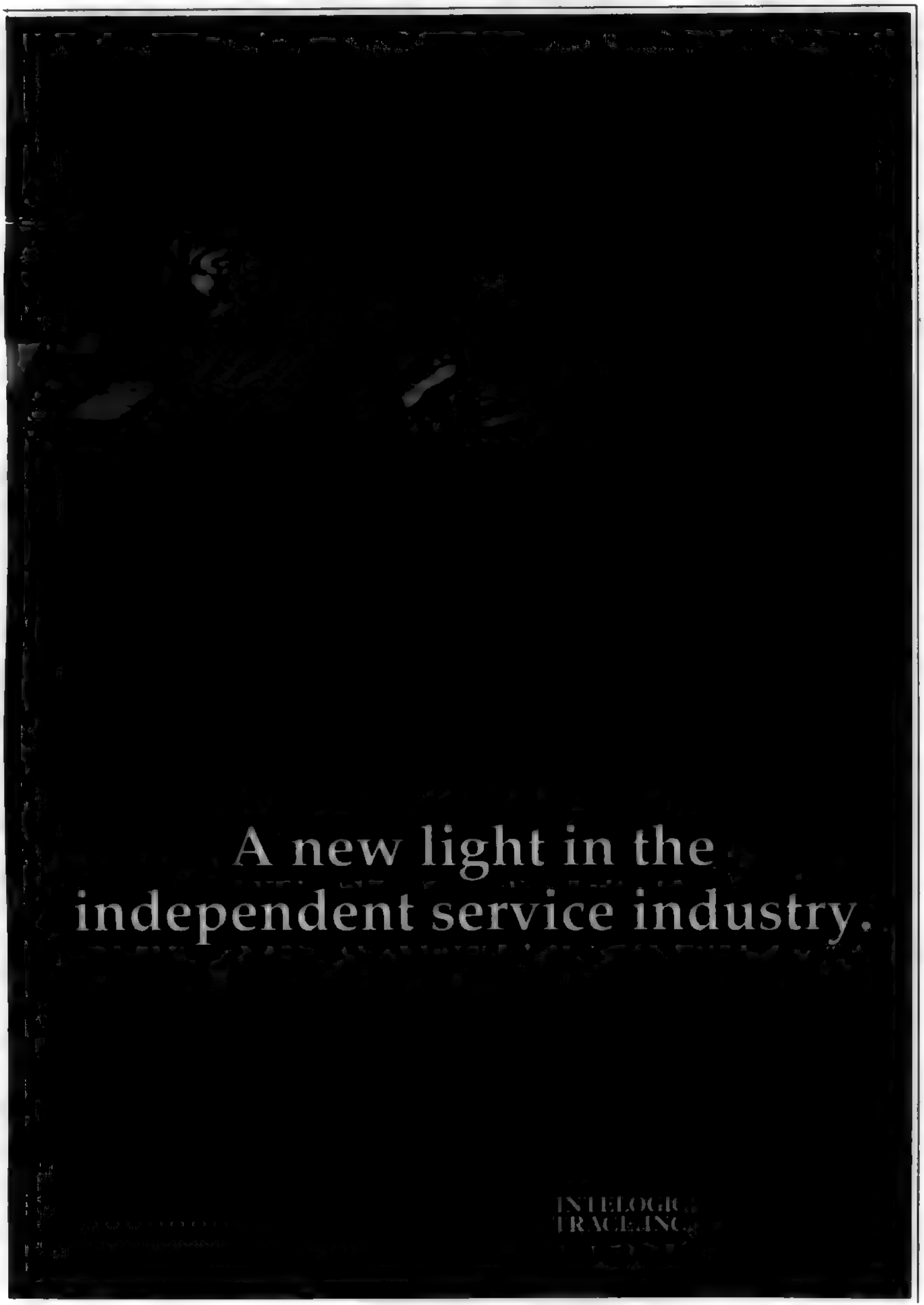
The differences in the seven packages "are based upon the user's existing system configuration and the various needs he has for desktop publishing," a spokeswoman for Xerox explained. Users can also select color or black-and-white printing and partial or full-page display.

Xerox said it treates the XDPS family as complete products from order entry to delivery to service. Users of the complete system can rely on a single vendor for support, and users of partial systems can purchase Xerox service arrangements that cover both Xerox and non-Xerox products.

"Xerox introduced Ventura last fall," said analyst Arlene Karsh of CAP International, Inc. in Marshfield, Mass. "I understand it's a really hot product, and shipments are quite good."

She said her company feels the software is a benchmark product because it sets a new performance level for what desktop publishing really means.

Prices range from $9,995 for the fully configured Model 601 to $2,195 for the partially configured Model 607. Deliveries begin in mid-February.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Site license, discounts seen for Q&A users

BY PEGGY WATT
CW STAFF

CUPERTINO, Calif. — Symantec Corp. will this week announce a corporate support and site licensing policy, which has already met with approval by some early takers who appreciated getting credit for earlier purchases.

The policy gives volume discounts that average 40% of suggested retail prices and site licenses that start with a minimum of 150 units, counting a customer's existing copies, said Rod Turner, executive vice-president for sales and marketing.

Discounts for large numbers of copies are negotiable, according to Turner.

Besides their product Q&A, Symantec's policy includes the several utility products for Lotus Development Corp.'s 1-2-3, marketed by Symantec subsidiary Turner Hall Publishing, and the project management program Time Line and Time Line Graphics from Breakthrough Software Corp., which Symantec recently bought, Turner said. The customer can mix the products under a single license and receive the site license discount.

Sales go through approximately 30 corporate account dealers throughout the country, which share support duties with Symantec, Turner said. The support plan includes a toll-free hot line, classes for corporate trainers, one-stop upgrades and rights to beta-test future products. It costs $5,000 yearly, less with a volume purchase.

"It's a great convenience," said an MIS manager for a transportation firm that already had several hundred copies of Symantec's Q&A data base in offices around the world and bought nearly 100 more under a new site license.

"I wouldn't normally have purchased more," he continued, "but the site license gave us discounts for more copies."

Site licenses a selling point

"There's more interest in site licenses, and this policy really hits the button," said Scott Reynolds, sales representative with Micro Solutions, Inc., one of the distributors that will handle Symantec's program. He said it prompted Schlumberger, Ltd. to pick up nearly 300 more copies of Q&A, after trying a few dozen.

Schlumberger also bought nearly 100 copies of SQZ, an add-on product for network use, according to Patsy Zurovec, a Schlumberger systems administrator.

"We're small fish among corporate accounts," Turner said. "We're trying to be realistic and convenient to deal with."

He said Symantec hopes to boost its share of corporate customers, which now accounts for approximately 25% of all product sales.

Symantec had planned to announce a corporate licensing program six months ago but postponed it after a lukewarm response from some customers, Turner added.

4GL revved up in Germany

BY ANDRE EISENSTEIN
SPECIAL TO CW

DARMSTADT, West Germany — Structured programming and array processing are two of several improvements in the latest version of Natural 2, a fourth-generation language that was developed by Software AG in West Germany.

The language offers a structured programming mode and occupies 40% less CPU space than the earlier version, according to the developer.

Program transfer and initialization time has reportedly been cut by about 80% from the previous version of the product.

Independent applications

Natural 2 applications, like those written in the earlier Natural language, are said to be independent of operating systems, teleprocessing monitors, data base techniques and data storage locations, thereby reducing the time required for maintenance and adapting applications, a company spokesman said.

The product allows access to Software AG of North America, Inc.'s Adabas, IBM VSAM and IMS files and DL1.

An interface to IBM's DB2 will soon be available, according to the company.

IBM, DEC compatibility

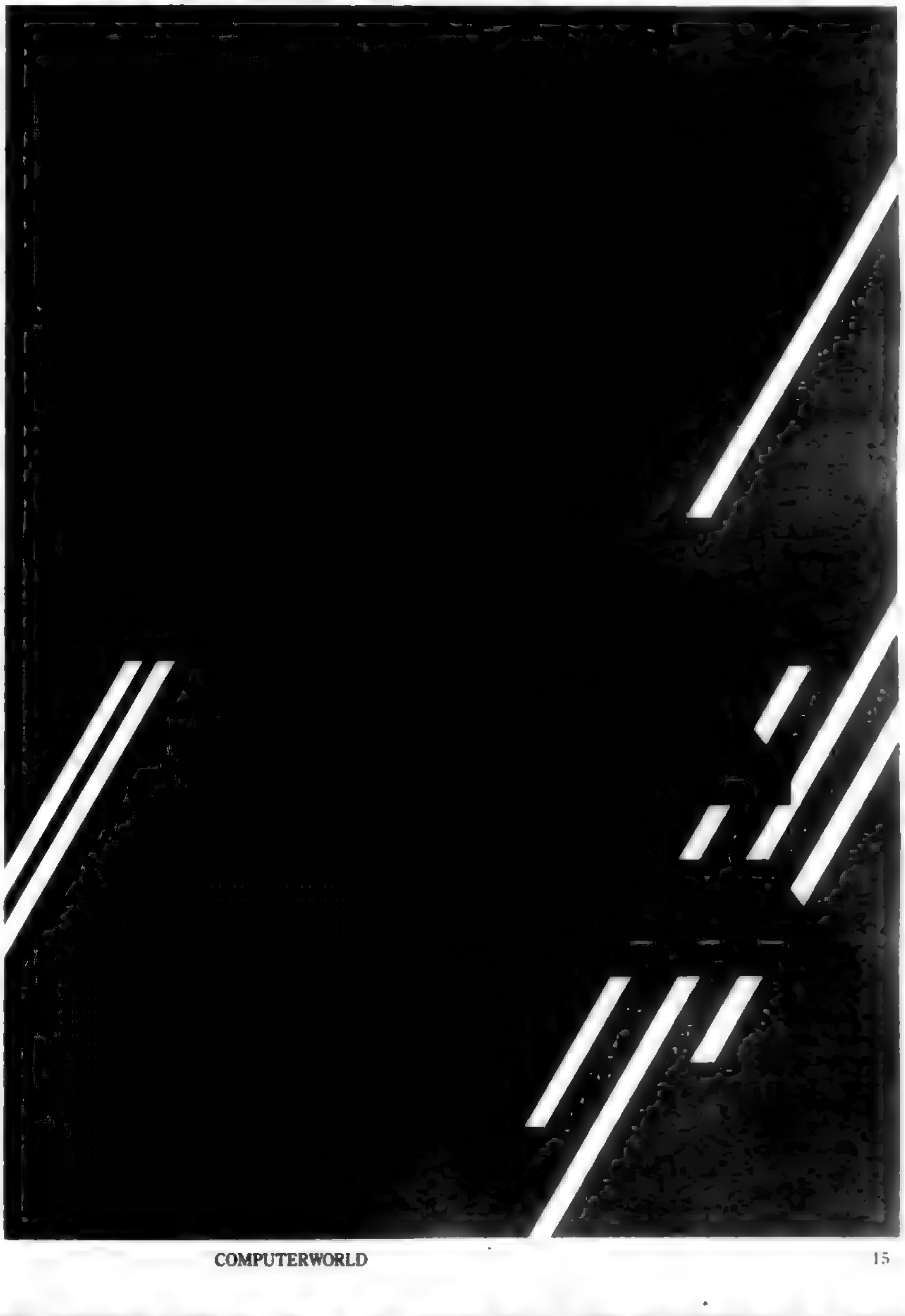
Natural 2 can be implemented with IBM operating systems as well as with Digital Equipment Corp.'s VMS, spokesmen said.

Natural 2 will be available in Europe in March.

Software AG of North America, which is headquartered in Reston, Va., is slated to make a mid-March announcement that it will offer Natural 2 for delivery sometime in May.

The company expects to report a revenue growth of about 30% worldwide and 60% in Europe for 1986.

Eisenstein is a writer at *Computerworld Schweiz*, a CW Communications Swiss publication.



EDITORIAL

Do you hear Bells?

If initial reactions mean anything, the U.S. Department of Justice recommendations to free the divested Bell operating companies of most regulations are going nowhere fast. On one side of the issue are the seven regional holding companies, the Reagan administration and its agents. Seemingly outgunning them, on the other side, are consumer groups, large-user groups, the Bell's competitors (of course) and every politician in search of a cause.

No matter what, the final outcome of this deregulation matter must be kept as apolitical as possible.

Interested parties should insist that the time-honored system of checks and balances be enforced and that the desires of the executive branch, which can change radically every four years, not be the overriding influence on decisions that will have such enduring impact.

Some governmental regulation will remain — must remain — a part of our national communications system, regardless of how the Bells are allowed to conduct other businesses. For purposes of national security and to ensure an orderly flow of business, a seamless network based on sound standards must be maintained.

Any arguments that the Bells or any of their competitors can be self-regulating in this regard should be carefully scrutinized, then dismissed. Witness the recent charges leveled by telecommunications users that the Bells have refused to cooperate with their customers to develop and standardize basic service offerings under Open Network Architecture.

Judge Greene has acted prudently in lifting the regulatory veil on AT&T as competition has crept into the long-distance world in the last three years. The same approach should be taken regarding the Bells.

Yes, the Federal Communications Commission requires the Bells to provide competitors equal access to local nets by way of ONA rules.

But ONA is a largely untested concept. The potential for abuse is enormous and enormously tempting. With hundreds of millions in profits pouring in from the local-loop monopoly, the Bells could brook substantial losses in other businesses while they build market share with temporarily depressed pricing. Consider the apparent losses some of the Bells have rung up in the computer store business. Where did the funds come from that paid those losses? And whether anyone can compete with the Bells in the local loops is an even broader unanswered question.

There are no good arguments against policies that foster increased competition. Despite some major headaches in the early years of the breakup of AT&T, there will be more companies providing a broader range of communications equipment and services much more efficiently than if one company were doing the job.

However, deregulation of long-standing, regulated monopolies needs be a gradual, carefully monitored process, not a knee-jerk reaction motivated more by political dogma than common sense.

WILL YOU JUST MAKE THE CONNECTION?!
NOT SO FAST, I'M STILL IN A PLANNING MODE.
USERS
BOCs
ONA

LETTERS TO THE EDITOR

The future of the Mac

John Kirkley's article, "Friendly vs. forward-looking: The Mac and AT square off" [CW, Dec. 22], fails to present a complete picture of the Macintosh's capabilities, vis-a-vis the battle against future DOS machines.

The problem lies in presenting only future promises for the Microsoft Corp. MS-DOS world. The Macintosh world has similar products on the way, and its development is no less forward-looking than that of the IBM Personal Computer ATs. Even before Apple Computer, Inc. introduces its own line of Motorola, Inc. 68020-based machines that are equivalent in computing power to Intel Corp. 80386 machines, current Mac owners can buy 68020-based boards for the Mac Plus from at least four vendors.

You get all this extra power without sacrificing the graphics interface or the monitors also available for desktop publishing and computer-aided design and manufacturing applications. Just as new graphics boards are just over the horizon, so, too, are similar boards using the T1 graphics chip for Apple's new Macintoshes.

And what is the definition of a closed operating system? Is the Macintosh's operating system any less accessible than MS-DOS? It certainly hasn't prevented developers from writing programs to do anything they desire on the Mac.

As for the comment about "sophisticated work," computer-aided design is a reality on the Mac as well as the AT, and it doesn't divorce the user from the Mac's interface; in fact, it can benefit from it.

The future for new Macintoshes that rival any PC for computational speed and ease of use is just as bright and promising as anything any PC whiz forecasts for his own machines.

David R. Kosiur
Fullerton, Calif.

Apple applause

This is just a quick note to applaud William Zachmann's column, "Time to take Mac seriously" [CW, Dec. 1], about the Apple Computer, Inc. Macintosh computer. The Mac is an impressive, innovative machine that your publication has paid relatively little attention to until now.

Perhaps now I, and others, can look forward to reading more than just the occasional review of Macintosh hardware and software in future issues of *Computerworld.*

A. J. Embelin
Upperville, Va.

Language factions

I must take exception with one comment made in Fabian Pascal's Reader's Platform, "The Distinction between 4GL and Relational Environments" [CW, Jan. 12].

His basic premise, that there is a clear difference in meaning between "relational" and "fourth-generation language", is correct. However, his parenthetical comment that, "there is only one relational language, IBM's SQL," is incorrect. There are, in fact, other relational languages, the one with which I am most familiar being Relational Technology, Inc.'s QUEL.

QUEL was originally developed by Michael Stonebraker and others at the University of California at Berkeley for the relational DBMS Ingres. Since then, of course, Ingres has evolved into a full commercial product, supporting both QUEL and SQL. Anyone who has used both of these languages will say that not only is QUEL a relational language but also that it is far superior to SQL.

Unfortunately, because of IBM's industry dominance, even Stonebraker admits that SQL is destined to become the "intergalactic standard" of relational languages.

Barry Randall
CIM Planning Analyst
Aircraft Engine Group
General Electric Co.
Lynn, Mass.

This week in history

Feb. 14, 1983:
Crocker Bank in San Francisco tests the feasibility of automated teller machines. Bank officials say the new concept was designed to expand service and convenience, reduce customers' waiting times in lines and hold down rising costs.

The Semiconductor Industry Association releases a document that it says includes "irrefutable" proof that U.S. chip makers have been seriously harmed by an unfair and illegal Japanese government program to protect and support its native semiconductor industry.

The report says a closed Japanese market and Japanese support of its firms' exports violate international trading treaties.

Talking back to computers

HARVEY NEWQUIST

Remember Doctor Doolittle's song, "Talk to the Animals"? Well, today we are going to do a couple of choruses of "Talk to the Computers."

The ability to talk to machines is nothing special. I bet most of you do it. However, getting the computer to answer is a whole different story, requiring an incredible amount of technological wizardry that is currently known as voice recognition.

Voice recognition is actually a fairly simple concept in which the voice is used to control a computer or terminal in much the same way a keyboard does. There are a number of ways to address this problem, such as creating software that replicates the way the ear works or developing a system that digitizes and stores voice patterns.

The most common form of implementation is essentially a pattern-recognition approach. The user trains the machine by speaking words into a microphone. The words are then digitized and stored on a disk. After storage, the user assigns a keyboard command to the words he just input. For instance, one might utter the word "Finish" and then input the "F10" key as the command to be triggered.

Sounds easy enough, right? Wrong. If it were that easy, keyboards on everything from Selectrics to Commodores would be doing a current tour of duty as paperweights or postmodern office art. So let's talk about some of the problems inherent in voice recognition and why keyboards are still working for a living.

First, no two voices are exactly the same. Thus, a digitally stored pattern of your voice is not going to find a perfect match if someone else utters the words you have stored. The result is that either no command is issued or the computer tries to guess which word already stored would be appropriate. Not very efficient.

Second, even a single individual has voice pitch and timbre variations at different times of the day or during periods of stress. A classic story from the voice-recognition world tells of a researcher who developed a voice system with an incredible accuracy rate. The researcher toiled alone for years to achieve this feat. So impressed were his supervisors with his accomplishment that they asked him to demonstrate the machine at the company stockholders' meeting.

When the fateful day arrived, the researcher faced some 800 stockholders from behind the podium, the first time he had ever addressed a crowd of more than three. The pitch of his voice rose about three octaves and cracked on almost every word. The machine's accuracy level over the course of the abbreviated demonstration? Zero.

Regardless of the veracity of this tale, it illustrates a key point in voice utilization. If the machine is not going to be 100% accurate, why worry about using it at all when keyboards already operate at that level?

There are plenty of arguments for the use of voice recognition. For a start, the voice is a much more natural interface than a keyboard. It is also useful in situations classified as hands-free. These are primarily industrial applications, such as inventory-part counting, quality control and inspection and manual package routing.

VOICE-recognition technology has proven itself primarily because the domain is limited to defined terms and is usually operated by the same person each time.

In these examples, it is important for the user to concentrate on the actual touching or holding of something. Thus, any time diverted to the keyboard for input is inefficient and slows down the overall process. Also, use by the handicapped is increasingly important, as voice-recognition systems allow for control of systems that might otherwise need to be physically manipulated.

In the above instances, voice-recognition technology has proven itself, primarily because the domain is limited to defined terms and the technology is usually operated by the same person each time, often in a fairly controlled environment. A variety of companies — from specialists like Votan Co., Scott Instruments Corp. and Dragon Systems, Inc. on to larger companies like Texas Instruments, Inc., Digital Equipment Corp., ITT, Gould, Inc. and Lanier Business Products, Inc. — is finding a wealth of opportunities in specialized areas.

Voice recognition sounds ideal for controlling the mundane key-oriented tasks of the office, such as data base queries and word processing. A number of companies are addressing the office area with machines called VATs — voice-activated typewriters. The best quality of the typewriter (print capability) is combined with the best of dictation machines (voice control and minimal hand operation) to make — voila! — a VAT.

Sounds good to me but not so good to computers. For any given office application, the machine would have to possess a precise vocabulary of at least 5,000 words, with an average of about 9,000 to 12,000. Attempting to store that many words would be a Herculean task for any memory, especially ones typically found in office systems.

The companies working on VATs are employing various technologies to help eliminate the need for brute vocabulary storage. Kurzweil Applied Intelligence, Inc. uses artificial intelligence techniques to help the system determine a word by its context within a given phrase, sentence or paragraph. Kurzweil's claims to fame include an optical character reader for the blind and a superb electronic synthesizer that duplicates the sound of acoustic pianos. Despite these accomplishments, Kurzweil didn't deliver on its promise of a 15,000-word VAT by the end of 1986.

Speech Systems has plans for a VAT with a twist. Instead of using a handheld microphone to communicate with the machine, the user employs a microphone designed like a telephone handset. Speech Systems uses artificial intelligence techniques that deal more with generated sounds than contextually appropriate words.

And last, but never least, there is IBM. During 1986, IBM displayed a VAT developed at its Watson Research Center. The Tangora system boasted a 20,000-word vocabulary but was painfully slow in displaying the transcribed words after they had been spoken. (Tangora, by the way, is named after Albert Tangora, the world-record holder for speed typing, with 147 words-per-minute to his credit. And you thought that IBM didn't have a great sense of humor.)

Before you decide to give everyone in the secretarial pool access to their own voice-activated machine, consider the social implications. Right now, 20 to 30 people can type away in the same room without really disturbing each other, because the clacking of keys becomes an innocuous drone. Now picture that same office scene with 20 to 30 people talking OUT LOUD to machines. Imagine the confusion of people talking to each other, to themselves, to the phone and to their machine. You are imagining pandemonium.

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

Profits put first put people out to pasture

Employees are assets not disposable commodities

JOHN L. KIRKLEY

"People are the key."

It's a slogan that sounds uncomfortably corny, one that rings a little hollow in today's rough-and-tumble computer industry, an industry characterized by corporate takeovers, massive layoffs and forced early retirements.

But when John Imlay became president of an ailing Management Science America, Inc. (MSA) nearly 15 years ago, he included "People are the key" as a daily operating principle in his long-range plan to resuscitate the company. He and his managers even wear miniature keys in their lapels to remind them of this fundamental commitment. It has worked. MSA has had its ups and downs, but it is not only still with us, but also doing well.

There seems to be a different operating principle at most U.S. corporations. The slogan has been rewritten: "Short-term profits are the key." Corporate management should be wearing little dollar signs in their lapels. People, like personal computers, have become a commodity item and, like most commodity items, they are disposable.

Much has been said about corporate America's short sightedness, its emphasis on quarterly profits, its compulsive need to please fickle stockholders and querulous Wall Street analysts. What I am concerned about is the negative impact of cold and opportunistic corporate behavior on individuals and their relationship to one of the fundamental human activities: meaningful work.

Obviously, it's difficult to feel loyalty to an organization that may lay you off or force you into early retirement at the first sign of a profit crunch. AT&T, once a haven for careerists, is decimating its ranks. Even the sheltering arms of IBM have lost their warm security. Still holding steadfast to its no layoffs policy, IBM has turned to early retirement. No one is exempt. In January, two of its top managers, Senior Vice-Presidents Dean Phypers and George Beitzel, chose early retirement during the company's three-month incentive period.

What happens to all these talented men and women in their fifties who suddenly find themselves on the outside looking in? The January 9 edition of *The Wall Street Journal* commented, "Retirement . . . forces people to come to grips with what is important in their lives. Early retirement, whether by choice or not, is forcing thousands of managers in their mid-50s to early 60s to face the issue more abruptly, while they are still young and healthy enough to resent a career interruption — or to realize a dream."

What's really happening here? The fact is that companies are losing valuable people who are, in most cases, talented, experienced and may even possess that rare commodity that only living on the planet for a goodly amount of years seems to bring: a modicum of wisdom. In the short run, the corporation saves money. In the long run, the corporation loses irreplacable assets: knowledgeable, experienced and loyal employees.

Baby-boomer bulge

And what about the individual retirees themselves? Most have to find other work to pay the mortgage and keep the kids in college. However, over the age of 50, one becomes almost unemployable. That enormous bulge of baby boomers (now 30.9% of the population) has matured, and these relative youngsters (aged 25 to 44) are fighting tooth and nail for every available managerial slot.

(They had better be careful. Soon corporate America may regard anybody over 40, to paraphrase Kipling, "in the dusk with the light behind them." After all, why hire someone in their mid-forties when you'll probably early retire them in five years or so?)

And the ancient ones, the over-50 crowd? Many become consultants, working 60 to 80 hours a week, learning the joys and terrors of erratic cash flow.

Perhaps all we over-50 ex-corporate managers should form a junior version of The Gray Panthers. We'll call it The Pepper-and-Salt Panthers and limit membership to veterans of the corporate wars between the ages of 50 and 64. We'll band together, begin our own businesses, hire each other and build a new work ethic led by middle-aged entrepreneurs who wear little keys in their lapels and believe in what the emblem symbolizes.

If we're successful, in time perhaps even the most callous of the quarterly oriented, grab-it-while-you-can corporations might correct their myopia and realize that people count as much as profits.

Kirkley, a former editor of *Datamation* magazine, is an industry consultant currently acting as editorial advisor to Patricia Seybold's Office Systems Group

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SOFTWARE & SERVICES

SOFT LINE

Carole Morton

Rounding off square wheels

Once there was a wagon maker. Everyone came to him to buy wagons because he built them well and because they were the best wagons in the kingdom.

To no one's surprise, he also built most of the wheels because they fit his wagons better than anyone else's.

But his products had one minor flaw: The wheels were square. This was a problem for his customers because they were left with the task of purchasing the tools to make the wheels round. The wagon maker didn't bother to make the wheels round himself because it took extra time and resources.

The demand for rounding tools created jobs for toolmakers. Soon, much of the kingdom's success depended on the wagon maker's success.

IBM makes square wheels for its wagons — its mainframe computer line. When IBM announces a major new software product, it invariably delivers a quality package that everyone

Continued on page 23

Tool monitors IDMS changes

BY CHARLES BABCOCK
CW STAFF

WESTBORO, Mass. — A software product named Endevor-DB is said to impose change control on the application development environment of Cullinet Software, Inc.'s IDMS/R and ADS/Online.

The product is available from a start-up company founded by former Cullinet executives. Business Software Technology, Inc. (BST) in Westboro, Mass., has also purchased a larger, MVS control product, Control-1, developed at Empire Blue Cross/Blue Shield in New York by Condor Technology, Inc. Control-1 has been renamed Endevor-C1.

Although the two stand as independent products, BST's intent is to tie them together so that changes to programs in both the development and production environments can be automatically tracked and controlled by MIS managers. The first integration will be available in 60 days, according to Nick C. Rini, BST president and former vice-president of software development at Cullinet.

John F. Burton

The new product, Endevor-DB, is designed to work in conjunction with the popular development language, ADS/On-line and the IDMS/R data base management system's Integrated Data Dictionary, Rini said.

Endevor-DB stores all changes to a developing application in a change control data base. The changes are logged with information concerning who made them, when and why. The $57,500 product intercepts ADS/On-line requests to the dictionary and logs them before sending them on to the dictionary, ac-

Continued on page 23

SOFTWARE NOTES

Relational tops the list

IMS is still at the top of the list of data base management systems, according to a survey of 310 major companies in the U.S. by **Troy State University** in Troy, Ala.

But many respondents have purchased a relational DBMS, and 90% indicated students should be taught the relational model.

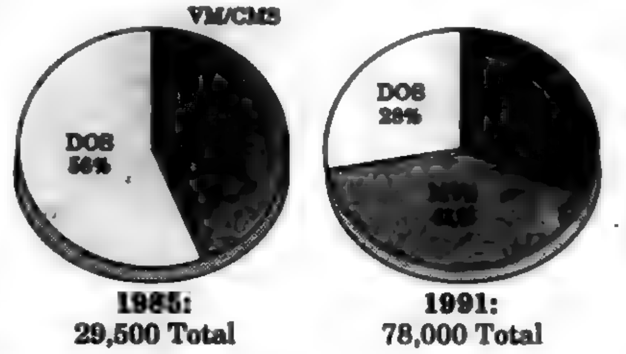
"The survey indicates relational is the DBMS of the future," said James Walton, the business professor who conducted the survey.

Continued on page 20

Data View

IBM operating system usage

During the next five years, the number of licenses for IBM mainframe operating systems will grow 163%



INFORMATION PROVIDED BY THE GARTNER GROUP, INC.
CW CHART: MITCHELL J. HAYES

Designer taps VAX

Integrated tools aid software development

BY ALAN J. RYAN
CW STAFF

PROVIDENCE, R.I. — A line of computer-aided software engineering (CASE) products will soon be available for Digital Equipment Corp.'s VAX/VMS processors.

Spokesmen for Cadre Technologies, Inc. said the firm's Teamwork products utilize DEC's local-area Vaxcluster system, enabling users to tap the additional performance and storage capabilities of the Microvax II and VAX 700 and 8000 series.

The family includes support for the automation of different phases of the software life cycle, which include systems analysis in Teamwork/SA, real-time systems analysis with Teamwork/

Continued on page 23

Inside

- Performance Software releases a CICS debugging system. Page 20.
- Ralph M. Parsons uses Unicorn's MicroCICS to set up an employee stock ownership plan. Page 24.
- Bennett Software announces Jobtrac system. Page 25.

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Performance tool tracks bugs

BY ALAN J. RYAN
CW STAFF

RICHMOND, Va. — Performance Software, Inc. has announced Track, Version 3.1, a CICS-driven monitor and interactive debugging system that analyzes a program prior to its execution and displays an error condition.

The program provides functions to assist the programmer in determining the cause of the error and facilitates an on-line, interactive correction of the problem, the vendor claimed. Users go step by step through a program to follow its logic, and Track is said to pinpoint errors on the screen. Cobol and PL/I source code can then be displayed along with the data files. Corrections are made interactively, then the execution of the program continues, vendor spokesmen said.

"I've found it pretty easy to use, especially in the CICS environment. Some of the other models I tried to use tended not to be flexible enough," said Phil Scanlon of Fountainhead Systems, Ltd., a software development company here.

Multiple errors can be examined and resolved in one execution of the program, and users do not have to wait to resubmit the program for additional compiles, doing more testing and looking at more dumps, the vendor said.

"I would have hated to try to do some of the debugging we did without it," Scanlon remarked.

He said the only problems he has had with the program were in earlier versions when the software was too protective at times and would not perform certain functions that did not go through CICS. "Now it has force commands to tell the program it is OK to do it," Scanlon said.

Track can also be used to monitor any specific program running under CICS. It protects CICS from transactions causing table-storage violation, thus preventing CICS crashes, the vendor said.

It is available for both IBM DOS/VSE and MVS at a price of $4,995."

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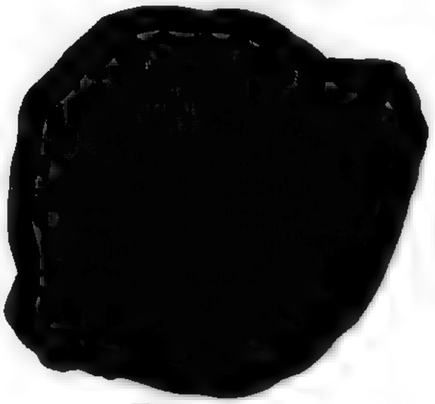

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Notes

CONTINUED FROM PAGE 19

IMS was used by 34% of those surveyed; **Cincom Systems, Inc.'s Total** and **IBM's DL/1** and **Development Management System** were used by 12% each; IBM's **DB2** was used by 9%; and IBM's **SQL/DS** and **Cullinet Software, Inc.'s IDMS/R** were used by 7%.

When asked what data model they would use in selecting a DBMS, 85% indicated relational, 7% hierarchical and 3% network.

IBM inadvertently or otherwise fanned expectations that a new release of DB2 will be out soon in its Jan. 26 announcement of a revised buffer search algorithm. When asked how the enhancement would be delivered to DB2 customers, an IBM spokesman said, "no decision has been made" on whether it will be delivered via an upgrade tape or in a new release.

Relational Technology, Inc. and **Pansophic Systems, Inc.** have teamed to develop an IBM MVS version of Relational's Ingres relational data base management system to run under IBM's CICS and TSO. Pansophic will have the right to use the DBMS in its product line.

On-Line Software International in Fort Lee, N.J., has renamed and repriced **Ramis II**, the information center data base management system it purchased from Martin Marietta Data Systems, Inc. The product will be marketed as the Ramis Information System and, instead of being sold as components, will be sold as a package for $49,000 to IBM DOS users, $88,000 to VM users and $115,000 to OS users.

The **National Systems Programmers Association** in Milwaukee is launching ***Technical Support Magazine*** to publish articles from its members addressing concerns of MVS systems programmers and communications analysts. Dues are $45. Contact P.O. Box 21525, Greenfield, Wis. 53221.

Information Builders, Inc. is reportedly preparing to offer a distributed data dictionary for distributed versions of its Focus data base management system, observers of the New York firm say.

Culler Scientific Systems Corp. in Santa Barbara, Calif., says it will introduce this month an expert system-based compiler that garners a 50% improvement in the performance of its parallel architecture superminicomputer, the Culler PSC. The compiler examines a sequence of Fortran statements, comparing them with the best possible execution times if perfect code could be written, then uses a knowledge base to search for the best code sequences, Culler spokesmen said.

Oracle Corp. has announced a flurry of agreements. Its relational data base management system will be marketed by **Altos Computer Systems, Inc.** on its supermicros, and **NCR Corp.** will market Oracle on its Tower Unix supermicros. Oracle will also be available on **Plexus Computer Corp.'s** Plexus P/Series Unix supermicros, **Sun Microsystems, Inc.** Unix workstations and **Sequent Computer Systems, Inc.'s** Balance 8000 and 210000 multiprocessor lines.

NEW
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Daily Seminars

National Database and 4th/5th Generation Language Symposium

San Francisco, March 23-26   Washington, D.C., April 21-24   Toronto, May 12-15

Dear Colleague,

The 4th Generation of software has become accepted as the best approach for developing applications. The combination of relational database management systems, integrated dictionaries and English-like programming languages has drastically reduced development time.

However, many are lagging behind in switching to 4th Generation technology because they do not fully understand what the technology entails and what is compatible with their current system. If they have already made the switch, they may not have all the appropriate components nor know how to maximize their system's potential. *Buyers must become more knowledgeable.* Failure to take advantage of available information is a mistake which can only cost more in wasted time, effort and money as time goes on.

It is your right as a buyer to expect a system to perform as advertised, but it is also your responsibility to become an EDUCATED buyer! You should know what you need, why you need it, which systems offer it, and finally, what you can realistically expect from a system once it is in place. By attending the *National Database and 4th/5th Generation Language Symposium* you will be able to make the informed purchasing decisions so critical to your company's future.

Our seminars on each day of the Symposium will help you understand the importance of key data management concepts, including 4th Generation software component integration and productivity, giving you the knowledge needed to evaluate and select software products. In addition, products comprising over 90% of the market for database and 4GLs will be presented *in one-hour product-specific sessions.* These sessions will give you the opportunity to closely evaluate the selected products which will be most beneficial to you. Through these evaluations and the knowledge conveyed in the seminars, the DB & 4th/5th GL Symposium will assist you in developing a comprehensive, workable software strategy.

Sincerely,

Geo Schussel

Dr. George Schussel
President,
Digital Consulting, Inc.

SYMPOSIUM CHAIRMAN
Dr. George Schussel

Dr. George Schussel, President, Digital Consulting, Inc. is one of the best known and most widely respected lecturers on DBMS and 4th Generation Languages. Dr. Schussel will lead the Symposium with the expertise and experience which prompted ICP INTERFACE MAGAZINE to call him the "Guru of Data Base Management." Dr. Schussel created the symposium to provide a forum for decision-makers to make objective comparisons among products and keep up with changes in the software field.

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1987 National Database and 4th/5th Generation Language Symposium

San Francisco, March 23-26 | Washington, D.C., April 21-24 | Toronto, May 12-15

THE 4TH GENERATION REVOLUTION

The 4th Generation Languages, relational databases, and related products introduced in the past three years promise a revolution in programmer and end user productivity. In many installations, remarkable success has been achieved in improving both the volume and quality of throughput. These products have been proven in the marketplace as tremendous improvements over COBOL. Combinations of new products can be put together to solve the problems of almost any organization, regardless of size and available resources. Leading-edge companies such as Federal Express, Fidelity Management, and American Express have recognized the profit potential of information systems and through their investment in advanced systems have achieved quality, growth, and profitability that outclass their competition. So why haven't *all* users migrated to the 4th Generation?

REQUIREMENTS FOR MULTIPLE TOOLS

In the Third Generation of software, everyone thought there was one universal language–COBOL. Today, however, many organizations are finding that a full software toolkit is necessary to develop applications successfully. A single 4th Generation language is useful, but far from adequate in many situations. Many organizations are finding that they need *several* 4GLs for different applications: one product for end user computing, one for top-level decision support, and another for programmers building strategic systems.

Meanwhile, in the database area, IBM, Hewlett-Packard, DEC, and other leading vendors are advocating a dual-DBMS approach as the best solution to the broad range of problems faced by today's complex organizations.

These trends mean that MIS departments will be required to purchase and implement an integrated suite of products. Since no single vendor has yet provided the complete range of products, MIS managers must integrate various products themselves. In order to do this effectively, a strong knowledge of both data management concepts and the available database and 4GL products is a necessity. Because of the rapid pace of technological change, even those companies using 4GLs and relational DBMS successfully need to keep up to date with new products in order to fully benefit from the tremendous productivity improvements that are possible.

Meanwhile, those companies that took a "wait and see" attitude toward 4th Generation data management products face severe long-term difficulties: still running obsolete COBOL systems, they are unable to exploit the timelier, more accurate tools for decision-making offered by the new technologies. Eventually, archaic systems may cripple these organizations in the competitive environment.

HOW THE NATIONAL DB & 4TH/5TH GL SYMPOSIUM CAN IMPROVE YOUR PRODUCTIVITY

The Spring 1987 National Database and 4th/5th Generation Language (DB & 4th/5th GL) Symposium can address the needs of both types of organizations. For companies that have not yet made the leap into the 4th Generation, the DB & 4th/5th GL Symposium is an imperative. The first day of educational seminars, designed for both management and technical personnel, provide a sound conceptual framework upon which to base a major purchasing decision while avoiding costly mistakes. The second, third and fourth days feature additional seminars and one-hour technical presentations on all the major database and 4th Generation products, made by trained representatives of the vendor companies. Independent consultants, vendors, and panel discussion participants are all available to answer questions, and many of the products are available for "hands-on" demos. Organizations have saved as much as six to eight months of research by attending a DB & 4th/5th GL Symposium.

"Information was presented without the sales pitch–Great! I am really pleased I attended–this was the best way to find out what software is available for 4GL applications."–W.C. Costuros, Crown Forest Industries

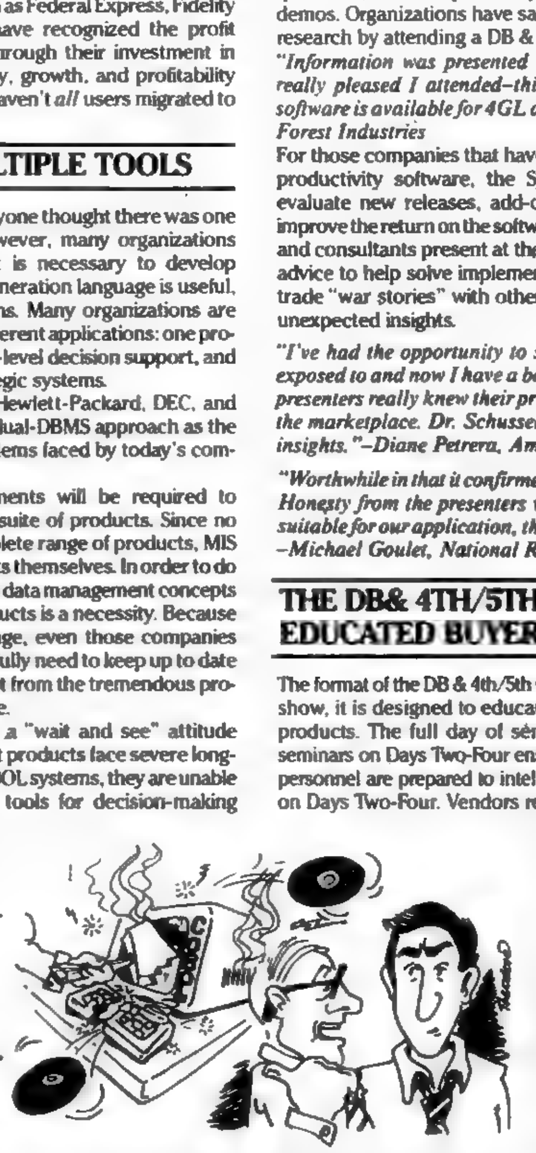
For those companies that have already made an investment in high-productivity software, the Symposium offers an opportunity to evaluate new releases, add-ons and alternatives that can greatly improve the return on the software investment. In addition, the vendors and consultants present at the Symposium can offer a wealth of free advice to help solve implementation problems, while the chance to trade "war stories" with other attendees and vendors can result in unexpected insights.

"I've had the opportunity to see software I would never have been exposed to and now I have a better basis for decision-making. All the presenters really knew their products and understood the concerns of the marketplace. Dr. Schussel is a wonderful speaker; I enjoyed his insights."–Diane Petrera, American Cyanamid Corp.

"Worthwhile in that it confirmed pre-Symposium product impressions. Honesty from the presenters was refreshing: if their product wasn't suitable for our application, they said so and suggested alternatives." –Michael Goulet, National Research Council of Canada

THE DB& 4TH/5TH GL SYMPOSIUM'S GOAL: EDUCATED BUYERS

The format of the DB & 4th/5th GL Symposium is unique. Unlike a trade show, it is designed to educate buyers as well as promote software products. The full day of seminars on Day One and the morning seminars on Days Two-Four ensure that both managerial and technical personnel are prepared to intelligently evaluate the products presented on Days Two-Four. Vendors representing over 90% of the DB & 4GL market make one-hour presentations on their products, providing a wealth of nuts-and-bolts technical information, not just sales pitches. The free consulting sessions, hands-on product demos and reference materials provided at the Symposium round out the learning experience. A detailed description of Symposium events appears on the opposite page. The depth and variety of information presented make the DB & 4th/5th GL Symposium a must for anyone who needs to understand the critical trends in data management, both today and in the future.



"Bob has expressed some dissatisfaction with the system, sir."

9 REASONS WHY YOU SHOULD ATTEND

1. **Day One Seminar**-A full day of training will explain the key concepts of 4GLs as well as in-depth product summaries and comparisons.
2. **Technical Product Presentations**-Sixty individual one-hour presentations on all the key DBMS and 4GL products during Days 2-4.
3. **Hands-On-Product-Demos**-The opportunity to test many products firsthand
4. **Free Consulting**-Free consulting sessions are available with senior staff members of DCI, including Dr. Schussel, who can answer your questions and offer specific solutions.
5. **Additional New Seminars**-On each morning of Days 2-4 there will be a seminar taught by a knowledgeable independent consultant.
6. **Concise Reference Library**-A copy of the 500 page Proceedings plus many other informative handouts, which serve as a valuable reference long after the program..
7. **Question the Experts**-A panel discussion with the experts fielding attendee questions, allowing lively discussion and eye-opening conclusions
8. **Networking**-The opportunity for attendees to share experiences with others who face the same challenges in the changing MIS world
9. **FREE ATTENDANCE for the fourth registrant** from your organization. See back page for details.

THE UNIQUE FORMAT OF THE DB & 4TH/5TH GL SYMPOSIUM

Day One

On the morning of the first day of the National Database and 4th/5th Generation Language Symposium you'll attend a combined management and technical track seminar taught interactively by George Schussel and James Davey. This presentation will provide you with the latest status on concepts and issues of 4th and 5th generation language subjects.

In the afternoon of Day One, there will be two separate product-oriented discussion sessions. Mainframe and related micro products will be covered in one session, while minicomputer and related micro products will be covered in the other session. An intensive discussion will be held on vendor products analyzing the competitive strengths and weaknesses of the different software products,

A discussion of IBM's software strategies and an evaluation of IBM's software products will be held in the mainframe discussion. Likewise, a discussion of DEC's software products and strategies will be held in the minicomputer room.

Days Two-Four

Responding to our attendees' requests for additional education, DCI has restructured the Symposium format for 1987. In addition to the seminars on Day One, there are also seminars in the mornings of Days Two, Three, and Four of the conference:

Day 2 Seminar—Hardware and Software Futures and the 5th Generation of Computer Technology—by Dr. George Schussel, President and founder of DCI.

Day 3 Seminar—Leveraging Application Development Productivity—by Vaughan Merlyn, President and founder, Merlyn Consultants.

Day 4 Seminar—Corporate Connectivity—by Larry DeBoever, Vice President of DCI.

During the afternoon on Days Two-Four you will have the opportunity to attend one-hour product presentations on all of the leading database and 4th Generation Language products. Four presentations run concurrently during each hour and you may move between presentations as you wish. Many companies send more than one attendee to the conference in order to get the maximum benefit from the presentations.

Consultants from Digital Consulting will be available to answer your questions and direct you to the right presentations. Whether you are in the selection or implementation phase, they can provide free expert advice to help answer your particular questions.

DAY ONE

MORNING SEMINAR

George Schussel, President and founder of Digital Consulting, Inc. and James Davey, DCI's Senior Research Associate, present a combined seminar program on DAY ONE of DB & 4th/5th GL. This interactive, fast-paced presentation features multiple projectors and screens and communicates an enormous amount of technical and management information within a one-day period. In the morning, you will learn all of the major 4th generation concepts. In the afternoon the discussion will move to a review of the software marketplace, the positioning of different software vendors and a comparison of DBMS, and 4th & 5th GL products. The advantages and disadvantages of using each company's products will be covered

DR. GEORGE SCHUSSEL
SYMPOSIUM CHAIRMAN

Dr. George Schussel, President, Digital Consulting, Inc. is one of the best known and most highly respected lecturers on DBMS and 4th Generation Languages. He received his doctoral degree from Harvard Business School, is a Fellow of the AAAS, holds the CDP, and is on the editorial board of several publications. Dr Schussel will lead the Symposium with the expertise and experience which prompted ICP Interface Magazine to call him the "Guru of Data Base Management."

JAMES H. DAVEY

Jim Davey is Senior Research Associate with Digital Consulting, Inc. specializing in database management systems, logical database design, 4th generation languages and structured analysis and design. He has twenty years of experience in design and implementation of database systems. Before joining DCI, Mr. Davey was Senior Database Consultant with Eastern Technical Associates, manager of Product Support and Assessment for Prime Computer, and Database and Software Support Specialist for Honeywell and General Electric.

SEMINAR OUTLINE

1. **4th and 5th Generation Concepts**
   a. Technical concepts
   b. Management issues
   c. The 5th generation of software
   d. Business systems definition languages (BSDL)
   e. 4GLs with Computer-Aided Software Engineering (C.A.S.E.)

2. **What Is a Database?**

3. **Different Types of DBMS**
   a. Structured
   b. Value-based DBMS

4. **Relational DBMSs**
   a. Structure
      -Tables
      -Normalization
      -Views
   b. Integrity
      -Entity integrity
      -Referential integrity
      -Database specific integrity
   c. Manipulation
      -Relational algebra
      -SQL

5. **Normalization**

6. **Relational Integrity**
   a. Entity integrity
   b. Referential integrity
   c. Database-specific integrity

7. **The Management Implications of Using Relational Databases**
   a. Higher productivity
   b. More data independence
   c. Better integrity
   d. Better performance-in certain conditions

8. **The Truth About the Relational "Performance" Problem**

9. **What Are "Born-Again" Relational DBMSs?**

10. **DBMS Standards**
    a. Network data language
    b. SQL Standard

11. **Problems with SQL**

12. **What is the Meaning of SQL as a New Standard**

13. **The Single vs. Dual DBMS Strategy**

14. **Transparency Conversion, or "How to Get There from Here"**

15. **Distributed Database Issues**

16. **Micro-to-Mainframe Links: Their Advantages and Problems**

17. **4th Generation Languages: How to Evolve to the Next Generation**

18. **Different Types of 4th Generation Languages**

19. **How to Categorize and Compare 4GLs**

20. **4GLs: Performance vs. Ease of Use**

21. **Prototyping**
    -What is it?
    -Why is it needed?
    -How to do it?
    -When to use it and when it doesn't work

22. **The Management Implications of Using 4GLs**
    a. Can 4GLs be used on complex projects?
    b. The need for data-driven design
    c. Why novices may be better than experienced programmers with 4GLs
    d. Computer resource utilization with 4GLs
    e. How the use of 4GLs affects the turnover of your programming staff

DAY ONE

AFTERNOON SEMINARS

SEMINAR OUTLINE

George Schussel

Mainframe Software and Associated Micro-Products

1. **IBM's Database and Programmer Productivity Aids**
    - a. How well has IBM done in software products?
    - b. A review and forecast of the total installed base of IBM mainframe compatible DBMS
    - c. An evaluation of IMS and DL/1
    - d. Choices for the IMS, DL/1-user
    - e. SQL and DB2: IBM's relational products
    - f. An evaluation of DB2 against Codd's rules
    - g. Software to complement DB2
    - h. The costs of using IBM software
    - i. Performance implications of DB2
    - j. Discussion of benchmark results
    - k. User surveys of DB2 and SQL-DS
    - l. Likely DB2 Futures
    - m. IBM's application development tools
    - n. What is CSP?
    - o. Evaluation of CSP
    - p. What CSP is missing

2. **Integrated Development Software for Mainframes**
    - a. Cincom/SUPRA
    - b. Cullinet/IDMS/R
    - c. ADR/DATACOM
    - d. CCA/204
    - e. Software AG/ADABAS
    - f. Mitrol/MITROL
    - g. Computer Associates/UNIVERSE
    - h. Oracle/ORACLE
    - i. RTI/INGRES

3. **Programmer 4GLs (for mainframes)**
    - a. Martin Marietta/CONSYST
    - b. Cincom/MANTIS
    - c. McCormack & Dodge/MILLENNIUM
    - d. MSA/INFORMATION EXPERT

4. **COBOL Generator/4GLs**
    - a. CORVET
    - b. PACBASE
    - c. ACCOLADE
    - d. INTELLIGENT ASSISTANT
    - e. APS
    - f. GAMMA
    - g. TRANSFORM

5. **Database Machines**
    - a. Teradata
    - b. Britton-Lee

6. **Evaluation and Discussion of End-User Software**
    - a. Decision support systems such as Lotus 1-2-3, System W, IFPS, APS
    - b. PC-oriented tools such as ICMS/Goldengate, PC/FOCUS
    - c. Information Center Software such as AS, RAMIS II, NOMAD2, FOCUS
    - d. English language products such as INTELLECT, ENGLISH, and ASI-INQUIRY
    - e. Query languages like ASI-INQUIRY

7. **Design Aids and Tools**
    - a. CASE-oriented products like KNOWLEDGEWARE
    - b. Graphical-design oriented products like TIP
    - c. DBMS Extensions, NORMAL and DATADESIGNER
    - d. Data-driven design tools, like FACETS and DATA CATALOG2
    - e. Report-writer tools like IMAGINE and ASI-INQUIRY
    - f. Workbench development products from DIALOGIC, CCA and ADR

8. **Non-370 Mainframe Products**
    - a. Honeywell, NCR, Burroughs, Sperry

SEMINAR OUTLINE

James Davey

Supermini and Micro Software

1. **Supermini Hardware Vendor Software**
    - a. Digital's VIA, Rdb, RALLY
    - b. Hewlett Packard/IMAGE and HPSQL
    - c. Data General/DG and SQL
    - d. Wang/PACE
    - e. Concurrent Computer/RELIANCE PLUS
    - f. Prime/PRIMEWAY and INFORMATION
    - g. Others

2. **Supermini Integrated DBMS and 4GLs**
    - a. Mainframe Products
        - -Cincom/ULTRA
        - -Software AG/ADABAS/NATURAL
        - -Info. Builders/FOCUS
        - -Others to come
    - b. Relational Pioneers
        - -Oracle/ORACLE
        - -RTI/INGRES
    - c. Other Contenders
        - -3CI/INFOCEN
        - -Software House/SYSTEM 1032
        - -ADM/DRS
        - -Logica/RAPPORT
        - -Seed/SEED II
    - d. New DBMSs
        - -Sybase Inc.
        - -GDS/GALAXY

3. **Supermini 4GLs and Application Generators**
    - a. Cognos/POWERHOUSE
    - b. Relate/3000
    - c. Cortex/APPLICATION FACTORY
    - d. Henco/INFO
    - e. Pro/PRO IV

4. **Supermicro (UNIX and MS-DOS)**
    - a. Informix/INFORMIX-SQL/4GL
    - b. Unify/UNIFY
    - c. RTI/INGRES
    - d. Oracle/ORACLE
    - e. DLC/PROGRESS
    - f. QINT/SQL
    - g. MDBS/MDBS III, KNOWLEDGEMAN & GURU
    - h. dBASE III PLUS
    - i. R:BASE 5000
    - j. Others

DAYS 2 — 4

MORNING SEMINARS

Day 2 - Hardware and Software Futures and the 5th Generation of Computer Technology

DR. GEORGE SCHUSSEL is one of the world's foremost experts in data base management technologies. He is President and founder of Digital Consulting, Inc., a prominent high technology education and management consulting firm that specializes in software productivity tools and is recognized as the world leader in DBMS and 4GLs.

1. **The Future of Integrated Circuit Technology**
2. **On Switching Speed Limits**
3. **The Need for Parallel Architectures**
4. **How the Cost (per MIPS) Compares - Micros, Minis and Mainframes**
5. **Microcomputer Futures**
6. **An Evaluation of Artificial Intelligence**
7. **What You Need in AI Software**
8. **Expert and Knowledge-Based Systems**
9. **IBM's Approach Toward AI**
10. **The Future for Office Automation**
    a. IBM's approach
    b. The mini-vendors' approach
    c. Networks become the backbone
    d. Distributed databases
11. **The Future of DBMS Software**
    a. Relational systems
    b. Network systems
    c. C.A.S.E.
    d. Distributed databases
    e. Database machines
    f. Data dictionaries
    g. The future for programming tools
        - UNIX
        - ADA
        - Programmer Workstations
        - Commercial AI
12. **Networking Forecasts**
    a. The network becomes the system
    b. An explanation of OSI
    c. OSI as a standard
    d. IBM's DataComm strategy

Day 3 - Leveraging Application Development Productivity

VAUGHAN MERLYN is a well-known authority on Application Generators and 4th Generation Languages, specializing in their use in the Information and Development Centers. He consults for major vendors and prospective users of fourth generation technologies and has also authored the widely-acclaimed report, *"Application Development Systems—The Comparative Consumer Report."*

1. **Redefining the Productivity Problem**
    a. Programmer productivity vs. application development productivity
    b. Application development productivity vs. application productivity
    c. Productivity vs. quality
    d. Measurement framework for productivity and quality
2. **Setting Productivity Expectations**
    a. What benefits can you expect from productivity tools?
    b. What is the cost of achieving the benefits
3. **Available Productivity Tools— Their Roles and Pitfalls**
    a. Higher level languages
    b. Application Generators
    c. Design/analysis workstations
    d. Programmer workbenches
    e. Maintenance tools
4. **Why Most Development Aids become "Shelfware"**
    a. Developer resistance issues
    b. Management commitment issues
    c. Training issues
    d. Expectation issues
5. **Avoiding the "Shelfware Syndrome"**
    a. Managing for successful tool implementation
    b. The role of "The Development Center"
    c. Managing change in the development community

Day 4 - Corporate Connectivity

LARRY DeBOEVER is a Vice-President of Digital Consulting, Inc. and a leading authority on systems integration issues. He is also chairman of The National Connectivity Symposium. Prior to joining DCI, Mr. DeBoever served as Director of Strategic Planning at Ungermann-Bass, Inc., which acquired Linkware Corporation where he was president.

1. **The Pressures for Achieving Corporate Connectivity**
    a. Desktop computing
    b. Departmental computing
    c. Host terminal support
    d. Demands for distributing data
    e. Strategic business requirements
2. **Basic Connectivity Technologies**
    a. Terminal networks and RJE
    b. Wide Area Networks
    c. LANs & data PBXs
    d. Very high speed interconnections
    e. File transfer & micro-mainframe links
3. **Obstacles to Connectivity**
    a. Utilize & preserve existing investments
    b. Slow emergence of standards
    c. Performance issues
    d. Functional issues
    e. Decision-making issues
4. **Trends in Computer Connectivity**
    a. SNA & OSI
    b. APPC
    c. LAN connectivity
    d. Twisted pair
    e. ISDN
    f. Gateways
    g. Micro-mainframe connectivity
    h. Enabling applications
5. **A "Hypothetical" Case Study**

DAYS 2–4

PRODUCT PRESENTATIONS

Digital Consulting, Inc. has published a classification system for database and 4th Generation Language products which includes fourteen major categories of software. All attendees of the DB & 4th/5th GL Symposium will receive a copy of this classification system, which can help software buyers understand the benefits of various types of products and select the right product for their applications. The four categories described below are examples of those in this classification system.

- **Integrated Development Software**
  Many sessions at DB & 4th/5th GL will be devoted to these systems.
- **4GL Programming Languages**
  All of the leading 4GL products will be presented at DB & 4th/5th GL and most will be demonstrated at "hands-on" sessions.
- **Information Center Software**
  All of the important Information Center tools for both mainframes and minicomputers will be presented and discussed at DB & 4th/5th GL.
- **Relational Database**
  Most of the currently available relational DBMS products will be presented and analyzed at DB & 4th/5th GL.

Vendors representing all fourteen categories will make one-hour technical presentations at the DB & 4th/5th GL Symposium. A list of the products that will be presented at the Spring 1987 Symposia appears below.

ONE-HOUR PRESENTATIONS WILL BE HELD ON EACH OF THESE PRODUCTS:

Vendor	DB & 4GL Packages
Applications Software Inc.	INTERROGATE
Applied Data Research, Inc.	DATACOM/DB IDEAL DATA DICTIONARY
Britton Lee, Inc.	INTELLIGENT DATABASE MACHINE
Burroughs Corp.	LINC II
Cincom Systems	SUPRA ULTRA MANTIS
Cognos Inc.	POWERHOUSE
Computer Associates International, Inc.	CA-UNIVERSE
Computer Corporation of America	MODEL 204 PRODUCTS IMAGINE, ACCOLADE
Cullinet Software, Inc.	IDMS/R ADS/O GOLDENGATE
D & B Computing Services, Inc.	NOMAD 2
Digital Equipment Corp.	VIA, Rdb and 4GLs
Gupta Technology	SQLBASE
Henco Software, Inc.	INFO
Hewlett-Packard	ALLBASE HPSQL
IBM Corporation	IMS, SQL/DS, AS, DB2, CSP
Information Builders, Inc.	FOCUS INFORMATION CENTER FOCUS APPLICATION DEVELOPMENT
Information Resources, Inc.	EXPRESS EASYTRAC FCRS

Vendor	DB & 4GL Packages
Informix	INFORMIX
Leading Software Technologies	INTELLIGENT ASSISTANT
Management Science America, Inc.	INFORMATION EXPERT
McCormack & Dodge	MILLENIUM
Micro Data Base Systems, Inc.	MDBS III
Mitrol Inc.	MITROL
MultiSoft, Inc.	SUPER-LINK
On-Line Software International, Inc.	RAMIS Information System RAMIS Workstation UFO Productivity System
Oracle Corp.	ORACLE
Pansophic Systems, Inc.	TELON
Pro Computer Sciences, Inc.	PRO-IV
Rapport Corp.	RAPPORT
Relational Technology, Inc.	INGRES
Sage Software	APS
Software AG of N.A.	ADABAS NATURAL
Software House	SYSTEM 1032
Sperry Corp.	MAPPER
Technology Information Products Corp.	INFO MODELING DATA MODELING
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3CI	INFOCEN
Unilog, Inc.	UNI-D
Wang Laboratories, Inc.	PACE

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GROUP ATTENDANCE: Previous attendees of DB 4th & 5th GL have told us that the best way for companies to gain the most benefit from the program is to send two or more attendees. Have you considered sending representatives from different departments, divisions, or locations within your organization?

CANCELLATION POLICY

Cancellations received two weeks or more prior to the Symposium will be accepted subject to a cancellation service charge of $100. Transfers to a different Symposium date or substitutions will be accepted with no cancellation service charge as long as the fee is paid and the request is received before the date of the original Symposium. Registrants whose cancellation requests are not received two weeks prior to the Symposium (or no shows) are liable for the entire fee.

DIGITAL CONSULTING, INC.

This Symposium will be conducted by Digital Consulting, Inc. (DCI), a leader in the field of EDP management training. DCI is located at 5 Kimberly Terrace, Lynnfield, MA 01940, telephone (617) 470-3870.

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SOFTWARE INSTITUTE OF AMERICA

This Symposium is sponsored by Software Institute of America, Inc. (SIA), a non-profit, educational organization dedicated to increasing understanding of advanced business oriented software SIA is based at 8 Windsor St., Andover, MA 01810, telephone (617) 470-3880

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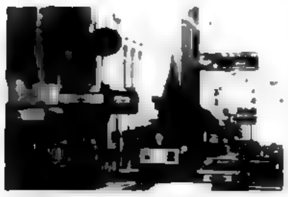

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Special feature on desktop connectivity. How PCs, terminals, data phones, and printers are being hooked up to corporate mainframes. Plus—a look at products and implementation strategies.

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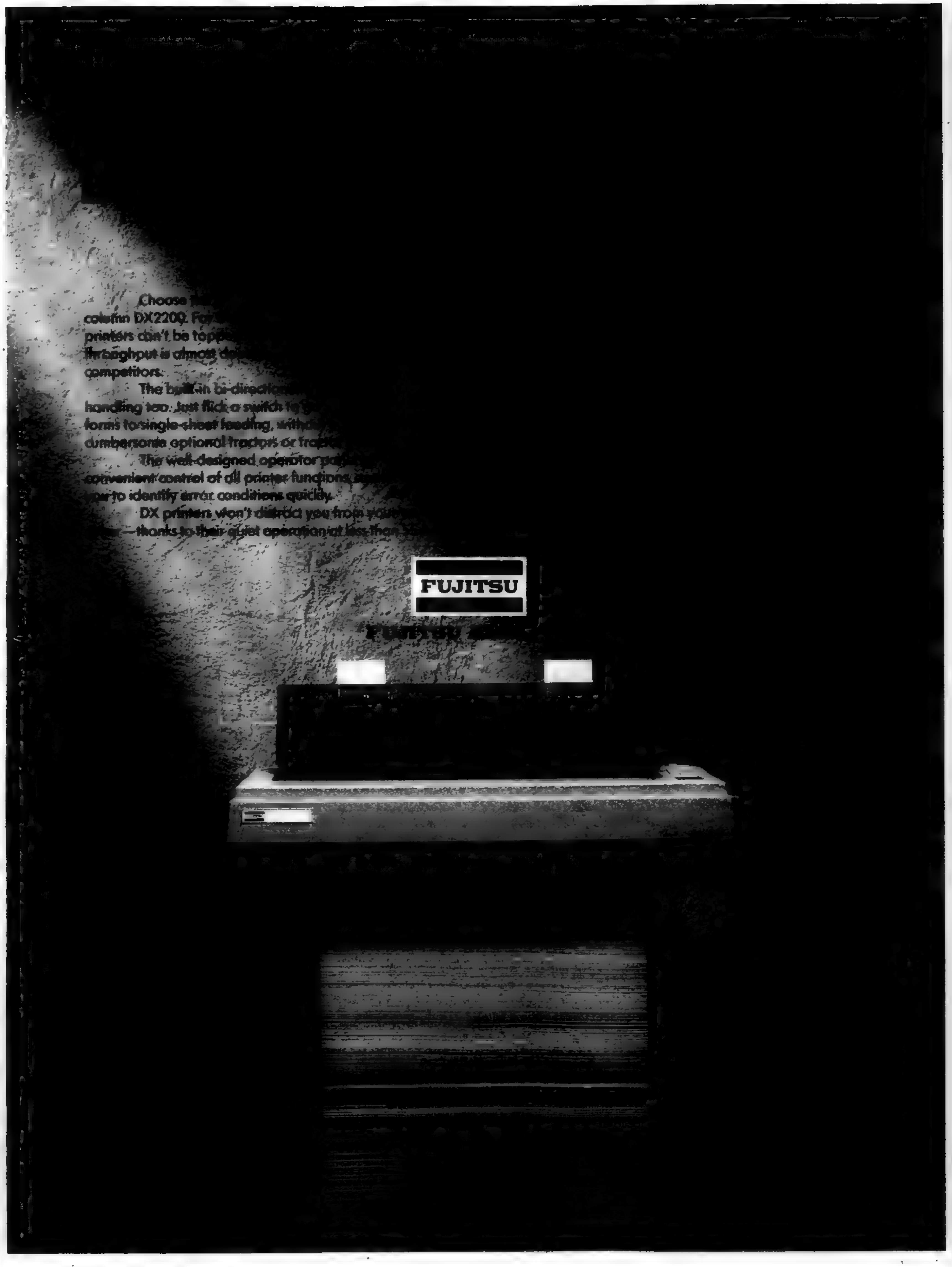

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Rounding off

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needs. However, that product typically needs rounding-off at the corners. This is not to say IBM develops incomplete software, but that its software often works better with the help of aftermarket products. IBM and others have been able to cut their product development costs substantially by letting aftermarket developers do the work.

In the microcomputer arena, IBM allowed thousands of micro software companies to develop the several thousand Personal Computer-compatible programs available today. I feel it was the efforts of these software developers that made the PC and its legacy of clones such a success, not the efforts of IBM's marketing department. In this case, the PC was IBM's square wheel. And even still, it appears everyone from the software developers and board makers to the PC furniture manufacturers is trying to make that wheel round.'

IBM has also found that it can create industry standards by letting others round the corners off their products. For example, when IBM introduced DB2 two years ago, the only interfaces and support languages for the product were those developed by IBM. Companies then began to develop and advertise products designed to enhance DB2

With so many developers flaunting their DB2 interfaces and capabilities, it appears that the whole world supports IBM's new data base. The product has created a following that is nothing less than remarkable, but then, this is what IBM expected.

Of course, IBM is not the only one profiting from its own square-wheel methodology. In fact, it is creating a healthy business environment for much of the software industry. By marketing a DB2 that can be greatly enhanced with the correct support tools, IBM has left open a number of areas in which third-party developers can thrive. For example, DB2 still needs screen management systems, numerous utilities, performance management products and so on.

Several developers have already begun introducing DB2 support products. CGI Systems, Inc. has developed a comprehensive DB2 application development and full dictionary support product called Pacbase. Information Builders, Inc.'s Focus, On-Line Software International's Ramis, Sterling Software, Inc.'s Dylakor Division and Dun & Bradstreet Plan Services, Inc. also provide DB2 support.

It's a practice that is another IBM original, and like all successful IBM originals, it is not without imitators. Cullinet Software, Inc., Lotus Development Corp. and others have also learned from IBM that trying to do it all yourself isn't necessarily the best business practice; however, keeping development costs low and letting the aftermarket build your product's following is.

Morton is president of the Dylakor Division of Sterling Software, Inc. of Granada Hills, Calif.

Tool monitors

CONTINUED FROM PAGE 19

cording to John F. Burton, BST executive vice-president.

A Comparator module in the product identifies differences between a purchased application and a vendor-supplied upgrade as well as isolated modifications made to the application by the customer. A Promotion module allows users to identify changes in applications that are being moved from development to test and production levels, Burton said. Control-1 similarly logs changes to source code and executable code in production applications, creating an audit trail that makes it possible to reconstruct any prior version of a program. It retails for $57,500.

William McClatchie, manager of data base administration at General Electric Co.'s Plastics Division in Pittsfield, Mass., said Endevor logs development changes quite well, but he would like to see "the ability to sign-out and sign-in code" added to the product in the future.

Designer

CONTINUED FROM PAGE 19

RT and systems design with Teamwork/SD phases.

Teamwork/Access, a data base and integration tool, is said to provide users with the ability to integrate other VAX/VMS software development tools with Cadre's Teamwork products.

Beta versions of the tools will be available later this month, and the products are expected to ship to customers on March 31, Cadre spokesmen said.

Derrick Hatley of the instrument and avionics systems division at Lear Siegler, Inc. in Grand Rapids, Mich., said he and his co-workers have been "evaluating all of the development-method tools becoming available over the last couple of years. At this point, Cadre is the best one."

Hatley said that while he had some problems with the product, they were "no more than you would expect with a new product. We have a rather demanding environment. . . . In a number of ways, we were stretching [the software] beyond expectation."

Teamwork features an interactive multiwindow, graphics-oriented environment. The tool set costs $8,900.

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Unicorn MicroCICS development environment operates on PC ATs separate from mainframe

BY EDDY GOLDBERG
SPECIAL TO CW

PASADENA, Calif. — Following the return of Ralph M. Parsons Co. to private ownership in 1985, management sent an edict to the Business Systems and Programming Department: Design a new system to handle the company's employee stock-ownership plan (ESOP) that will be printing out employee dividend checks within five months.

"We had to change the whole record-keeping system. All the retirement plans had to be folded into one trust as part of the ESOP," said Tom Meikle, manager of Business Systems and Programming. "We also had to include the new organizations that were acquired."

Parsons, one of the largest international engineering and construction consultants, is an $8.5 billion firm with employees in more than 100 countries. In addition to the design and programming challenges, the team had to deal with the different systems used worldwide.

Already strapped for processing power and disk space and unfamiliar with the intricacies of retirement and benefit plans, it was do or die for the department, Meikle said.

> "THE use of MicroCICS was a major plus. You can develop the entire application with it at one workstation. You can set up all the definitions and do the programming."
>
> TOM MEIKLE
> RALPH M. PARSONS CO.

Outside assistance was clearly needed, but the service bureau the company had been using estimated the job would take 18 months and cost $1 million.

In July, after defining the preliminary specifications, the company began contacting outside consultants.

"We were looking for a system that could be completely on-line and interactive to the benefits department, so they could make their own changes," he said. "We wanted to put it in the hands of the users and not require a tremendous amount of work for the DP department."

After narrowing the field to two candidates, Parsons selected Unicorn Systems Co. in Los Angeles, primarily on the basis of its MicroCICS product, Meikle said. MicroCICS could operate on IBM Personal Computer AT/370s, completely separate from the company's mainframe.

The project leader from Unicorn arrived in early September, and by October, additional Unicorn staff came in to begin the early stages of program development. Three AT/370s were purchased to run Unicorn's MicroCICS product.

MicroCICS is one of a growing number of CICS development environments that operate on standard IBM PCs or PC/370s. After development and testing on the PCs, the programs can be uploaded to the mainframe or run on the PC ATs. The main benefits of doing CICS development on a PC are a dedicated development environment and the knowledge that if a test crashes, it will not bring down a mainframe CICS region.

"The use of MicroCICS was a major plus," Meikle said. "You can develop the entire application with it at one workstation. You can set up all the definitions, do the programming, use aids to set up an IBM Basic Mapping Support map. You can get through the development process quicker. You don't have to be quite as careful in desk checking as you do on the mainframe," he remarked.

All the development work on the ESOP was performed by Unicorn personnel using proprietary CICS structured design and programming methodology.

The job was completed on schedule at a cost of $350,000, which included the AT/370s. The employees received their dividend checks on time, and Parsons' DP department weathered the crisis.

After the system was developed, Parsons discovered what Meikle called one of the real pluses of the system: Runtime versions of the ESOP were set up for AT/370s to run independently in the company's major subsidiaries in Houston, Chicago and Boston.

Each month, the subsidiaries send a floppy disk to headquarters in Pasadena, Calif., where the data is uploaded to the mainframe data base for use by the corporate benefits department.

After the data is processed, each subsidiary's portion is extracted and sent back on a floppy disk.

This saves a lot in communications costs, Meikle claimed, as Parsons is now able to realize the benefits of a distributed system without the additional telecommunications costs of attaching remote terminals to the mainframe.

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NEW PRODUCTS

System software

Template, the software division of Megatek Corp., has ported its **Figaro** Programmer's Hierarchical Interactive Graphics System (PHIGS) standard product to Digital Equipment Corp. Vaxstation GPX environments, IBM systems with MVS or CMS operating systems and Apollo Computer, Inc. and Sun Microsystems, Inc. workstations.

According to a company spokesman, PHIGS is a graphics standard that can solve highly dynamic three-dimensional modeling applications while remaining device independent.

Figaro costs $5,000 to $32,000.

Template, 9645 Scranton Road, San Diego, Calif. 92121.

Compucept, Inc, has announced **Intercept**, software designed for automating IBM MVS and MVS/XA data centers.

Intercept is said to allow users to program automatic responses to time-of-day events and activities that take place in the system.

It has access to write-to-operator and write-to-operator-with-reply messages and operator commands before they have effects on the system.

According to the vendor, with Intercept, users can suppress and reroute messages, simplify operator commands, implement console security and control network activity.

Intercept is priced from $9,000.

Compucept, Suite 238, 2464 El Camino Real, Santa Clara, Calif. 95051.

Bennett Software, Inc. has announced **Release 2.2** of its **Jobtrac** scheduler system for the IBM MVS mainframe environment.

The Jobtrac system was designed for MVS JES2 environments requiring scheduling services under IBM's TSO/ISPF.

Release 2.2 enhancements include data set triggering abilities, systems operator command scheduling and automatic message recognition and reply triggerings.

A permanent site license for the Jobtrac scheduler system is priced at $38,400.

Bennett Software, P.O. Box 96694, Houston, Texas 77213.

Languages

Adrem, Inc. has announced **Adders/GXL**, a component of its Adders on-line data entry system.

Adders/GXL is said to incorporate within Adders the power of Guest, Adrem's fourth-generation applications development system.

It is said to allow users to tailor Adders' validation capabilities to meet a specific need. The GXL fourth-generation language features English-language commands that are entered on-line using a full-screen editor. Adders runs on IBM-compatible mainframes.

It is priced from $18,500 to $24,000. The GXL option is priced at $2,500 for IBM VSE users and $3,000 for IBM MVS users.

Adrem, One Hollis St., Wellesley, Mass. 02181.

Application packages

Diagonal Data Corp. has enhanced its **Micro Maint** plant and facilities maintenance software package.

Users can now insert notes to maintenance procedures via a special page added to the program.

According to the vendor, the page can be used to describe in any desired level of detail additional specific instructions or information about a particular maintenance procedure.

Micro Maint costs $4,950 for the single-user version. It runs on systems ranging from personal computers and the IBM System/36 to multi-user networks and some mainframes.

Diagonal Data, 2000 E. Edgewood Drive, Lakeland, Fla. 33803.

William A. Pendersen and Associates has announced **Plot 220** graphics software for the Digital Equipment Corp. VT220 and compatibles.

Plot 220 is said to provide true graphics presentation on a terminal with down-line-loadable character set capability.

It is an application development kit made up of callable routines that define and initialize the plotting area on the screen, define terminal type and plot lines with pen control, either a line at a time or in multiline mode. The program supports output of the graph to a printer or to a file for inclusion on another document.

Plot 220 is priced at $295 for DEC Microvax and VAX-11 systems and at $495 for VAX 8000 series machines.

William A. Pendersen and Associates, 1037 N. Fair Oaks Ave., Sunnyvale, Calif. 94089.

Utilities

Promod, Inc. has introduced **Ada CFG**, an Ada code frame generator option for its Promod series of computer-aided software engineering (CASE) environments.

Promod CASE environments with Ada CFG are said to take the user step by step from structured analysis through automatic Ada code frame generation. The

Continued on page 26

can manage IS effectively from the top down.

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Continued from page 25

Ada CFG is used during the implementation phase of the CASE program, automatically creating Ada program templates from the preceding design phases.

The Ada CFG costs $4,000 for the Promod version that operates on the Digital Equipment Corp. VAX and $1,000 for personal computer environments. Promod CASE costs from $9,950 to $25,000.

Promod, 22981 Alcalde Drive, Laguna Hills, Calif. 92653.

Symark International, Inc. has added Hewlett-Packard Co. Laserjet support to its **CMA-Spool** remote print-management system.

The feature provides users with control of reports directed to Laserjet printers, including number of copies, page formatting, page selection and font selection.

According to the vendor, CMA-Spool supports VTAM-based remote printer networks and operates as an MVS subsystem.

CMA-Spool costs from $10,000 to $15,000. The HP Laserjet feature costs $3,500.

Symark International, Suite 704, 5655 Lindero Canyon Road, Westlake Village, Calif. 91362.

Visual Engineering, Inc. has announced **Visual 3D**, a modular two-dimensional graphics library for the Unix environment.

Visual 3D features three-dimensional primitives such as box, sphere, cylinder and rounded rectangles, surface shading such as wire frame, nonshaded solids and global shading, done through ray-tracing.

According to the vendor, other features include solid extrusions from any two-dimensional area including text; and solid surface attributes such as multiple light sources of different types and anti-aliasing.

Visual 3D is priced between $1,500 and $8,000.

Visual Engineering, Suite 600, 2150 N. First St., San Jose, Calif. 95131.

Pacific-Sierra Research Corp. has announced **Forge**, an interactive facility for Fortran optimization for Cray Research, Inc. supercomputers available on Digital Equipment Corp.'s Microvax II workstations under VMS.

Forge is said to allow users to get timing analysis at the DO loop level; interactively restructure code; record an audit trail; recreate and modify any session; specify hardware and software target systems; and create transportable Fortran.

Also provided is an on-line seminar on various machine architectures, according to the vendor.

A corporate license is priced at $99,000. A single workstation license is priced at $45,000. After the first year, annual maintenance is extra.

Pacific-Sierra, Suite 203, 312 Main St., Placerville, Calif. 95667.

K.I.S.S. (Keeping It Simple Software) **Division** of Robert J. Loeb Management Consultant has announced the **RTMN/CICS Response Time Monitor.**

The monitor for CICS is said to display CICS response times and produce a log file that can be viewed on-line or printed in batch mode.

The RTMN/CICS Response Time Monitor costs $998.

K.I.S.S, 5803 N. Cicero Ave., Chicago, Ill. 60646.

Softool Corp. has announced **Release 2.1** of its **Change and Configuration Control** (CCC) environment for the IBM VM/CMS operating system.

Release 2.1 is said to increase execution speed and add new data base and journal file formats.

CCC protects the integrity of the information it manages. A new command locates and documents invalid data that can optionally be corrected or excised from the data base.

CCC on the IBM VM/CMS is priced at $30,000.

Softool, 340 S. Kellogg Ave., Goleta, Calif. 93117.

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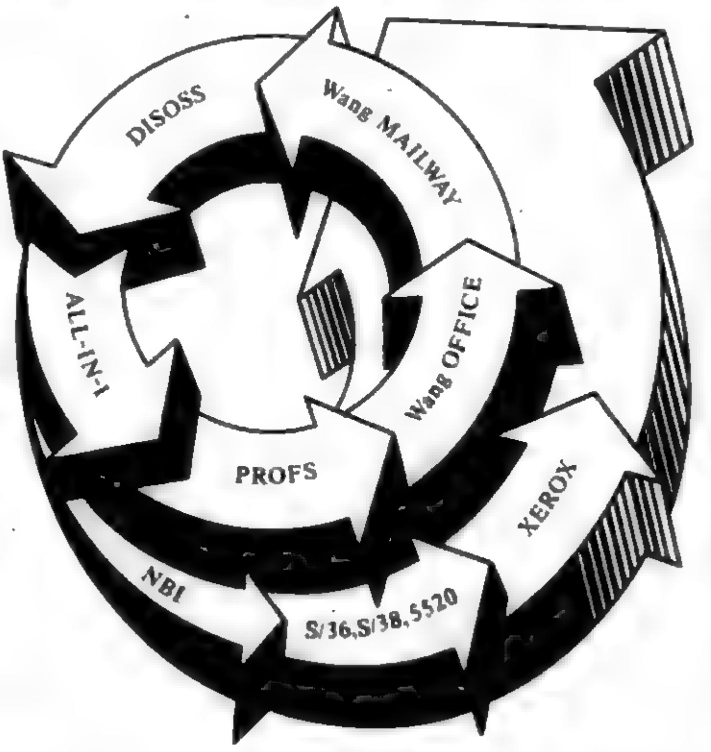

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MICROCOMPUTING

SMALL TALK

William Zachmann

Bringing 3-D to your PC

In these days of growing dominance by a few major software vendors, it is refreshing to note that individuals can still come up with useful products in their spare time. A recent instance is found in Datasurf, a program for creating three-dimensional graphs on an ordinary IBM Personal Computer or compatible.

Developed by Mark Bridger, an associate professor of mathematics at Northeastern University in Boston, Datasurf makes it easy to create 3-D graphical presentations of data arrays. Sold by mail, Bridge Software, Inc.'s $125 Datasurf package can be used to produce high-resolution 3-D graphs on standard dot matrix printers.

The program's basic capability turns a two-dimensional table of data values into a 3-D graph. The rows and columns of the table are used to define a horizontal plane of rectangular plot points. The data values in

Continued on page 30

Vaxmate buyers await delivery

BY DAVID BRIGHT
CW STAFF

Although Digital Equipment Corp. is promoting its Vaxmate microcomputer as a key part of its networking strategy, key elements of the system are five months late. However, DEC customers say they are still hopeful that the complete system will work as promised.

Introduced five months ago, the Vaxmate is an IBM Personal Computer AT-compatible system with a built-in Thinwire Ethernet networking capability for closely linking the unit to other VAX systems. DEC is also readying an integration kit for giving complete Vaxmate capabilities to PC ATs.

However, George Symula, marketing manager of DEC's Personal Computing Systems Group, cannot say when that product will be available.

The basic $4,065 Vaxmate comes with 1M byte of random-access memory and one 1.2M-byte floppy disk drive. DEC offers an optional $1,945 expansion box that contains a 20M-byte hard disk drive and two expansion slots, but the unit has so far been difficult to obtain. DEC experienced some thermal problems with the box, which does not have a fan, but Symula says these have been solved. Normal delivery procedures are now in effect, Symula says. Other than that, he cannot specify delivery times for either the Vaxmate or the expansion box.

VAX/VMS Services for Microsoft Corp. MS-DOS, a major component of Vaxmate that includes network server features, has been shipping since the system was announced, Symula notes. However, he cannot say when the network interface card necessary for linking the Vaxmates to other machines will be available in volume. DEC is currently shipping the card to selected accounts, he claims.

Camp Dresser & McKee, Inc. in Boston ordered two Vaxmates last September, received the systems in early January and is still waiting for the expansion boxes. The firm's director of computer resources, Bill Sommerfeld, says the testing procedure is being held up by the lack of the expansion units. DEC told him it is planning to deliver the boxes in March or April, he says.

"On paper and in the demos that we've seen, it looks like a very nice product, particularly for a site that has a lot of VAXs, as we do," Sommerfeld says. "We don't feel that we can order any more of them until we get the whole thing together and have a real chance to test them." Sommerfeld says he feels DEC should drop the price of the systems to make them more competitive with other microcomputers on the market.

However, one analyst claims that, at least in Fortune 2000 scientific and engineering environments, the connectivity issue is more important than pricing. "Networking and connectivity is

Continued on page 31

DDL reaches PC tools

MORAGA, Calif. — An agreement recently reached between Insight Development Corp. and Imagen Corp. will bring Imagen's Document Description Language (DDL) capability to existing IBM Personal Computer-compatible applications software, the two companies said.

According to Insight President Doug Cole, his company's Lasercontrol software will serve as a bridge between most PC software packages and printers that support DDL. The menu-driven software package enables existing applications programs to access laser printers by emulating printers supported by those applications.

"Imagen's version of Lasercontrol will help protect the investment the installed base has made in software by bringing the advanced features of DDL to that software," Cole said.

DDL is said to provide flexibility in the designing and printing of complex documents, such as in desktop publishing applications.

Under the agreement, Insight will develop a private-label version of Lasercontrol for Imagen to sell or license to its laser printer customers and to sell through distributors and dealers.

Kaypro slashes prices

SOLANA BEACH, Calif. — Following the industry trend of lowering microcomputer prices, Kaypro Corp. late last month cut the prices of its IBM Personal Computer AT-compatible systems by as much as 25%.

The price of the Kaypro 2861 Model C with 640K bytes of random-access memory (RAM) and a 30M-byte hard disk drive fell from $3,995 to $2,995. The price of the Kaypro Model A with 640K bytes of RAM and one 1.2M-byte floppy disk drive dropped from $2,495 to $1,995.

Kaypro had recently increased the speed of the systems' processors to 10 MHz and increased the systems' memories to 640K bytes.

Kaypro's move follows IBM's most recent price reductions. IBM lowered the prices of its Personal Computer XT Model 286 and the entry-level PC AT from $3,995 to $3,395.

Inside

- A virtual memory manager allows programs to access 8M bytes of virtual memory on IBM PCs. Page 31.
- Ricoh introduces a compact 6 page/min printer. Page 35.

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Oracle launches ALLIANCE program for software VARs

Oracle Corp., supplier of the ORACLE distributed relational DBMS and application development tools, has announced a new program for software value-added relicensors dubbed the Oracle *Alliance* program. The program offers broader markets, simpler, faster selling cycles, and shorter time-to-market for VARs who build or convert their applications to use Oracle's products.

According to Larry Harman, Oracle's Director of the VAR program, "We offer major business benefits to VARs who choose to use ORACLE with their products. Chief among these benefits is ORACLE's portability and the portability of ORACLE-based applications, allowing applications and data to be shared among different machines. Oracle also provides the link software to exchange database information among the different machines."

Broader VAR Markets

ORACLE runs on the widest array of hardware: IBM mainframes under MVS and VM, most vendors' minis under both proprietary and UNIX operating systems, and PCs under MS/DOS. Oracle also developed SQL/RT, marketed by IBM on the RT PC.

Harman states, "Only with ORACLE can an application developer produce software on one system and *inherit* a vast market of users of multiple vendors' hardware. Basically, we let our software VARs do *blindfold selling*."

"Blindfold Selling"

The company described "blindfold selling" as the ability of a VAR's salesman to walk into an end-user site blindfolded and say, "I don't know what types of hardware you're using, or how many types there are, but my applications run on all of them"

Harman points out that VARs have a tough decision to make concerning what hardware to implement on. With ORACLE, that decision needn't be made. Software VARs who establish a niche in a particular vendor's install base can take advantage of ORACLE's portability to sell in other hardware environments.

Shorter Time To Market

The company also cited the high level of productivity offered to VARs by Oracle's broad range of application tools, including a forms system, integrated spreadsheet, graphics and other tools. These yield development and maintenance efficiencies that translate into shorter time-to-market and lower costs.

And, Harman adds, "ORACLE is the most complete and mature SQL-based DBMS on the market. SQL is becoming a national standard, so developing applications with an IBM-compatible, portable DBMS makes business sense in both private-sector and public-sector markets."

Harman concludes, "Generous discounts plus support, training and co-marketing combine to make the Alliance program an outstanding opportunity for software VARs."

Oracle Corporation, founded in 1977, builds and markets the ORACLE distributed relational DBMS, 4GL and DSS tools. ORACLE was the first commercial SQL-language DBMS, and is compatible with IBM's DB2 and SQL/DS DBMSs.

ORACLE provides a standard software environment across a wide range of computers and operating systems, including IBM mainframes, minicomputers from DEC, DG, ATT, HP, Stratus, IBM, Apollo and many others, and IBM PCs. ORACLE runs with IBM's MVS and VM/CMS, DEC's VAX VMS and DG's AOS/VS among others, as well as with UNIX on most systems.

All versions of ORACLE, from the mainframe to the PC implementation, are identical. ORACLE is the only relational DBMS which provides the complete portability of data and applications across a wide variety of systems. Oracle's SQL*Star architecture links dissimilar systems running ORACLE.

Oracle Corporation markets its products worldwide through 30 direct sales offices, 11 distributors and the Authorized Oracle Dealer network. In addition, ORACLE is sold by numerous hardware manufacturers, including IBM, Honeywell, Sperry, Stratus and Prime.

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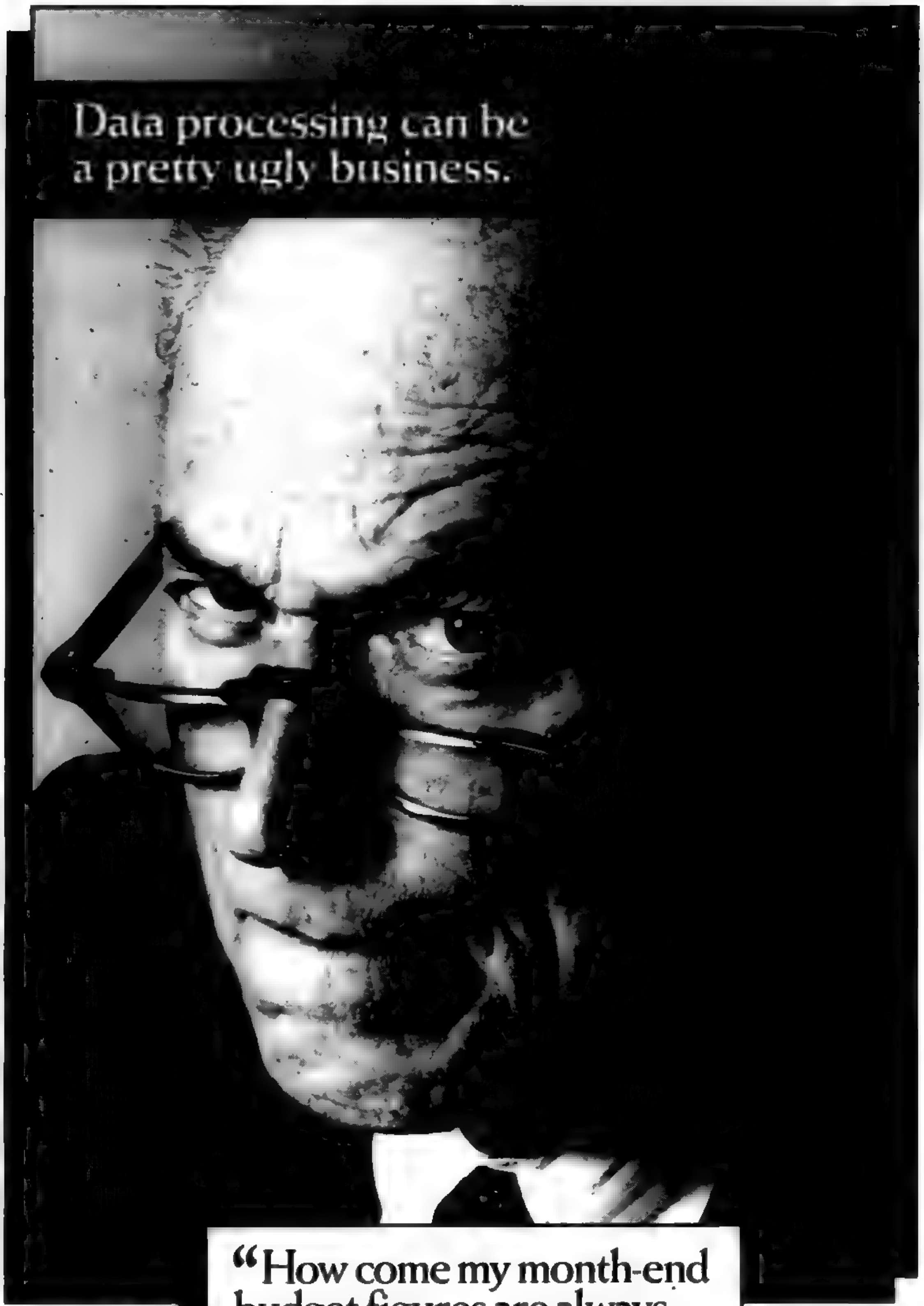
For additional information, contact Larry Harman, Director, VAR Marketing, Oracle Corporation, 20 Davis Drive, Belmont, CA 94002 or call 800-345-DBMS



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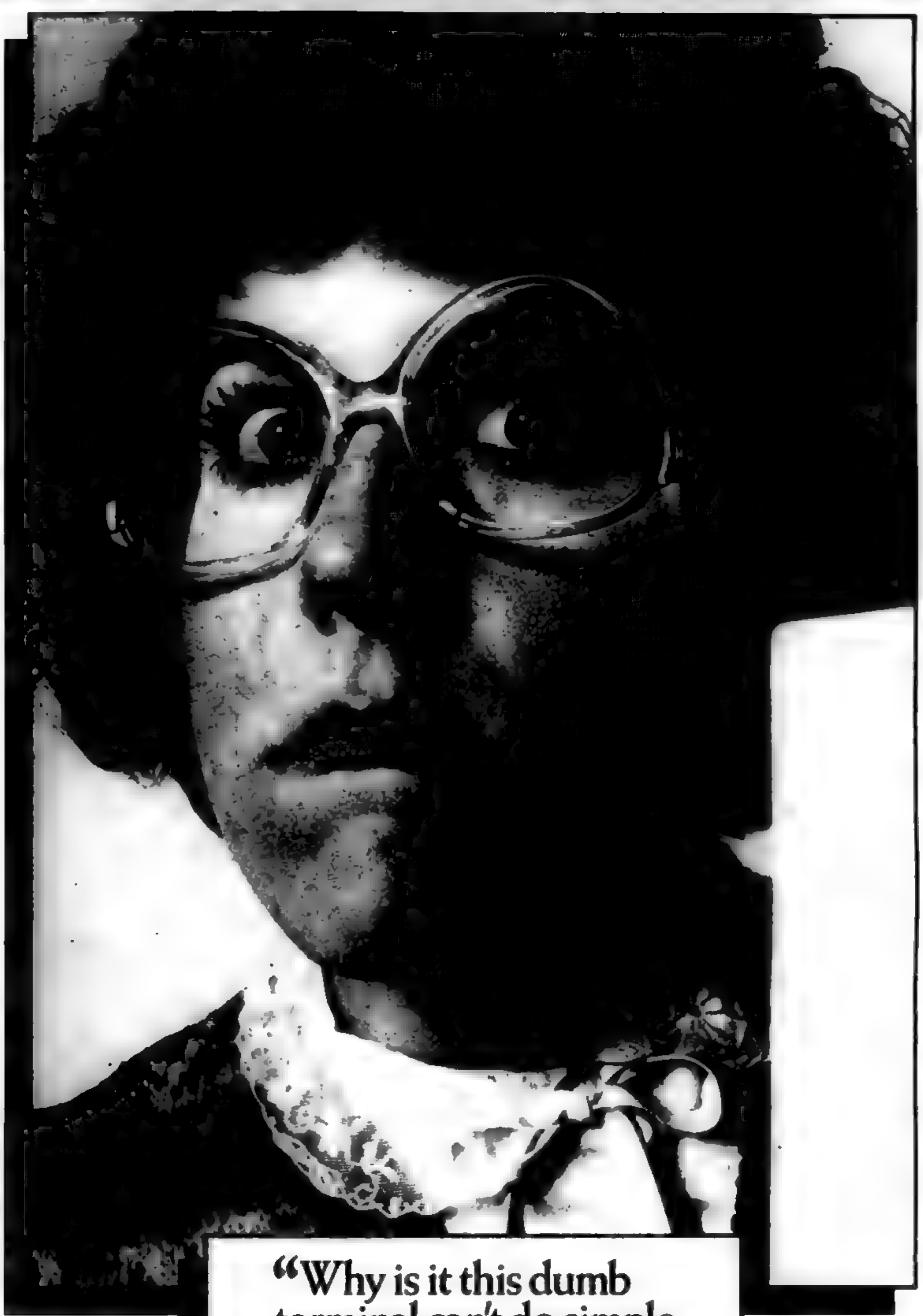

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Battle brews

FROM PAGE 27

the table are used to determine the height of the graph points.

The resulting 3-D shape may be represented as either a succession of overlapping planes or a surface. A standard autograph command can be used to create an initial view of the data.

Additional commands make it relatively easy to rotate or rescale axes and annotate the graph with titles of different fonts and sizes.

The data arrays that define the graph may be input to Datasurf directly or imported from another file.

A conversion utility assists in bringing in data from ASCII text files, Micropro International Corp.'s Wordstar files or Lotus Development Corp.'s work sheet files. Datasurf can handle input tables with up to 32,767 plot-point entries.

The program delivers a reasonable what-you-see-is-what-you-get display using the 640- by 200-pixel monochrome graphics display of the IBM Color Graphics Adapter or a compatible adapter. It will work with the Enhanced Graphics Adapter only in the 640-by-200 mode of the program's current release.

Printer output, however, may be done at what amounts to plotter resolution. Epson America, Inc. FX printers and compatibles, for example, may be used at resolutions up to 1,600 by 640 for a screen image. A version is also available to support plotters.

Creates time series

The printer/plotter resolution the program handles, combined with the annotation capabilities it provides, makes Datasurf a practical tool for creating 3-D presentation graphics. Monthly time series covering a number of years, for example, can be nicely represented in a Datasurf 3-D graph.

Annotation and labeling of graphs is facilitated by a capability that sets the annotation cursor on the graph by the individual cell position in the input data. A good assortment of scaling, rotational and other options facilitates positioning the 3-D graph to the best advantage.

Datasurf comes standard with a version to support the Intel Corp. 8087 or 80287 math coprocessor chips. Users will appreciate the additional speed these floating-point processor chips provide.

The program and its documentation does carry some indication of its modest origins. It is a bit more quirky than more polished software from big-time vendors and requires a certain amount of user sophistication. For example, if the matrix dimensions for the input data are not described correctly, the program is likely to come to an abnormal termination.

For anyone interested in turning data into 3-D graphics, however, the rough edges on the program will be no more than minor irritations. The many examples included in the documentation and the straightforward menu selection system are adequate to make the functions of Datasurf available to the average PC user.

The essence of business graphics lies in its ability to represent a lot of information in a single image. Although many graphics programs are available, those offering 3-D graphical representations for ordinary business users are few. Though hardly a perfect product, Datasurf goes a lot farther in making 3-D graphics feasible to ordinary users than many more expensive programs.

Zachmann is vice-president of research at International Data Corp.

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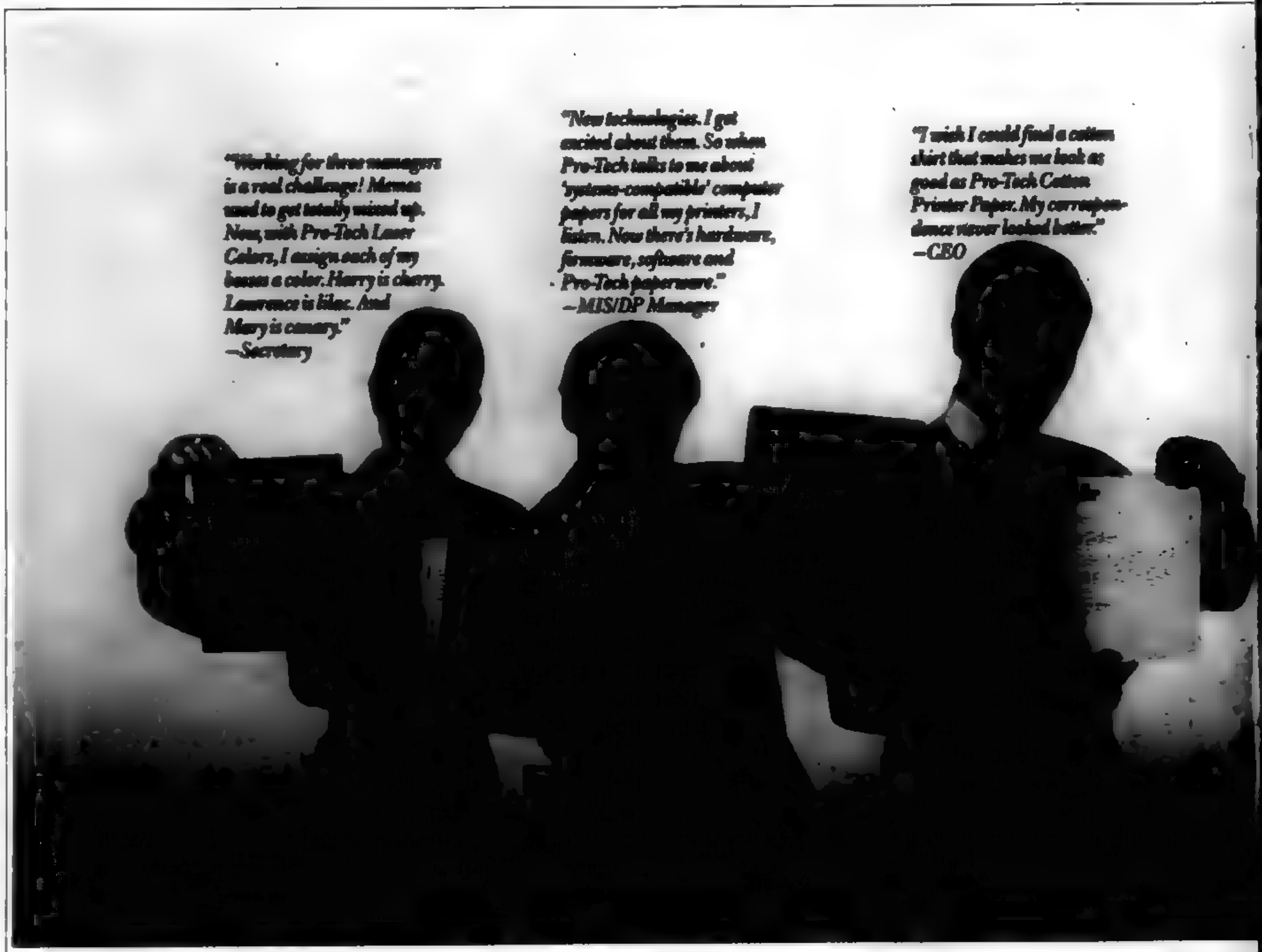
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Vaxmate

FROM PAGE 27

the No. 1 priority across the marketplace for 1987," observes Marty Gruhn, vice-president of the Sierra Group, Inc., a Tempe, Ariz., market research firm. "If DEC can deliver a product that has that kind of transparent network ability that people can't get with the IBM PCs, it would do very well almost at any price."

Gruhn adds DEC is less likely to have success with the Vaxmate in price-sensitive Fortune 500 general manufacturing and commercial environments.

But one beta-test user suggests that the Vaxmate is actually better suited for office environments.

This is because engineering environments generally require add-on boards more often than office environments, says Peter Duray, a systems integration engineer at Polaroid Corp.'s Waltham, Mass., office.

Speed vs. handling

Duray is in the process of comparing the performance of three Vaxmate beta units with PC ATs equipped with the integration kit. He says the PC ATs do not operate quite as fast on the network as do the Vaxmates and that the Vaxmates provide faster screen handling.

A big plus with the Vaxmates, Duray observes, is in not having to worry about filling up the hard disk drives.

Instead, the VAX/VMS services for MS-DOS let him use disk drives on the larger VAXs. However, using this method of storage gets him into trouble with the systems managers who complain about the space being used on *their* disks, he comments.

Price vs. performance

Another user interested in comparing the Vaxmate with a similarly equipped PC AT is Brian Briggerman, a systems manager with Caterpillar, Inc. in Peoria, Ill.

Briggerman says his group has just made the decision to buy integration kits for the PC AT first and then buy some Vaxmates.

He will then evaluate the systems based on price, performance and user preference. A hard disk drive is essential, he agrees.

Duray and Sommerfeld would also like to see the Vaxmates equipped with color monitors. Color monitors are in the plans, Symula says, but no dates have been announced for introduction.

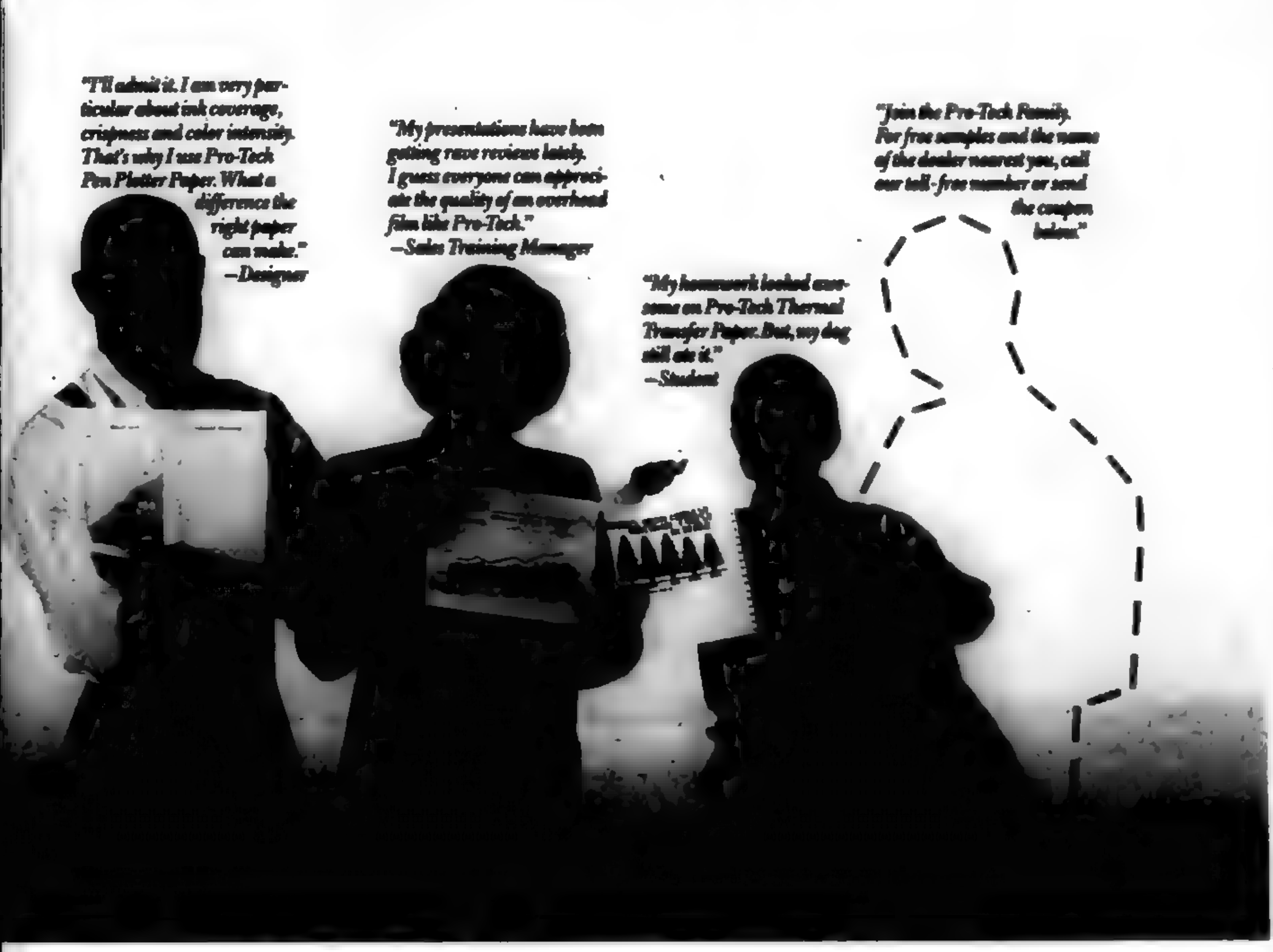
V8 expands PC memory

SANTA CRUZ, Calif. — A virtual memory manager that allows C language programs to access 8M bytes of virtual memory on an IBM Personal Computer has been introduced by Sapiens Software Corp.

According to President Katherine Kelly, Sapiens V8 is for C programmers who want to develop PC applications that go beyond the current 640K-byte memory limit of Microsoft Corp.'s MS-DOS operating system. She said programmers should be more productive since they will not have to worry about low-level bookkeeping in managing the virtual work space.

While the $300 virtual memory manager is best for new applications, Kelly said that depending upon the complexity of their data structures, some existing applications can be recoded to take advantage of V8.

By the end of April, Sapiens will be releasing a version of V8 for the IBM PC AT that provides a 64M-byte virtual memory work space, Kelly said.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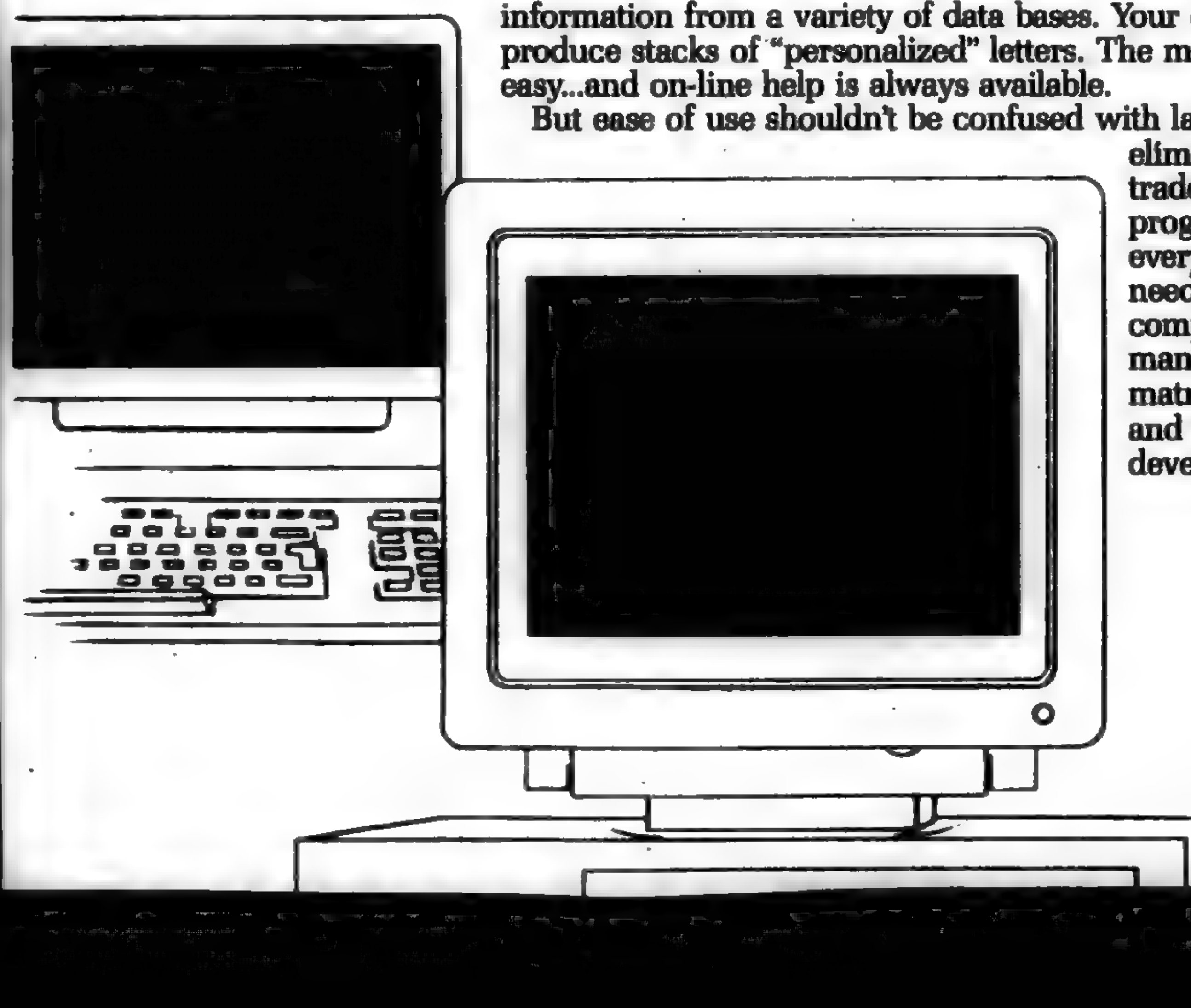

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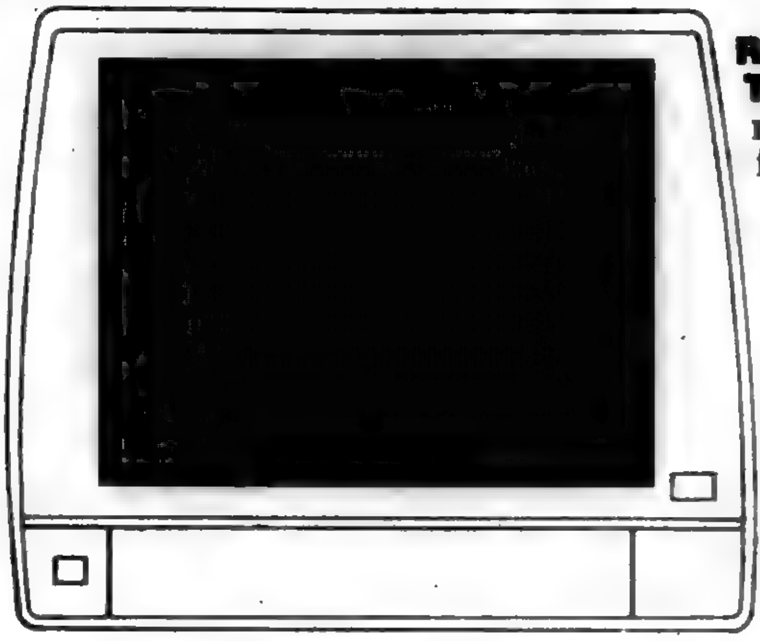

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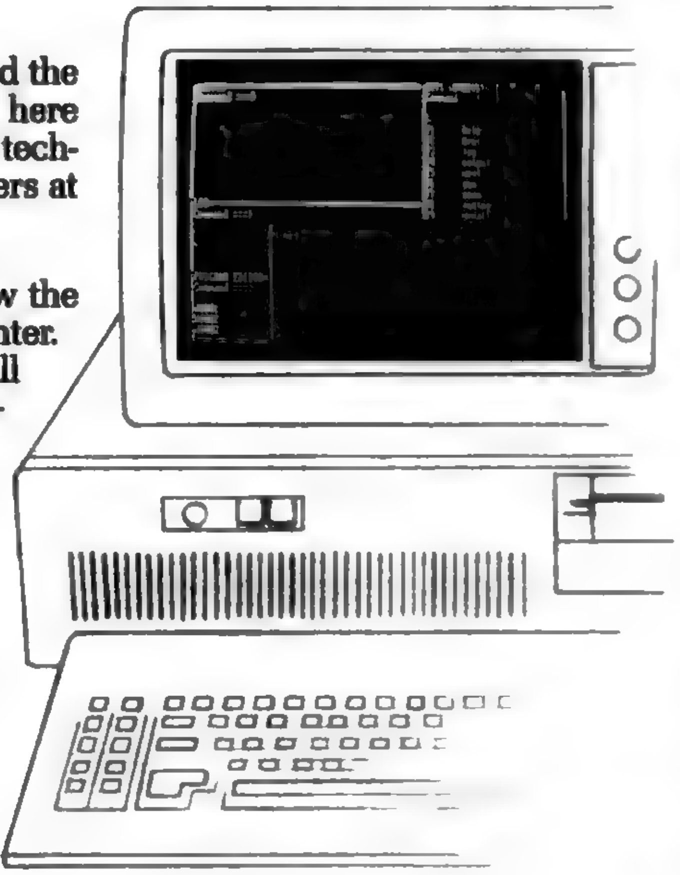
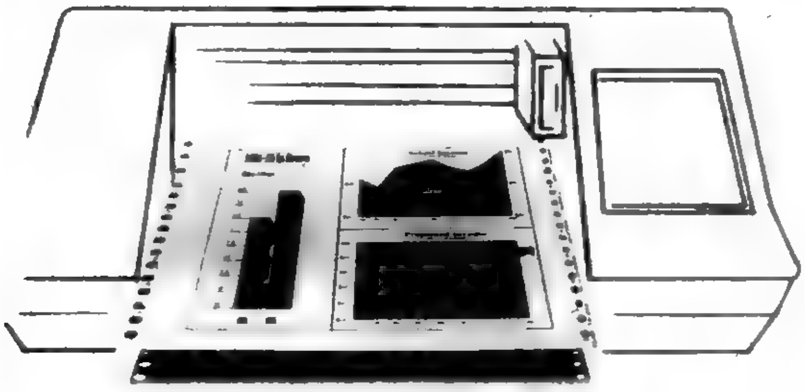


The SAS System runs on IBM 370/30xx/43xx and compatible machines under OS, TSO, CMS, DOS/VSE, SSX, and ICCF; on Digital Equipment Corp. VAX™ 8600 and 11/7xx series under VMS™; on Prime Computer, Inc. Prime 50 series under PRIMOS®; on Data General Corp. ECLIPSE® MV series under AOS/VS; on IBM AT/370 and XT/370 under VM/PC; and on IBM PC AT and PC XT under PC DOS. Not all products are available for all operating systems.



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NEW PRODUCTS

Peripherals

Lodown has introduced its **Image Scanner**, a tabletop optical scanner for Apple Computer, Inc.'s Macintosh.

The Image Scanner offers input resolution with true half-toning, according to the vendor.

The system connects to the small computer systems interface bus.

It digitizes graphics, photographs and drawings, providing full-page scan in 12 sec. at 300 dot/in. and with 32 shades of gray scales.

The user may edit the captured images by cropping, sizing, touching up and adjusting the brightness and contrast, the vendor said.

The Lodown scanner is priced at $1,295.

Lodown, Suite 200, Victor Sq., Scotts Valley, Calif. 95066.

Lodown's *tabletop optical scanner*

CPT Corp. has announced the **CPT LP-8S** desktop laser printer.

The CPT LP-8S is said to feature one-pass printing of scientific notation and advanced text processing. It offers 11 built-in fonts and supports portrait or landscape modes of the entire set of CPT-supported scientific, arithmetic and Greek symbols as well as the extended ASCII character set.

The printer offers speeds up to 8 page/min and is compatible with CPT Phoenix, Phoenix Jr. and Office Companion 2000 workstations as well as IBM Personal Computers.

The CPT LP-8S costs $3,500.

CPT, P.O. Box 295, 8100 Mitchell Road, Minneapolis, Minn. 55440.

Ricoh Corp. has introduced the **PC Laser 6000**, a compact 6 page/min printer.

The printer is said to feature a controller configured with 1M byte of random-access memory, expandable to 2M bytes. Other features include 300 dot/in. resolution, Centronics Data Computer Corp. parallel and RS-232C serial interfaces.

The printer supports up to 32 fonts per page from the eight built-in fonts, font cartridges or fonts downloaded from the host microcomputer. Fonts can be printed in portrait or landscape orientation on the same page in bold, shadowed or underlined.

The PC Laser 6000 is priced at $2,395.

Ricoh, 5 Dedrick Place, West Caldwell, N.J. 07006.

International Microcomputer Software, Inc. has announced **Economouse**.

Economouse is a Microsoft Corp.-compatible mouse said to feature 200 dot/in. resolution. The mouse comes with its own pop-up menus and is intended for use by volume users for desktop publishing systems.

The Economouse requires an IBM Personal Computer, Personal Computer XT, AT or compatible with RS-232 serial port. It costs $99.

International Microcomputer Software, 1299 Fourth St., San Rafael, Calif. 94901.

Western Automation Laboratories, Inc. has announced the **Seleris**, an intelligent plot spooler designed to work with computer-aided design systems.

The Seleris supports IBM Personal Computers and compatibles. Software compatible with the system includes Autodesk, Inc.'s Autocad and Versacad. Plotters supported include those from Hewlett-Packard Co., California Computer Products, Inc. and Houston Instruments, Inc.

The Seleris installs via an RS-232 port. It comes in 512K-byte, 1M-byte and 2M-byte sizes. It can selectively abort or repeat a plot, check the status of stored plots, purge a spooled file and plot multiple copies.

Prices for the plot spooler range from $595 to $1,295.

Western Automation Laboratories, 1700 N. 55th St., Boulder, Colo. 80301.

Link Technologies, Inc. has introduced the **MC1** VDT designed for multiuser personal computer environments.

The MC1 is said to transmit both IBM scan codes and ASCII transmissions. It offers both the full 256-character IBM character set and Personal Computer AT keyboard.

The VDT has two separate serial communications ports that allow communications with the host computer and a local printer at speeds of up to 19.2K bit/sec., the vendor said.

The MC1 features a 14-in. display available in green or amber and an 80-col. by 25-line display format.

The MC1 is priced at $419.

Link Technologies, 47339 Warm Springs Blvd., Fremont, Calif. 94539.

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Computer Friends, Inc. has introduced **Superchroma**, a color display for the Apple Computer, Inc. Macintosh.

The Superchroma is said to include the video display controller, software and high-resolution red-green-blue monitor. It offers 640- by 640-pixel resolution, the ability to display 256 colors simultaneously from a palette of 262,144 and an automatic shading command for the effect of three-dimensional shapes and color blends.

Superchroma is priced at $2,995.

Computer Friends, 14250 N. W. Science Park Drive, Portland, Ore. 97229.

Board-level devices

Standard Microsystems Corp. has introduced the **SMC4013-PC Dual Winchester and Dual Floppy Controller** board.

The board is said to be plug compatible with IBM Personal Computers. It controls up to two standard Winchester disk drives and two IBM-compatible floppy disk drives. It provides for data error detection and correction as well as adjustment-free, on-board data separation.

The SMC4013-PC Dual Winchester and Dual Floppy Controller Board is priced at $195.

Standard Microsystems, 35 Marcus Blvd., Hauppauge, N.Y. 11788.

Tatung Company of America, Inc. has introduced an enhanced version of its high-resolution enhanced graphics adapter (EGA) card, called the **TEGA-22 Plus**.

The TEGA-22 Plus features a screen-saving feature to prevent burn-in on screen phosphor.

The card is also said to be 100% compatible with IBM's EGA, Color Graphics Adapter and Monochrome Display Adapter and Hercules Computer Technology, Inc. graphics cards.

Other features include flicker-free performance, 256K bytes of display memory and horizontal scan rates of 15.75 KHz, 18.43 KHz or 22 KHz. Sixteen colors are available from a palette of 64 for EGA mode.

The TEGA-22 Plus is priced at $599.

Tatung, 2850 El Presidio St., Long Beach, Calif. 90810.

Matrox Electronic Systems has announced the **SM-640(A)** solid modeling board set for the IBM Personal Computer AT. It is said to use Silicon Graphics, Inc.'s Geometry Engine to enable the PC AT to act as a three-dimensional mechanical engineering workstation.

The product offers 640-by-480, noninterlaced resolution. It features a custom very large-scale integration shading engine for Gouraud shading and 1M byte of display list random-access memory. It includes a full-screen Z-depth buffer for hidden line/surface removal.

The SM-640 is priced at $4,995.

Matrox, 1055 St. Regis Blvd., Dorval, Quebec, Canada H9P 2T4.

NCR Corp. has announced the **ADP-31S** host adapter designed to connect IBM Personal Computers and compatibles to the small computer systems interface (SCSI).

The ADP-31S is said to support byte-by-byte and direct-memory address data transfers. It also allows the sharing of the channels with other cards. The on-board, socketed and optional read-only memory includes a disk driver that provides an interface to IBM's PC-DOS for up to two fixed disk devices supporting the SCSI command set.

The ADP-31S is priced at $225 including read-only memory.

NCR, Engineering and Manufacturing, Wichita, Kan. 67226.

Software applications packages

Executive Technologies, Inc. has announced its **Searchexpress** product series for full text and image storage and retrieval.

Searchexpress utilizes either write-once optical disks or magnetic disks. It works on the IBM Personal Computer family and compatibles. According to the vendor, text and images may be input via scanners and optical-character recognition software.

Features include full Boolean searching capabilities and simple word search. It uses windows and pull-down menus.

Searchexpress costs from $199.

Executive Technologies, Suite 260, 1075 13th St. S., Birmingham, Ala. 35205.

International Microcomputer Software, Inc. has announced **Desktop Publisher's Graphics**, a graphics packaged designed for desktop publishing.

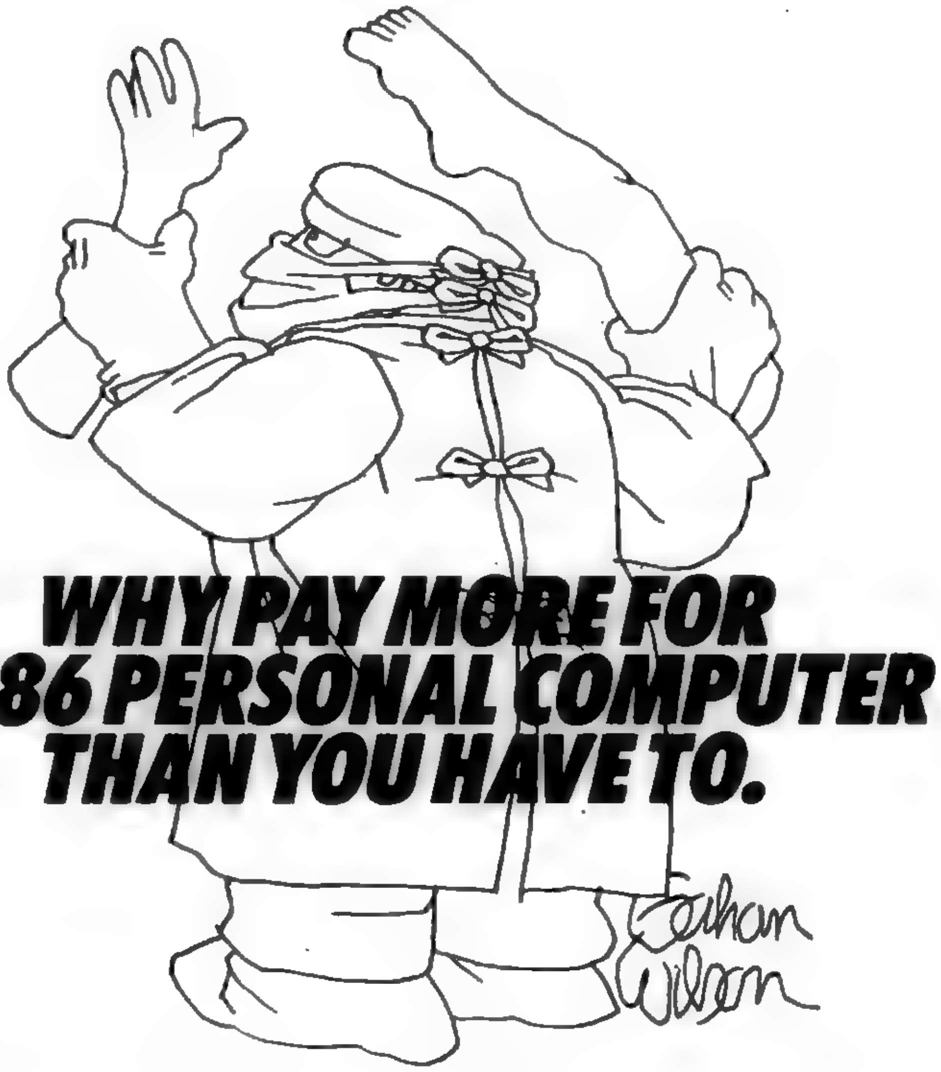
The software is said to feature freehand graphics. It allows users to import, edit and enhance images from programs such as Lotus Development Corp.'s 1-2-3, Decision Resources, Inc.'s Chart-Master, Microsoft Corp.'s Chart and Autocad from Autodesk, Inc. for use with IBM-compatible desktop publishing software such as Xerox Corp.'s Ventura.

The software is priced at $195.

International Microcomputer Software, 1299 Fourth St., San Rafael, Calif. 94901.

Dyson-Eubanks, Inc. has announced its **Office Management System** (OMS) software.

Information management functions performed by OMS include client and job information maintenance, vendor information maintenance, general ledger, billing and expense reporting, purchasing, quotations, job accounting, accounts re-



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ceivable, accounts payable, project management, direct mail and reporting.

According to the vendor, OMS allows integration of the accounting function with other business functions.

OMS runs on IBM Personal Computer XT or AT compatibles. It costs $395.

Dyson-Eubanks, Suite 200, 1380 Lawrence St., Denver, Colo. 80204.

Software enhancements

Skok Systems, Inc. has announced **Release 1.02** of its **Drawbase** computer-aided design software package, which can integrate drawing and data management.

The release offers features such as associative dimensioning, insert object, object to set by label, dimension conversion and off-line plotting.

The enhanced Drawbase is also said to provide users with a more flexible hardware platform, featuring enhanced graphics adapter controllers and high resolution in single- or dual-screen configurations.

Drawbase costs $4,995. Existing users may upgrade for $500.

Skok Systems, 222 Third St., Cambridge, Mass. 02142.

Imaging Technology, Inc. has announced **Imageactionplus**, a software capability for use with the vendor's PCvisionplus frame grabber.

Imageactionplus is said to allow users to perform complex image processing applications on IBM Personal Computers and compatibles.

It contains more than 100 image processing functions and features a menu-driven interface with all functions selectable via an optical mouse.

Functions include the ability to acquire and clear images, area-of-interest processing, image filtering, graphics, a command-line interpreter and scripting capability.

Imageactionplus is priced at $995. The PCvisionplus frame grabber costs $1,995.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801.

Graphic Systems, Inc. has announced **Release 2.0** of **The Space Program**, a space planning, design and facility management software for personal computers.

Release 2.0 is said to feature an integrated Programming/Report module designed to aid users in extracting information from an architectural program and sharing data with others.

Other features include the ability to allocate rectangular or square spaces, draw envelopes to scale and define unusable space within an envelope.

Space Program is priced at $444.95. Present users can purchase the Programming/Report module separately for $29.95.

Graphic Systems, 180 Franklin St., Cambridge, Mass. 02139.

MicroMRP, Inc. has upgraded its **Max, The Production Manager** software for IBM and compatible microcomputers.

Version 4.0 features pop-up menus and carry-through logic. Other features include mass change of bills of materials, mass delete of bills of materials, multiple labor rates for standard cost roll-ups and purge part stock records.

Version 4.0 consists of 13 major modules.

Prices begin at $2,000 for a single-user stand-alone bill of materials and inventory system.

The full unlimited user Max with accounting system costs $23,000.

MicroMRP, 1065 E. Hillsdale Blvd., Foster City, Calif. 94404.

Visible Systems Corp. has announced **Version 2.2** of the **Visible Analyst Workbench**, its modular integrated software engineering tool.

Version 2.2 is said to include the ability to build a common data dictionary and do block moves.

This version is also said to allow for a page size of 15- by 11-in.

Other enhancements include faster wild card searches and pop-up windows, according to the vendor.

Visible Analyst Workbench is priced at $1,785. It runs on IBM Personal Computers and compatibles.

Visible Systems, 336 Baker Ave., Concord, Mass. 01742.

Deeresoft, Inc. has announced an enhanced **network version** of its **Magic Menu** software program designed to support the enhancements and extended features of Novell, Inc.'s Advanced Netware 2.0.

Features are said to include login from a menu entry, logout from a menu entry, network audit trail enhancements and predefined network variables.

According to the vendor, all functions currently available in the generic network version are also available in the Novell version. Total upward compatibility is maintained for upgrade purposes.

Magic Menu Novell version is priced at $500 per file server.

Deeresoft, P.O. Box 1360, Melbourne, Fla. 32902.

Tech Knowledge has announced **Version 1.8** of **WX**, an IBM Personal Computer utility said to reformat Wordstar files onto Xyquest, Inc.'s Xywrite II or Xywrite III word processor file format.

WX interprets the Wordstar context to generate appropriate Xywrite commands for margins, paragraphs, indents and multilevel lists. It also converts screen codes to Xywrite screen attributes.

Continued on page 38

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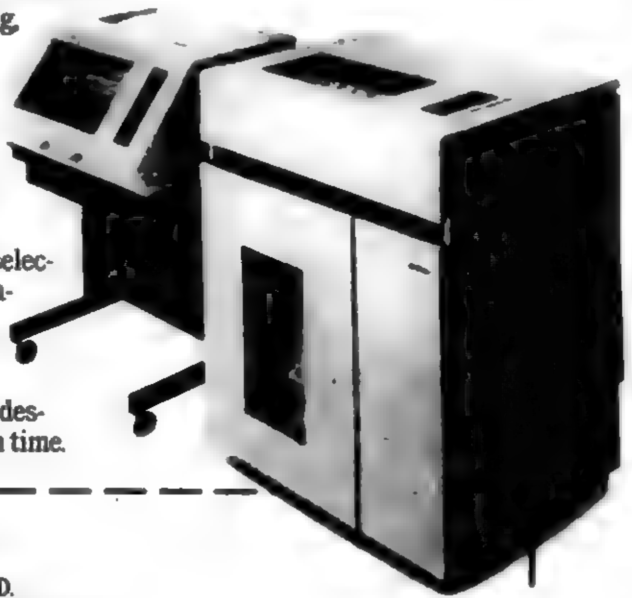

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PRINTRONIX

Continued from page 37

WX supports embedded and command-line options. It converts Wordstar dot commands and allows for deleting unwanted control characters.

WX is priced at $39.95.

Tech Knowledge, 1728 11th Ave., Seattle, Wash. 98122.

Software languages

Gimpel Software Co. has announced **C-Terp for Xenix**, a C interpreter and development environment for the Microsoft Corp. Xenix 286 System V operating system.

C-Terp is said to support the full C language. It has no fixed-size tables to overflow so it can use the full 16M-byte address space supported by Xenix.

The system also supports multiple modules and include files as well as library routines.

It comes with a library of its own and a batch file that can link functions in the Xenix C library.

C-Terp for Xenix carries a price tag of $498.

Gimpel Software, 3207 Hogarth Lane, Collegeville, Pa. 19426.

Software utilities

Borland International has announced the **Turbo Prolog Toolbox**, a collection of tools, sample programs and source code for use with its Turbo Prolog for artificial intelligence applications.

The Toolbox includes user-interface design tools for setting up context-sensitive Help menus, menus in windows containing both text and graphics characters and screen layouts for either the actual screen or for a virtual screen.

The Toolbox contains predicates to generate a variety of graphs and import existing data from other applications.

The Turbo Prolog Toolbox is priced at $99.95.

Borland International, 4585 Scotts Valley Drive, Scotts Valley, Calif. 95066.

Communication Horizons has announced **UDF +**, a user-defined function engine for Ashton-Tate's Dbase III Plus.

UDF + is said to allow the Dbase user to write customized functions and run them under Dbase. Functions are defined using Dbase syntax and do not require knowledge of C or assembler languages.

UDF + also allows users to debug Clipper code. Users can also create their own Dbase function libraries, which will run under Clipper with little or no program change.

UDF + requires any version of Dbase III Plus and 5K bytes of free memory. It is priced at $99.

Communication Horizons, Suite 900, 701 Seventh Ave., New York, N.Y. 10036.

Select Corp. has announced **CMDNC0/PC**, a personal computer software utility for Prime Computer, Inc. Series 50 users.

The utility is said to provide Series 50 users with Primos commands on their personal computers running DOS.

CMDNC0/PC allows users to access commands such as ATTACH, LD, AVAIL, CNAME, POP and ORIG, according to the vendor.

On-line Help is provided for all commands in the CMDNC0 directory.

CMDNC0/PC is accessible from within Cosmos, Inc.'s Revelation and Prime's Prime Information/PC data bases along with other third-party packages.

CMDNC0/PC is priced at $69.95.

Select, Suite 100, 10 Learney Road, Needham, Mass. 02194.

Polytron Corp. has introduced **Polyshell**, a Microsoft Corp. MS-DOS extender and command interpreter.

Polyshell features Unix-like commands. It offers a Unix interface. It includes more than 50 utility programs and an interactive help facility.

According to the vendor, software created when using Polyshell does not require Polyshell to operate.

Polyshell costs $149. It runs on IBM Personal Computers and compatibles.

Polytron, Suite 1220, 1815 N. W. 169th Place, Beaverton, Ore. 97006.

Training

Anderson Soft-Teach has introduced two video-based courses titled **MS/PC-DOS: Using DOS with Hard-Disk Systems** and **MS/PC-DOS: Advanced DOS Commands for Hard-Disk Systems**.

Each course consists of six lessons. The first includes topics such as DOS concepts, using directory commands and setting up subdirectories. The second includes establishing a subdirectory system, organizing the hard-disk and file-maintenance commands.

Each course includes a personal training guide, practice disk and videotape in either VHS, Beta or ¾-in. format. They cost $275 each or $495 for the set.

Anderson Soft-Teach, 2680 N. First St., San Jose, Calif. 95134.

Systems

Our Business Machines, Inc. has announced an **IBM Personal Computer XT and AT-compatible multiuser subsystem** for sites requiring two to eight workstations.

The system includes a 14-in. green monitor, AT-style keyboard, network software, a multiuser expansion card and 256K bytes of random-access memory expandable to 704K bytes. It costs $995.

Our Business Machines, 9698 Telstar Ave. #307, El Monte, Calif. 91735.

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The Tandy 3000 HD is compatible with the IBM PC/AT®, yet offers greater hard disk storage (40 MB vs. the PC/AT'S 30). Better yet, the 3000 HD is priced at only $4299 (vs. $5295 for the PC/AT*).

Based on the 16-bit Intel 80286 microprocessor, the Tandy 3000 HD (25-4011) operates at 8 megahertz. And since the 3000 HD is a multi-user system, people located throughout your office can all simultaneously access it from inexpensive data terminals, for program development, as well as user applications.

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NETWORKING

DATA STREAM

Elisabeth Horwitt

Let's hear it for Bellcore

U.S. West, Inc. recently announced that it is giving the requisite three-year notice needed to sell its stock in Bell Communications Research Corp. (Bellcore). The reason, according to industry sources, is that U.S. West feels constricted by the current arrangement, under which all seven regional holding companies own equal shares in Bellcore and have equal access to all new technologies, protocols and services developed by the company.

"Our differences involve our request to provide services that match the individual and competitive needs of the different companies; we want to see more proprietary, tailored solutions," explains Donald Johnson, director of corporate information for U.S. West. He adds that U.S. West has not committed itself to getting out of Bellcore — just to making sure it has that option if current negotiations with Bellcore do not work out.

Continued on page 42

Gate links PCs, Unix terminals

BY ALAN J. RYAN
CW STAFF

MINNEAPOLIS — Control Data Corp. has announced a gateway software product suite that allows authorized users to gain selective access to business and engineering computers using a personal computer or terminal.

The Ascent gateway software/works under University of California at Berkeley Unix 4.2 and with Digital Equipment Corp.'s Ultrix on the VAX-11 780, according to Don Jense product manager at CDC.

The software works with computer systems from a variety of vendors, including Pyramid Technology Corp., Tolerant Systems, Inc., Gould, Inc., Elxsi Co. and Solarity.

The key aspect of the product, Jensen said, is that it allows users to access existing applications on Unix-based systems and integrate the existing equipment base so users do not have to bring in new equipment.

"The software breaks the traditional barriers between equipment," said Gary Guardia, vice-president of CDC's Professional Services division. Acting as a gateway, the software allows users to key into it through any machine connected to the network. Only the gateway machine requires Unix, according to the company.

Products included in the suite are as follows:

- Ascent gateway, which allows automated access and connectivity to local or remote computing resources through local and long-haul communications paths. By using a single command, a user can connect to a remote data base without worrying about access numbers, logon procedures or passwords, CDC claimed.
- Ascent mail, which provides message services within a computer network and offers addressing, forwarding and mail file-management functions. It is compatible with Simple Mail Transfer Protocol.
- Ascent plus, which provides a menu-driven user interface to access the integrated software applications, utilities and system

Continued on page 42

AT&T cuts dedicated line rates

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — AT&T recently proposed to the Federal Communications Commission pricing changes that would reduce interstate private-line customers' rates by approximately $24 million overall, the company said.

This filing modifies a proposed increase of 3.3% in rates for most intercity private lines, which AT&T submitted to the FCC last November. AT&T has suggested that most intercity dedicated digital and analog services would be increased by 2.7% instead of 3.3%.

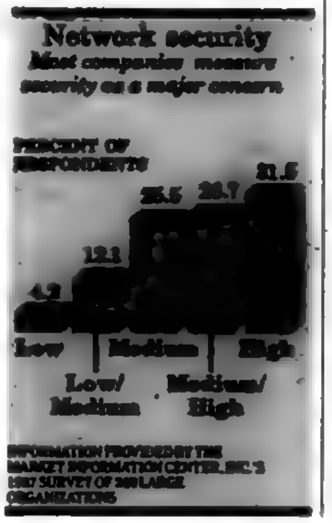
The company further proposed that pricing for switched private-line services, such as Common Channel Signaling Arrangements and Enhanced Pri-

Continued on page 40

Inside

- **Stratacom enhances voice-packet switch. Page 41.**
- **Agile Systems rolls out asynchronous interface cards. Page 43.**
- **Connecticut Technical adds modems for RS-232, V.35 interfaces. Page 48.**

Data View



Network security

Most companies measure security as a major concern

INFORMATION PROVIDED BY THE MARKET INFORMATION CENTER, INC.'S 1987 SURVEY OF 200 LARGE ORGANIZATIONS

Proteon adds internetworking, net management to Pronet-4

BY ELISABETH HORWITT
CW STAFF

WASHINGTON D.C. — Proteon, Inc. is expected to introduce products this week that add network management, internetworking and enhanced configuration capabilities to its Pronet-4 local-area network (LAN), which is based on the IEEE 802.5 token-ring standard.

At the Communication Networks '87 conference, held here this week, the Westboro, Mass., vendor is expected to introduce enhancements to its P2700 series of Intelligent Multi-Station Wire Centers for Pronet-4, an IBM Personal Computer-based network management system for 802.5 networks and a Pronet-4 implementation of Virtual Network System (Vines) from Banyan Systems, Inc.

The P2700 is an existing Proteon product that performs the same basic functions as IBM's Multistation Access Unit, interfacing up to eight IBM PCs to a nearby wiring closet, which in

Continued on page 40

MAINFRAME
printf("Hello, world\n");

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Proteon

FROM PAGE 39

turn forms part of a token-ring network.

Proteon is introducing a series of enhancements this week that go beyond the basic 802.5 connectivity offered by both the P2700 and IBM's product, according to Tony Bolton, Proteon director of marketing. These include:

- The P2712 fiber-optic wire center, which permits mixing fiber and nonfiber access units on the same network. It will be available in April.
- The P2713 remote wire center, which permits an additional eight IBM PCs to be interfaced to the network via the same twisted-pair link. It will be available in March.
- The P2710, an intelligent version of the P2700. Equipped with an on-board microprocessor, the P2710 can perform network diagnostics such as loop-back testing, talk to other wire centers and interface with the newly introduced Advanced Network Management software. The P2710 will be available in March.

> "THE implementation of Banyan's Vines server software on Pronet-4 provides users with more choices in terms of networking software."
>
> MICHAEL KATZ
> PROTEON, INC.

Advanced Network Management is a multitasking, multiwindow program that turns a dedicated PC into a centralized network management system that controls, monitors and remotely configures nodes on a Pronet-4 or IBM Token-Ring network.

According to Proteon, the software can collect diagnostic data from multiple Intelligent Multi-Station Wire Centers and list location and status of all intelligent wire centers and nodes on the display screen.

It can remotely take wire centers on and off the network in order to isolate network trouble spots.

Delete and restore

IBM's network management software for the Token-Ring can remotely delete nodes from the network but not restore them, according to Proteon. IBM was unavailable for comment.

The Advanced Network Management package, priced at $1,250, will be available in March. Pricing for the other products is not yet available from Proteon.

Proteon's implementation of Banyan's Vines server software on Pronet-4 has the ability to provide users with more choice in terms of networking software that can be implemented on the token-ring network, according to Michael Katz, Proteon product manager.

Banyan offers "better integration of different networking protocols" as well as internetworking and global naming features, he added.

Vines permits Pronet-4 users to share resources with other PC users on a variety of other networks, including Proteon's Pronet-10 token-ring, the PC Network and Ethernet LANs, the vendor said.

The product is also said to offer a 3270 gateway to IBM mainframes.

Vines software for the Pronet-4 is currently available for $1,895.

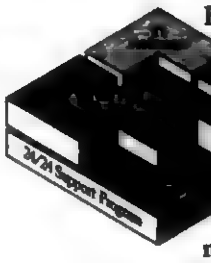
AT&T cuts

FROM PAGE 39

vate Switched Communications Service, would be reduced by $28 million, effective March 13.

Taking effect last week was a net reduction of $55 million in charges for local channels needed to connect customer locations to AT&T central offices.

These latter changes reflect AT&T's projection of lower costs this year as a result of recent reductions in the local telephone companies' access charges to interexchange carriers, the company said.



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Firm upgrades voice-packetizing T1 switch

IPX converts synchronous and Fastpacket protocols to support 96 lines, 500 integrated data channels

BY STANLEY GIBSON
CW STAFF

CAMPBELL, Calif. — Stratacom, Inc. recently announced Release II of the Integrated Packet Exchange (IPX), a T1 switch that packetizes voice transmissions, and a network management system that supports IBM's Netview.

The enhanced version of the IPX Network Resource Manager includes the Fastpacket Data Packet Assembler-Disassembler (PAD), an integrated data interface that statistically multiplexes four data channels at speeds up to 1.344M bit/sec.

The product is T1-compatible despite the fact that the T1 rate is 1.544M bit/sec., the company said.

The PAD converts between synchronous and Fastpacket protocols, compressing and routing each channel independently, with a throughput of 5.376M bits per PAD.

Capacity expansion

Stratacom has also expanded the switch's capacity in order to support up to 96 T1 lines and up to 500 integrated data channels.

Original Stratacom IPX models were capable of supporting only 40 T1 lines.

Installed IPXs can be upgraded to the full expanded capacity with minor mechanical changes, according to Stratacom.

Strataview

Also introduced was Strataview, which is a Netview-compatible, IBM Personal Computer AT-based network management system.

Strataview features color graphics displays of the network; integrated monitoring and control for third-party T1 and lower-speed multiplexers.

Other attributes of the network management system include an IPX Network Modeling Tool, a network design facility and packet diagnostics that support subsecond rerouting of voice and data channels.

The Fastpacket PAD is priced at approximately $3,000; the expanded IPX is priced from $15,000 to $400,000 per node; and Strataview is priced from $10,000 to $30,000.

Beta-testing

The IPX Release II will be beta-tested during the next four months and will be available in the third quarter.

Stratacom, created approximately one year ago from a restructuring of Packet Technologies, Inc., has sold equipment for eight customer networks thus far.

The firm recently received $7 million in venture capital funding, resulting in a total venture investment of $11.5 million.

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Let's hear it

CONTINUED FROM PAGE 39

U.S. West would like to be able to fund special projects whose fruits would be enjoyed by its customers alone. It evidently has tired of an arrangement that, as a holdover from predivestiture days, assumes that the good of one operating company is the good of all. "These are not my siblings anymore; these are my competitors," U.S. West is not unreasonably pointing out.

It is hard to blame U.S. West for taking this attitude in the increasingly cutthroat post-divestiture market, in which every research and development dollar counts. On the other hand, U.S. West's exit from the Bellcore alliance could have long-range repercussions for users — and not just in U.S. West's region, either.

Even if the other companies do not follow U.S. West's lead — and none shows any sign of doing so at the moment — the breaking away of even one of the seven endangers Bellcore's viability as a protocol coordinator. Both before and after divestiture, Bellcore has ensured that customer-premise equipment uses the same electrical interfaces, hand-shaking protocols and channel-access methods to communicate with each local telephone company's central office — be it in New York City or Gary, Indiana. This is a largely unsung but absolutely crucial role.

"Bellcore is the only standards organization with a real staff," says Henry Levine, a partner at Washington, D.C., law firm Morrison & Foerster. "I have some problems with Bellcore — everyone does — but it would be disastrous" if the organization lost its ability to be "guardian of the uniformity of the national local exchange network. Look at how much trouble we're having with standards even *with* Bellcore."

And so we are. ECSA and dozens of T1 committees gnash their teeth trying to get carriers, central office switch vendors and customer-premise equipment vendors to agree on interface specifications. Just recently, the T1C1.2 subcommittee finished drafting protocols on the data link layer, which will carry diagnostics, monitoring and other crucial network management information. Interestingly enough, U.S. West was the only member of the committee to issue a hard no on the specifications.

U.S. WEST evidently has tired of an arrangement that assumes that the good of one operating company is the good of all.

While other bodies hammer out the higher level protocols, Bellcore has quietly ensured that local carriers may get together on the basics of switch-to-switch and switch-to-customer-premise equipment communications. Despite its efforts, glitches can occur; for instance, code mix-up between certain channel-service units and carrier switches, which interfere with diagnostics on the local loop [CW, June 30].

Or, as has happened recently, customers can lose whole blocks of data in the limbo between different carriers' switches due to a lack of synchronization between clock speeds.

One such incident occurred over a link between independent telephone company Litel Telecommunications Corp. and divested Bell operating company Ohio Bell.

Which brings us to an interesting point made by Levine: Why can't the major independent telephone companies buy a stake in Bellcore? Of course, the original seven stockholders — U.S. West in particular — may well object to making the fruits of Bellcore's R&D projects available to a greater number of potential competitors.

It all comes down to a classic dilemma faced by computer and communications vendors alike: How do you achieve interoperability if the features that make products incompatible also constitute the added value that causes customers to choose one vendor over another? During the next few years, we will all be confronting this issue in all its knotty aspects.

CDC debuts

CONTINUED FROM PAGE 39

administration tools. With this, all users use the same commands to access the software, according to CDC.

The software is currently being beta-tested. Prices vary with size of machine. For example, software with all three components combined for the Pyramid 98X would sell for $25,000, and for the smaller Tolerant machine, the price would be $15,000, said John Iffland, CDC marketing manager. Each component can be purchased separately, he added.

The amount of customization required for installation depends on the number of systems being hooked into the gateway, Jensen said. CDC customizes its menu-based program to link it with existing software. For the beta-test version, CDC will be the integrator.

Production releases are planned for mid-year.

[redacted]

NEW PRODUCTS

Local-area network hardware

Agile Systems, Inc. has introduced two packet-mode asynchronous interface cards, the **AN 20/IBM** and the **AN 20/TI**.

Both add-in local-area network (LAN) cards are said to attach up to two user devices to the vendor's Agilenet 20 network, providing distributed intelligence while enabling the user device to communicate on both an Agilenet 20 and a broadband LAN. The AN 20/IBM interfaces with IBM Personal Computers. The AN 20/TI interfaces to Texas Instruments, Inc. personal computers. Both support asynchronous user device data communications.

Both two-port Agilenet 20 series add-in cards cost $495.

Agile Systems, Suite 103, 1411 LeMay Drive, Carrollton, Texas 75007.

Computer Protocol Corp. has announced the **CS420** multiple protocol add-in Multibus board for Unix-based systems.

The CS420 can be supplied with protocols, including IBM Systems Network Architecture/Synchronous Data Link Control, IBM 3270 Binary Synchronous Communications, Burroughs Corp. Poll/Select, X.25 and Honeywell, Inc. VIP7700. It comes supplied with any two protocols.

The board allows simple ASCII terminals to act as mainframe terminals and supports 16 virtual circuits at one time to one or both host computers.

The CS420 comes in two-port or eight-port versions. Prices range from $3,750 to $5,250.

Computer Protocol, 155 West St., Wilmington, Mass. 01887.

Local-area network software

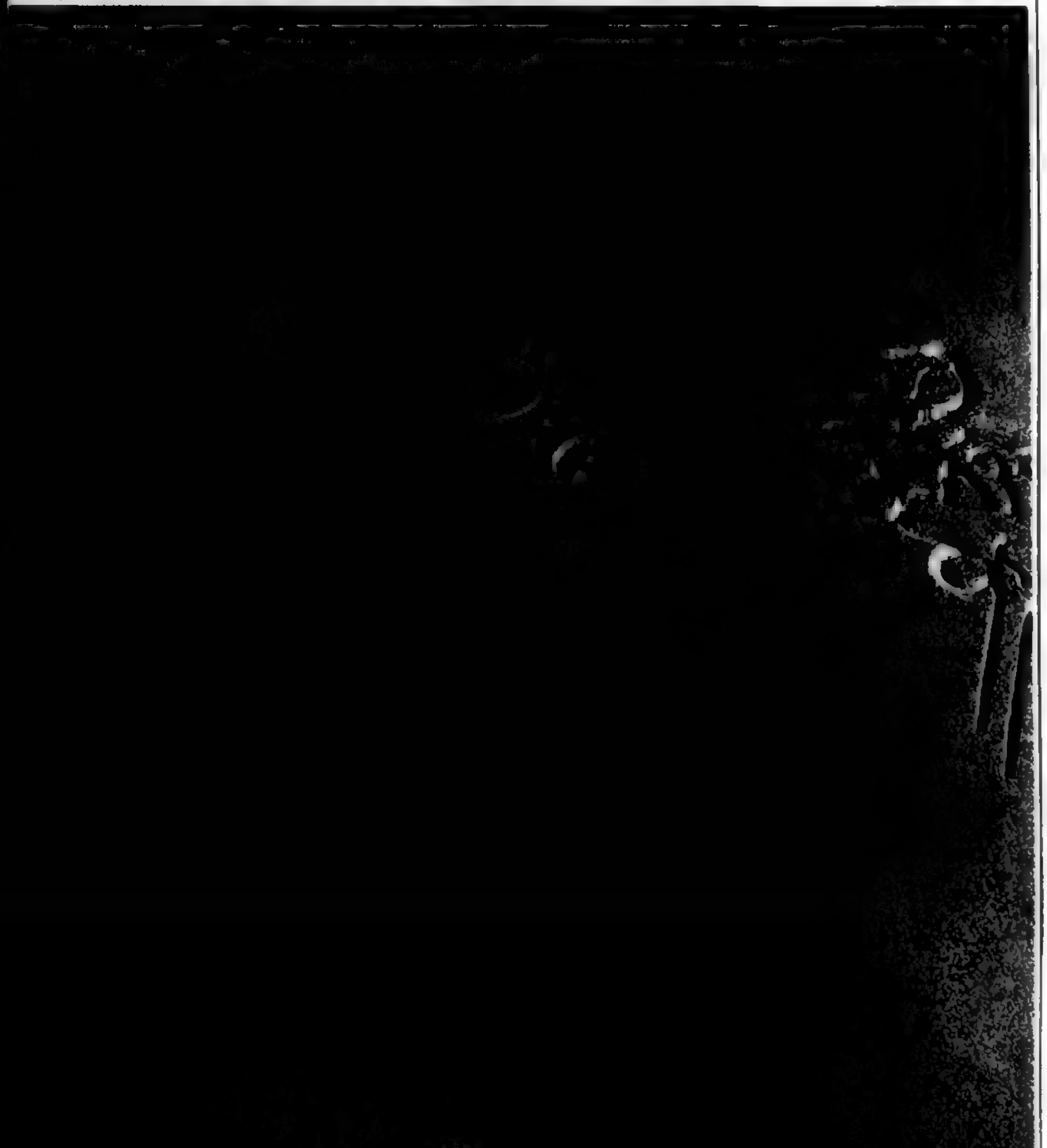
Software Synergy, Inc. has released **Respond/Quick**, an asynchronous data communications package for the IBM Personal Computers and compatibles.

The package is said to feature teletypewriter and Digital Equipment Corp. VT100 terminal emulation, predefined communication session parameters, automated autodial and autologon, on-line Help and the ability to exit to DOS while maintaining communication. It also supports the Xmodem protocol.

Respond/Quick contains more than 20 different predefined parameter files for accessing information network services such as Dow Jones, The Source and Easylink.

Respond/Quick costs $39.

Software Synergy, 641 Avenue of the Americas, New York, N.Y. 10011.



Standard Microsystems Corp. has introduced the **Netbios Emulator**, a software IBM PC Netbios emulation program.

The Netbios Emulator is said to enable users of Datapoint Corp.'s Arcnet local-area network (LAN) to operate in an environment that requires Netbios compatibility. The emulator consists of two program modules that execute in the personal computer as memory-resident background programs. It enables application software to execute normally while managing communication with other computers on the system.

The Netbios Emulator is priced from $195 for up to four nodes.

Standard Microsystems, 35 Marcus Blvd., Hauppauge, N.Y. 11788.

Persoft, Inc. has announced versions of its **Smarterm terminal-emulation software** packages said to allow personal computers to communicate through network systems.

Users of the new versions of Smarterm 220 and Smarterm 400 who purchase an optional network kit can communicate with host computers through either the Ungermann-Bass, Inc. Net/One or Bridge Communications, Inc. Etherterm network systems, the vendor said.

Both products support Xmodem and Persoft's PDID file-transfer protocols. Smarterm 220 supports the Kermit protocol.

Smarterm 220 costs $195, and Smarterm 400 costs $149. Each network kit costs $50.

Persoft, 465 Science Drive, Madison, Wis. 53711.

Protocol converters

Telebyte Technology, Inc. has announced the **Model 121** dual RS-232-to-RS-422 converter module, said to provide the user with up to 28 full-duplex converters in 5¼ inches of rack space.

The module contains two independent and programmable converters mounted on a plug-in card for use with the Model 76 card cage.

Each converter is said to perform the function of providing a hardware conversion for full-duplex signals between devices containing RS-232 and RS-422 I/O ports.

Other features include Data Terminal Equipment/Data Communications Equipment selector switch, data rates up to 38K bit/sec. and a programmable cable terminator.

The Model 121 costs $150.

Telebyte Technology, 270 E. Pulaski Road, Greenlawn, N.Y. 11740.

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Stratus Computer, 55 Fairbanks Boulevard, Marlboro, MA 01752

Commtex, Inc. has announced the **CX-78** Type-A-to-ASCII Communications Adapter.

The CX-78 is a protocol converter designed to transform IBM 3278, 3279 or compatible display stations into asychronous ASCII terminals. Transformation of the polled coaxial interface to an RS-232-compatible connection permits the user to access a broader assortment of computing resources.

Each unit has 10 RJ45 connectors and one DB-25 RS-232 connector.

The CX-78 costs $2,495.

Commtex, 1655 Crofton Blvd., Crofton, Md. 21114.

Connecticut Technical Corp. has announced **Interface Converters** said to allow full bidirectional communications between otherwise incompatible equipment.

According to the vendor, the Interface Converters allow conversion of data between CCITT V.35 and RS-232 V.24, CCITT V.35 and RS-422 and RS-232 V.24 and RS-422 devices.

Features include modem eliminator capability, front-panel selection of data rates from 1.2K to 921.6K bit/sec. and digital loop-back diagnostics.

The Interface Converters are available in stand-alone or rack-mount versions and are priced from $405.

Connecticut Technical, P.O. Box 4607 Stamford, Conn. 06907.

Security

Sophco, Inc. has announced a security program called **Gatekeeper** designed to provide access control to user nodes on network systems.

Gatekeeper can be placed on a local-area network (LAN) floppy-boot disk or on a hard disk. Users must log on before they are permitted into the LAN system, ensuring that only authorized personnel gain entry to the network.

When placed on a hard disk, boot protection can be installed, stopping anyone from booting off a diskette to gain entry to the hard disk.

Gatekeeper is priced at $39.95 per node.

Sophco, P.O. Box 7430, Boulder, Colo. 80306.

Modems/multiplexers

Emulex Corp. has announced the **CS08**, an eight-line, Q-bus asynchronous multiplexer with DHV11 emulation.

The CS08, designed for use with Digital Equipment Corp.'s Microvax II, is a single, dual-width board with RS-232 interface compatibility with most asynchronous terminals. It features up to 60K char./sec. throughput.

The CS08 costs $1,000 without modem control and $1,200 with modem control. Both prices include an eight-line distribution panel.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

Gen/Comp, Inc. has announced its **Model 2136** 16-line bus DH/DM asynchronous multiplexer for Digital Equipment Corp.'s MicroPDP-11 and Microvax computers.

The quad-height multiplexer is said to connect 16 asynchronous serial communications lines to the computer. It features program-controlled data transfer rates through 38.4K bit/sec. It inserts directly into any Q-bus peripheral slot and provides 18- or 22-bit direct-memory access addressing.

The Gen/Comp Model 2136 is priced from $1,800.

Gen/Comp, Six Algonquin Road, Canton, Mass. 02021.

Western Datacom has announced the **424 Line Backer** security modem.

The modem is said to be configurable as either a two-wire, dial-up modem with call-back security or as a four-wire, leased-line modem with two-wire dial backup. Up to 56 access codes or phone numbers can be edited using a menu-driven editor. During both automatic and manual dial backup, call progress and the status of the leased line is sent to the user's terminal.

Features include diagnostics, network node functionality and speed conversion.

The 424 Line Backer costs $795.

Western Datacom, 5083 Market St., Youngstown, Ohio 44512.

Burr-Brown Corp. has introduced the **LDM80** fiber-optic modem, said to be powered by the host RS-232 port signals.

Two of the limited-distance modems are said to allow most RS-232 cable links to be replaced and extended with a duplex fiber-optic cable. This allows the RS-232 limit to be extended up to 3.5 km with data transfer rates up to 19.2K bit/sec.

The LDM80 was designed for full-duplex asynchronous operation and to eliminate ground loops and reduce error rate.

The LDM80 is priced at $98.

Burr-Brown, P.O. Box 11400, Tucson, Ariz. 85734.

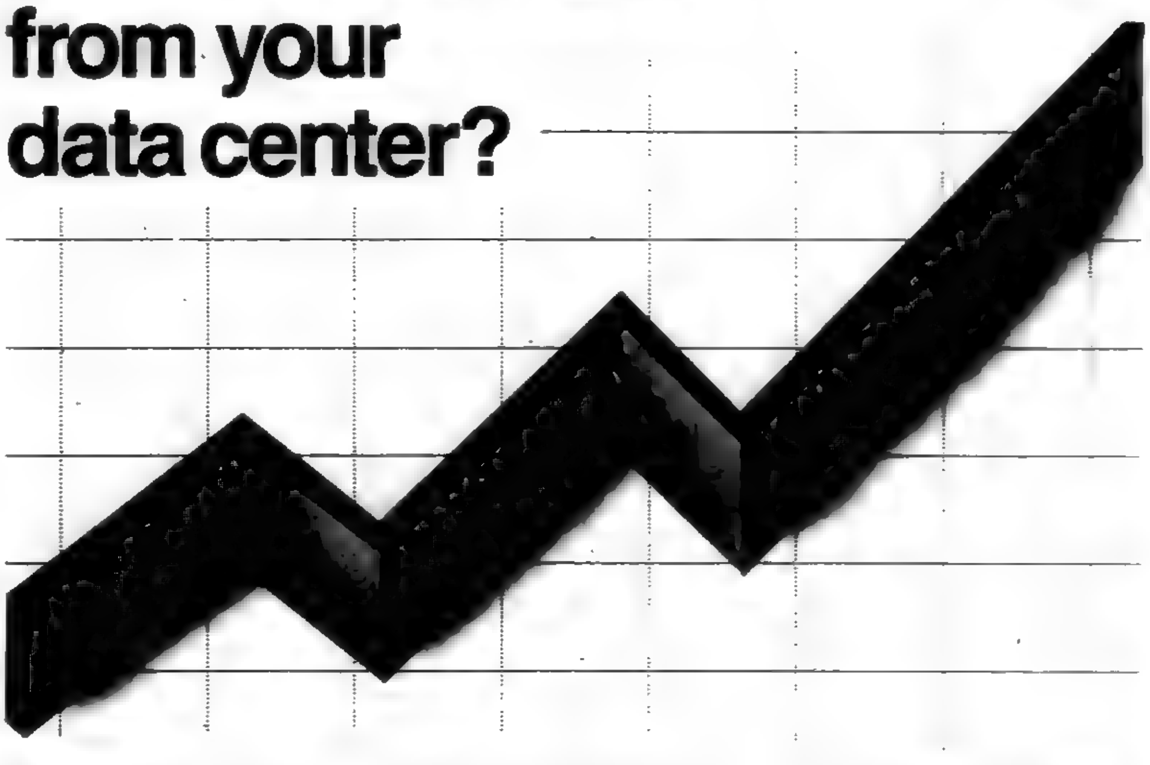
Bizcomp Corp. has introduced its **Intellimodem 2400** and **Intellimodem 2400 PC** Hayes Microcomputer Products, Inc.-compatible modems.

The modems feature an internal bus, audio call-progress monitoring and loop-through RJ-11 connectors.

The external Intellimodem 2400 features a multicolor, signal-quality bar graph display. The internal Intellimodem 2400 PC is a half card that fits in a short slot of a personal computer.

The modems cost $599 each.

Bizcomp, 532 Mercury Drive, Sunnyvale, Calif. 94086.



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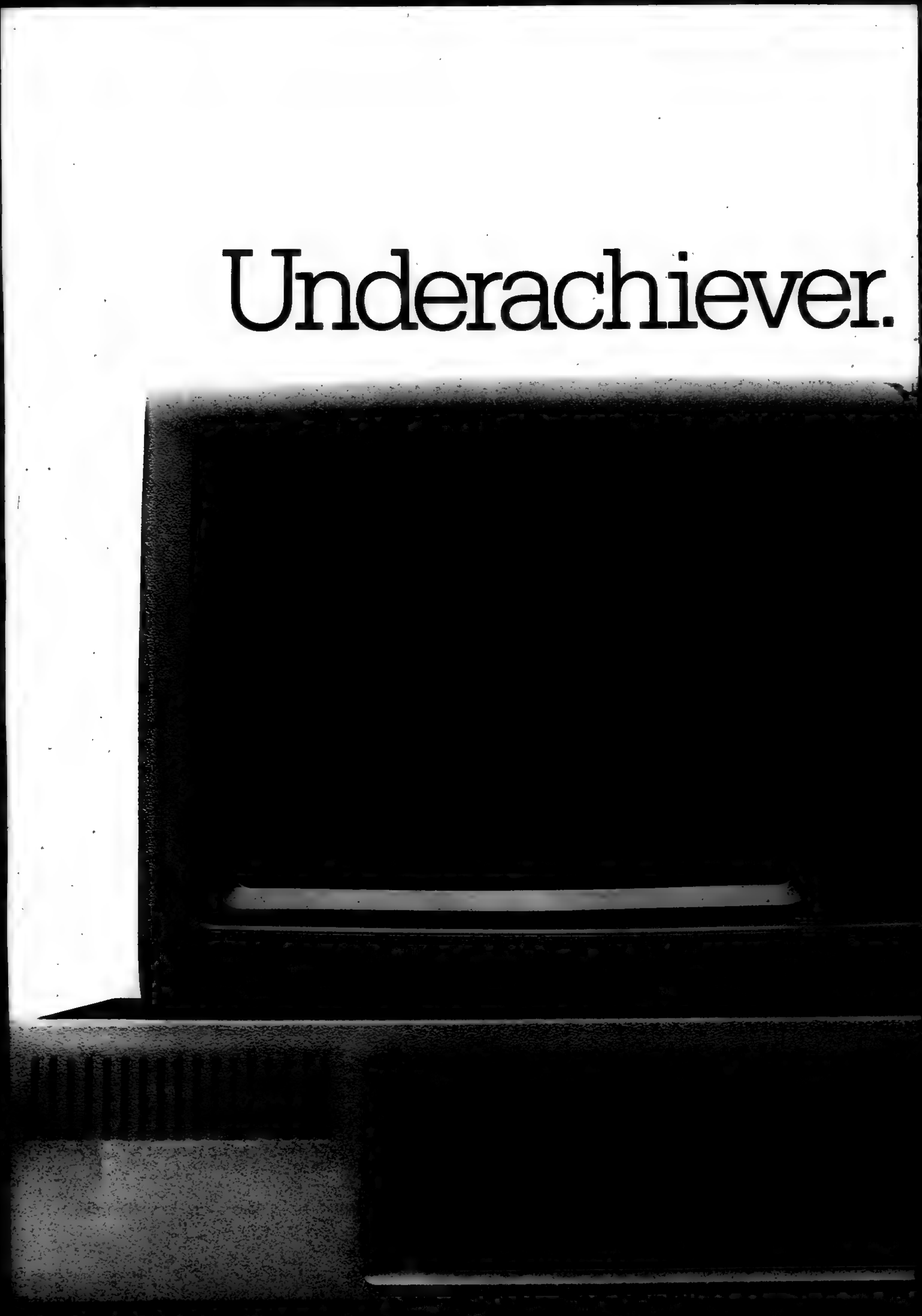
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Using a PC merely as a stand-alone is rather like using a race car to fetch the groceries. A severe case of under-utilization.

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One way the PPC does this is with HP Information Access. It gives your PC users a consistent, relational-like interface to data anywhere in the network. Without special programming. It can save data in a variety of formats, such as 1-2-3® from Lotus® and R:Base™ 5000, right on the PC. This means that its data can be manipulated and analyzed off-line. So your users are less prone to ask you for special reports. Leaving you free to satisfy your users' more important needs.

With HP Advancemail, your PC users can send messages and files to any user on the network, as well as process mail off-line. Which means not only added convenience for your PC users, but less drain on the host system.

All of these capabilities are given to your IBM PC users as well. And every PC user can also send any DCA-compatible file throughout the network, the file automatically being converted to the format which the recipient can read and edit. Your PCs are linked to each other as well as to central data bases—yet they also provide users with their own local processing power and familiar user interface.

The Personal Productivity Center, as you can see, is quite a remarkable achievement. Made more so because it can be integrated with IBM PROFS and DISOSS mainframe office systems. It lets your PC users share printers, discs and tape back-up devices. And it comes from the company with an unsurpassed record of service and support, the company that never stops asking "What if…" about how best to help you fully utilize your PCs.

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HEWLETT PACKARD
Business Computing Systems

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Connecticut Technical Corp. has announced its **Limited Distance Modems** for RS-232 and V.35 interfaces.

The modems offer half- or full-duplex asynchronous communications speeds of up to 38,4K bit/sec. for RS-232 and 57.6 bit/sec. for V.35-compatible equipment. They use balanced-line and frequency-shift keying modulation to provide high-speed transmission.

All models include a selectably timed remote-terminal system antistreaming feature and are available in stand-alone or rack-mount modules.

The RS-232 versions are priced from $125 and the V.35 versions are priced from $150.

Connecticut Technical, P.O. Box 4607, Stamford, Conn. 06907.

Applied Spectrum Technologies, Inc. has announced its **Econ** limited-distance modem.

The Econ is said to multiplex voice and data onto a single pair of wires for synchronous or asynchronous data transmission at rates up to 19.2K bit/sec. It utilizes a forward error-correction algorithm and supports all RS-232-compatible devices.

The Econ is priced at $490 per link.

Applied Spectrum Technologies, 450 Industrial Blvd., Minneapolis, Minn. 55413.

Diagnostic equipment

Electro Standards Laboratory, Inc. has announced its **Model 700 EIA RS-232 Interface Analyzer.**

The Model 700 is a diagnostic tool designed for use at the standard RS-232 or CCITT V.24 data interface of modems, multiplexers, terminals and computers. It is inserted in series between the Data Terminal Equipment and the Data Communications Equipment to provide access to and monitoring of all data, timing and control signals.

The Model 700 analyzer costs $245.

Electro Standards Laboratory, P.O. Box 9144, Providence, R.I. 02940.

Computer Systems Technical Support has added **20-, 40- and 60-point modular expansion boxes** for its UCT-1000 universal continuity tester.

All three boxes can be moved from harness to harness using the same mechanical connectors. Testing a large harness with higher count test-point expansions requires permanent backwiring to the jig board.

Without mating connectors, the 20-point expansion box costs $253. The 40-point box costs $273, and the 60-point box costs $293.

Computer Systems Technical Support, 1140 S. Raymond Ave., Fullerton, Calif. 92631.

The **Data Controls Division** of Airborn Electronics Corp. has announced the **Analyst 2**, a portable RS-232C digital test set and data line monitor.

The unit is said to perform multiple digital tests. It features a recessed, 32-character, electro-luminescent backlit display; a 512K-byte, nonvolatile, static random-access memory; a capture and review function. Other attributes include data monitor high-display control characters in English and menu-driven programs.

The Analyst 2 costs $995.

Data Controls Division, 4221 Airborn Drive, Addison, Texas 75001.

Network Communications Corp. has announced the **6630 Network Probe**, a system of diagnostic instruments for high-speed networks.

The 6630 Network Probe is said to handle real-time monitoring up to 72K bit/sec. for fully decoded X.25 and Systems Network Architecture data full duplex and 64K bit/sec. bit-error rate test/block-error rate test capabilities.

Functions include data line monitor, RS-232 lead status monitor, programmable DVOM, power-line monitor, programmable emulator, speaker monitor, protocol analyzer and decibel-level monitor, according to the vendor.

The 6360 Network Probe is priced at $4,995.

Network Communications, 9600 W. 76th St., Minneapolis, Minn. 55344.

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SYSTEMS & PERIPHERALS

HARD TALK

Donna Raimondi

Science mart battle brews

Mini- and near-supercomputer vendors are gearing up to do battle with each other as they feel the rumblings of a shakeout in their industry.

The scientific systems, which range in size from high-end superminicomputers to low-end supercomputers, have earned names like minisuper, near-super, Baby Cray and Crayette after supercomputer vendor Cray Research, Inc. The performance range is vast, and some of the many systems will even surpass Cray supers if they attain what their creators set out to build.

Less than a year ago, when the Baby Cray people talked comparisons, they measured their systems against Digital Equipment Corp. VAXs. Now, while some still compare with VAXs, most of them pit their systems against other minisuper companies. Compilers, operating systems, disk-access methods and marketing ploys are bursting forth from these vendors.

Boosting code efficiency

Culler Scientific Systems Corp. announced a compiler that uses expert system techniques to optimize Fortran for parallel execution and dynamic hardware for instruction sets tailored to specific application packages.

The vendor claimed that the improvements gave Culler a "four times greater code efficiency" than Alliant Computer Systems Corp. and Convex Computer Corp. machines.

Before the Culler compiler, Alliant's FX/Fortran had been the only commercially available compiler that could run parts of customers' existing Fortran programs in parallel. But even as Culler made its claim; Alliant released improvements of its compiler and a raft of enhancements that the firm claimed can speed I/O by 400% and computation time by

Continued on page 55

IBM offers credit on 3380 disk drive replacements, adds printers

BY JAMES CONNOLLY
CW STAFF

RYE BROOK, N.Y. — IBM has announced a $16,000 special sales promotional credit for users who want to convert single-density IBM 3380 disk drives to double-density drives.

The offer was one of several peripherals announcements tied to IBM's recent introduction of new models in its 3090 mainframe family.

The $16,000 credit, which one user notes is slightly more than he has previously been able to receive in trading in the older 3380s, is available until May 29 for users replacing standard density 3380 direct-access storage devices (DASD) with the 3380E dual-density DASD.

The credit announcement came after IBM began replacing parts of the head-disk assembly on out-of-production single-density 3380 Models AO4, BO4 and AA4 due to design problems.

The list price for a string of four 3380E drives is $416,900.

Other announcements

IBM also announced the 3800 Printing Subsystem Model 6, which IBM said is an intermediate speed version of its mainframe laser printer. The Model 6 replaces the 3800 Model 1, which is no longer marketed. The 3800 is an electrophotographic fanfold printer.

The Model 6, with a print speed of 134 page/min, was designed to be upgraded at a future date to the 230 page/min 3800 Model 3. The new model also features the same print density as the Model 3 at 240 by 240 dot/in., and advanced function printing to produce images, text, graphics and forms. The Model 6 costs $175,000 and will be available during the second quarter of this year.

In another mainframe printer announcement, IBM introduced the 4248 Line Printer Model 002 as a replacement for the Model 001.

The Model 002 was designed to print 4,000 line/min, compared with the Model 001's 3,000 line/min. Other improvements include print density on multipart forms comparable with that of the IBM 3211 printer and ergonomic enhancements such as the ability to do 20 job set-ups for instant recall.

The Model 001 can be field upgraded to the Model 002. IBM said the Model 002 is intended to provide a growth path for users of the IBM 3211, 4245, 3203 and 1403 printers.

The Model 002 will also be available during the second quarter and costs $75,000.

Unisys package edges out IBM option in Chicago hospital system upgrade

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — When the time came to order a mainframe at the University of Chicago Medical Center last year, the choice was between IBM's 3080 and Burroughs Corp.'s A 15.

It was a tough decision — one that would determine the course of computing for years to come at the hospital complex, a 700-bed facility that also serves 1,000 outpatient cases daily in Chicago's South Side.

After requesting bids for an IBM 3081 Model K and a Burroughs A 15, both dual processors, the decision was made not on the cost of hardware alone but on the cost of supporting the existing Burroughs hospital-management application. Burroughs has since merged with the former Sperry Corp. to become Unisys Corp.

"We had no reason to leave the Burroughs world, and we did have reason to stay," says Mridu Sekhar, director of information services. A careful analysis, she says, showed that the IBM solution would have cost three times as much due to the cost of converting the Cobol-based Burroughs hospital management system to IBM Cobol.

In October, the university became the second U.S. site to install a Burroughs A 15-I.

"It was the applications solution that drove the decision — not the features on the competing pieces of hardware," Sekhar says. The package, the Burroughs Hospital Information System, had been running on a B7800, which was running out of capacity. The application itself is the lifeblood of the center's patient-care system, Sekhar says. It creates a single data base containing both patient-care information and financial statements on each step of patients' treatment. She says it is not exactly duplicated in the IBM world.

"It's a tremendous management tool and a research vehicle," according to Sekhar, who has directed MIS operations for five years. "It enables you to track everything that's happened to a patient from the time he enters the hospital until he leaves."

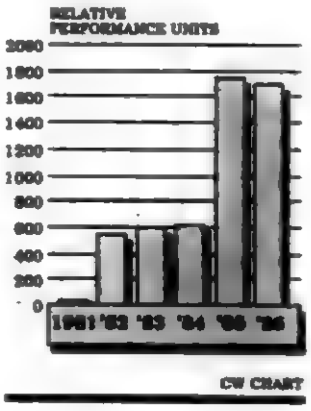
Doctors can ask MIS managers for data base extracts based on ad hoc queries based on patient age or disease symptoms. The result, Sekhar says, is a new way of evaluating the efficacy of certain treatments as well as a way to make a cost/benefit analysis of the treatment.

Sekhar's philosophy of MIS management has a lot to do with the way the hospital views its computing resource — the hardware is there to run an application, not the other way around.

Continued on page 51

Explosive growth in Chicago

Computing power at University of Chicago Hospital Center grew in five years from four DEC PDP minicomputers to a configuration of Unisys mainframes



CW CHART

DEC ups MicroPDP mini line

Winchester hard disks incorporated in units

BY STANLEY GIBSON
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. recently announced more powerful disk drives for its MicroPDP-11 minicomputers.

In addition, DEC announced it will offer upgrade kits later this year that will convert lower level MicroPDP-11 computers to top-of-the-line MicroPDP-11/83s.

DEC said it will offer two new standard configurations of the top-of-the-line PDP-11/83, each incorporating the company's recently introduced RD54 159M-byte, 5¼-in. Winchester technology hard disk.

In addition, two standard MicroPDP-11/53 computer systems, incorporating half-height RD32 42M-byte Winchester technology hard disks, were introduced.

Utilizing the half-height disks allows users to stack two disk drives in the space of one larger disk drive. In this way, a user can mix and match floppy and hard disks, according to a DEC spokesman.

MicroPDP-11/53 standard systems with 1M byte of memory, a 42M-byte disk drive and 95M-byte cartridge drive are priced from $14,000.

MicroPDP-11/83 standard systems with RD54 disk, 2M bytes of memory, a 95M-byte cartridge drive and a 16-line multiplexer are priced from $26,500.

RD54 disk add-on units are priced from $7,900. All are available immediately.

Inside

- Sequent adds synchronous communications controller. Page 50.
- Dual announces VME-based multiprocessing unit. Page 55.
- Systech unveils host adapter. Page 56.
- Xerox Marathon copier line expanded. Page 57.

Firm adds wide-area network options

Processor, X.25 capability let Sequent systems talk with other vendors' units

BY ALAN J. RYAN
CW STAFF

PORTLAND, Ore. — Sequent Computer Systems, Inc. recently announced its Synchronous Communications Controller (SCC) hardware and compliance with the X.25 international standard communications protocols.

The products enable Sequent's Balance parallel systems to communicate with other systems over public and private data networks and provide a means of routing data over nationwide and international networks.

"It gives us a wide-area networking capability. What that will do is let us speak to other vendors' computers that support the X.25 protocol," said Joanne Kahn, Balance systems product manager. She said those vendors include IBM , Digital Equipment Corp., Honeywell, Inc. and other minicomputer vendors.

The SCC is an intelligent communications processor that interfaces the Intel Corp. Multibus in Sequent Balance 8000 or Sequent Balance 21000 computers and is supported by Dynix, Sequent's multiprocessing version of the Unix operating system.

> "IT gives us a wide-area networking capability. What that will do is let us speak to other vendors' computers that support the X.25 protocol."
>
> JOANNE KAHN
> SEQUENT COMPUTER
> SYSTEMS, INC.

The company's Dynix X.25 software offers wide-area networking. It facilitates communications with other vendors' computers through CCITT X.25, X.29, X.3 and X.28 protocols. It also allows Sequent systems to exchange data with public and private packet-switching networks. Dynix X.25 is fully integrated with the Dynix multiprocessing operating system and provides Layers 1 through 3 of the OSI networking model, according to Sequent.

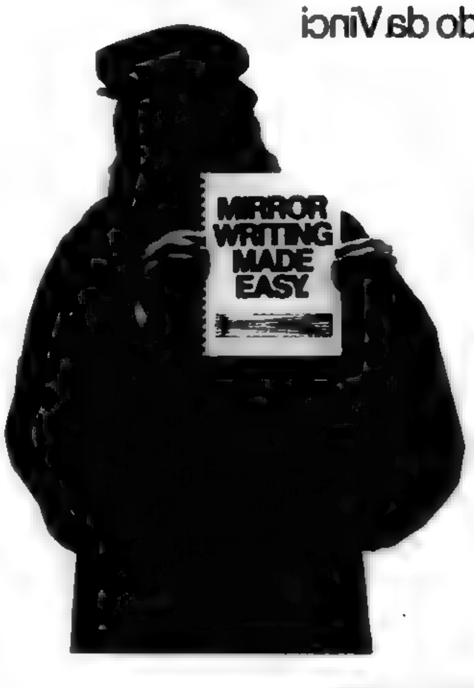
The SCC is available with two to four ports, with each port providing an independent full-duplex channel. The vendor claimed that two ports per board can support full-duplex direct-memory access (DMA) and line speeds of 64K bit/sec., while non-DMA ports support lines up to 19.2K bit/sec. The X.25 and X.29 protocols run on the communications board, off-loading the system from conversion overhead, and can be downloaded from Dynix. There is a choice of a packet-mode interface or a data-mode interface.

Dynix X.25 facilities allow remote asynchronous terminals to log onto the Sequent host. Dial-up and leased lines are supported, with line speeds from 1,200 to 64K bit/sec. Dynix X.25 also provides user-level facilities for file transfer, mail and remote command execution between Sequent systems.

Price of the basic kit, with two ports, is $16,000 and includes controller board, hardware for the ports and software.

Sequent and Clinicom, Inc., in Boulder, Colo., have signed an OEM resale agreement in which Clinicom will offer the Sequent Balance 8000 and 21000 parallel computer systems as part of its Clinicare Bedside Information System.

The Clinicare system uses a portable, wireless hand-held terminal that communicates to a central Sequent Balance 8000 or Balance 21000 system. The terminal is a two-way communication terminal used to document and access patient care information at the time care is provided.



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FROM PAGE 49

"As the technology specialists in this hospital, we have the responsibility to look at computers as means to get a job done," she says. And while most vendors, Unisys and IBM included, try to sell a single-vendor solution, that is not the way things have turned out at the medical center.

The consumer-based approach resulted in a second computer room full of Digital Equipment Corp. machines, including a VAX-11/780, a VAX 8500, a PDP-11/44 and a Microvax II. The DEC machines support critical applications for the hospital's obstetrics, radiology, laboratory and outpatient billing departments. The DEC machines pass information to the A 15 through a Unisys CP 9500 front-end processor. The network allows real-time updates in the central data base. Under these conditions, the A 15 handles up to 9,000 transactions per hour.

A consequence of the Unisys and DEC decisions is a lack of IBM compatibility — other than that provided by standard networking protocols to IBM's SNA/Synchronous Data Link Control. But the medical center compensates by diverting most administrative batch processing to the University of Chicago's Amdahl Corp. 5860 mainframe. Each month, staffers walk over 12-in. 6250 bit/in. tapes with payroll information to run on the Amdahl machine.

Researchers also use the Amdahl system for statistical analyses of patient data run on a dial-up basis under SPSS, Inc. or SAS Institute, Inc. programs — which are not supported on the A 15.

The applications-first philosophy says the MIS organization's task is to select and maintain hardware to drive solutions selected by medical professionals. For this reason, the DEC machines might one day be upgraded to a DEC Vaxcluster to improve disk support and to promote file passing.

Response time boosted

Certainly, response time on the Unisys side of the shop was greatly boosted by the upgrade to the A 15. The system created extra capacity for the 2,000 end users, who dial up the mainframe from Unisys B 25s, DEC VT 100s and VT 200s and IBM Personal Computers emulating Unisys terminals. The A 15 now runs just 82 of a possible 96 communications ports, but an increase in the number of ports is being evaluated.

Expanding the number of communications lines would not have been possible before the A 15 came along. The B7800 had been running at 80% to 90% of capacity. The 24M-byte A 15 runs at less than 40% of capacity most of the time. That means the hospital's end users have second or subsecond response times on their PC or terminal screens.

"When we switched over from the B7800, the change in response time was really dramatic," Sekhar says. "Before, we had as much as 10- to 12-second waits, and after the A 15 came on-line, response time was down to a second or less.

"It's been like opening up new lanes on a highway," Sekhar continues. "Adding the A 15 will allow us to support more applications as we go along."

Before the changeover, the A 15 was able to address just 6M bytes of main memory at a time, Sekhar says. Recompilation was carried out on two smaller Unisys A 3 processors, which share the A 15 computer room.

Generally, these machines are used for off-line software development. To make the change, some hardware features had to be added over a period of seven hours. Additional software changes will take another one to two hours and are expected to be be completed this week.

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Dual Systems adds 25-MHz VMEbus unit

BY ALAN J. RYAN
CW STAFF

BERKELEY, Calif. — Dual Systems Corp. has introduced a 25-MHz VMEbus-based multiprocessing unit and a VME I/O module.

The VMPU-4M multiprocessing unit is optimized for a virtual-memory Unix environment based on a 25-MHz Motorola, Inc. 68020 microprocessor. With 4M bytes of memory, it features four times the memory of Dual System's earlier released VMPU-32, the vendor said.

It features a 68020 central processing unit, a Motorola 68851 memory management unit and a Motorola 68881 floating-point coprocessor.

The company said the unit has a zero-wait-state performance obtained through the use of a software-selectable 2K-byte logical data and instruction cache that ensures no-wait-state operation for typically 70% to 90% of the 68020's bus cycles.

The on-board memory reportedly features an access time of 115 nsec and a cycle time of 200 nsec. The board also includes up to 64K bytes of on-board erasable programmable read-only memory.

VME address space access

VME extended, standard and short address space can be accessed, and dual-port memory can be accessed by both standard and extended masters.

The unit also features a board-to-board mailbox interrupt that allows multiple VMPU-4M boards to interrupt one another. Dual-port memory and cache memory allow multiple VMPU-4M boards to share the system bus.

The VME I/O module, the Dual IOSP, provides serial and parallel ports for asynchronous terminals and printers and computer-to-computer communications. It provides six serial and two output-only parallel ports and offers RS-232 ports and parallel printer ports in systems that have communication processors using the Motorola I/O bus, Dual said.

The IOSP was designed as a companion to the vendor's VIOP VMEbus I/O Processor Board but will reportedly also operate with other I/O bus masters.

Science mart

FROM PAGE 49

up to 56%.

Based in Richardson, Texas, the rapidly-growing Convex — maker of a minisuper that can run VAX software on a vector processor — and Alliant, in Littleton, Mass., both went public during 1986. Customers say the firms keep close tabs on each other. "Alliant paid a lot of attention to us, particularly when they saw that they were moving into second place with us against Convex," one Alliant FX/8 owner says.

Scientific Computer Systems Corp. (SCS), based in San Diego, will spend this year enhancing its connectivity options, a spokeswoman says. The vector processor machines can communicate with VAXs and Cray systems, and during the next year SCS will hook up with various workstations.

Another goal is to make the SCS systems easier to use — presumably to help the transition from the current university and research sites out to the commercial marketplace.

Traditional mini makers pay attention to the success stories coming out of this relatively new marketplace. Prime Computer, Inc. recently preannounced a scientific minisuper that will use parallel and vector processing techniques. DEC has been researching parallelism and other techniques, such as reduced instruction set computing, to beef up its traditional strengths in the engineering and scientific fields.

IBM itself has become more talkative about its parallel projects. While technical problems will keep Big Blue's massively parallel systems in research mode for years to come, the company has committed new resources and people to optimize scientific use of its 3090 mainframe.

Sequent Computer Systems, Inc. in Portland, Ore., has made inroads into the business arena in addition to maintaining its traditional scientific turf. Upcoming announcements should lay out efforts to appeal to more business users through third-party software arrangements and support of protocols needed by business.

"Before, when we sold mostly to academic customers, TCP/IP [Transmission Controlm Protocol/Internet Protocol] and Unix were enough. Now we are making an effort to offer IBM Personal Computer interconnects, X.25 protocols and other things that are less traditional for us and more important to business," a spokesman said.

Meanwhile, Dallas-based Flexible Computer Corp., initially a promising contender in the parallel marketplace, did not get enough of the parallel pie to stay healthy. In December, the company said it might not be able to raise enough money to continue, but efforts so far this year have been encouraging. The firm received $1.3 million from Swiss and American investors by the end of January as part of a $3.9 million package it expects to receive by the end of February, a spokesman says. The money will help Flexible pay its outstanding bills, "and it gives us some breathing room," the company says.

What this all means for scientific and engineering users is that there are a lot of choices out there right now. As happened with minicomputers and microcomputers, chances are pretty good that some companies will dominate while others fall by the wayside. At this point, it is too early to tell who the big winners will be.

Ramondi is a *Computerworld* senior writer

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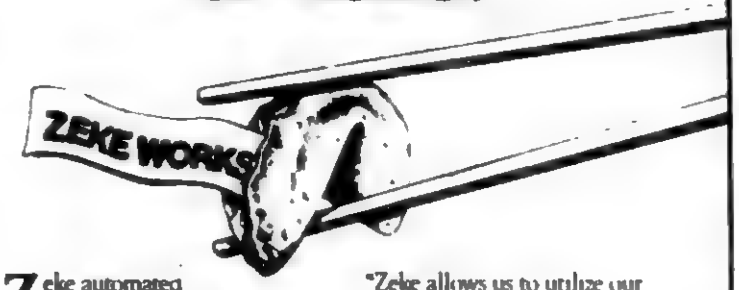

Zeke automated scheduling is worth a fortune to The Bank of Tokyo, Ltd. "We've found that Zeke eliminates the possibility of out-of-order submissions and other errors," says VP/Electronic Data Processing Systems Department Manager Kazuahiro Kobayashi. "It takes the burden of individual submission off our operators.

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NEW PRODUCTS

Processors

Systech Corp. has introduced the **HPS-6945**, a VMEbus-compatible host adapter for its Unplug data communications subsystem.

The Unplug subsystem is made up of High-Performance Serial (HPS) host adapters and HPS cluster controllers.

The data communications subsystem can support up to 128 serial devices occupying a single expansion slot in the backplane of a host computer.

The HPS-6945 features a 12.5-MHz, Motorola, Inc. 68010 microprocessor with 512K bytes of zero wait-state parity random-access memory.

The adapter costs $1,770 in quantities of 100.

Systech, 6465 Nancy Ridge Drive, San Diego, Calif. 92121.

Micro Memory, Inc. has announced its **MM-9080D** dynamic random-access memory (RAM) modules for Multibus I systems.

The MM-9080D provides 2M-, 4M-, 6M- and 8M-byte memory modules using 256K-byte dynamic RAM Zips. Cycle and access times are 275 and 185 nsec, respectively.

The dynamic RAM modules use odd-parity generation and checking for each byte.

Parity output status is displayed on an I/O register whose address is jumper selectable in the 64K-byte I/O map.

Other features include module selection on 64K-byte boundaries for the starting and ending address and on-board transparent refresh and orientation of the memory chips so that maximum airflow is available.

The MM-9080D with 8M bytes costs $1,895.

Micro Memory, 9540 Vassar Ave., Chatsworth, Calif. 91311.

Sequent Computer Systems, Inc. has announced a **synchronous communications capability** for its Balance family of parallel computing systems.

The capability consists of the Synchronous Communications Controller hardware and the X.25 communications protocols.

The capability is said to enable Balance systems to communicate with other systems over low-cost and private-data networks and provide a means of routing data over both nationwide and international networks.

A single Sequent parallel computing system supports up to eight synchronous controller boards, according to the vendor.

Each board supports two or four ports. Each port provides a full-duplex channel.

Balance systems are priced from $60,000 to $500,000.

Sequent Computer Systems, 15451 S.W. Koll Pkwy., Portland, Ore. 97006.

Computer Design & Applications, Inc. has announced the **MicroMSP-4**, a single-board array processor for Digital Equipment Corp.'s Microvax II.

The MicroMSP-4 array processor does real-time and numerically intensive signal and image processing, according to the vendor.

In quantities of 100, the MicroMSP-4 is priced at $5,950.

Computer Design & Applications, 411 Waverly Oaks Road, Waltham, Mass. 02154.

Terminals

Wells-Gardner Electronics Corp. has introduced the **K7000** integrated family of interactive color displays.

The single LED touch screens are available in 13-, 15-, 18- and 19-in. sizes featuring both standard CRTs and full square flat-face tubes. Display resolution ranges from 320 by 240 to 640 by 240 with a variety of horizontal and scan frequencies, the vendor said.

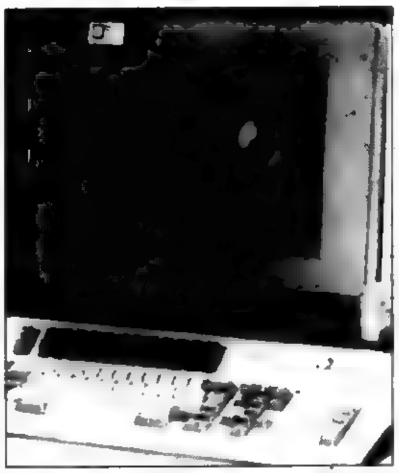
The 13-in. size is priced at $700 and the 19-in. size costs $800.

Wells-Gardner Electronics, 2701 N. Kildare Ave., Chicago, Ill. 60639.

Decision Data Computer Corp. has enhanced its **3781** 15-in. screen workstation for the IBM System/34, 36 and 38 environments.

The workstation now features printer capabilities to support 5224/5225 text-only emulation as well as 5256 emulation. A standard screen dump capability is provided via the RS-232C port.

Other features of the 3781 include a 122-key keyboard, a detachable coil cable and a five- to 20-degree tilt range for the display screen.



Decision Data's *3781 workstation*

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The 3781 is priced from $1,650. The workstation printer capability is priced at $400.

Decision Data Computer, 400 Horsham Road, Horsham, Pa. 19044.

Printers/Plotters

Roland DG has announced the **DXY-885** and the **DXY-990**, both A/B-size plotters.

The DXY-885 is an eight-pen flatbed plotter capable of working at a speed of 12 in./sec. It uses standard RS-232C serial and Centronics Data Computer Corp. parallel interfaces and Hewlett-Packard Co. HP-GL emulation.

The DXY-885 features automatic pen-capping.

The DXY-990 adds an electrostatic paper hold, an LED coordinate display and manual pen-speed programming, according to the vendor.

The DXY-885 costs $1,595, and the DXY-990 costs $2,195.

Roland DG, 7200 Dominion Circle, Los Angeles, Calif. 90040.

Bruning Computer Graphics has announced a plotter, called the **Zetadraf 900**.

The single-sheet, A- to E-size plotter is said to provide 45 in./sec. pen speed.

The product features built-in preset programs. It prints on bond, translucent, vellum or mylar media.

The Zetadraf 900 has an eight-pen cartridge that accepts a labyrinth nylon tip and labyrinth liquid roller in 10 colors or liquid ink pens in four colors, according to the vendor.

The Zetadraf 900 costs $7,950.

Bruning Computer Graphics, 777 Arnold Drive, Martinez, Calif. 94553.

Xerox Corp. has announced the **Xerox 1065 Marathon** copier.

The copier is said to feature 63 copy/min speed on letter- or legal-size paper.

Other microprocessor controller features of the product include automatic double-sided copying from single- or double-sided originals and automatic reduction and enlargement.

The Xerox 1065 Marathon copier is also said to feature margin shift to the right or left on one or both sides of the paper, automatic covers insertion and automatic contrast control.

Two versions of the product are available.

One version has a recirculating document handler, and the other has an automatic document handler.

The Xerox 1065 Marathon copier is priced from $23,095.

Xerox, Xerox Square 006, Rochester, N.Y. 14644.

Xpoint Corp. has announced the **Xpoint 6225**. Xpoint 6225 is a 400 or 800 line/min shuttle matrix printer.

The product has the ability to provide plug compatibility with both the IBM 5294 and 5251 cluster controllers, according to the vendor.

The printer is said to emulate the 5225 Model 3 and 4214 printers, both of which are offered by IBM.

Features of the product are said to include bar code printing, data processing, letter-quality printing and line and block graphics.

The printer comes standard with a quietized cabinet.

The Xpoint 6225 400 line/min printer costs $7,950; the 800 line/min version costs $9,950.

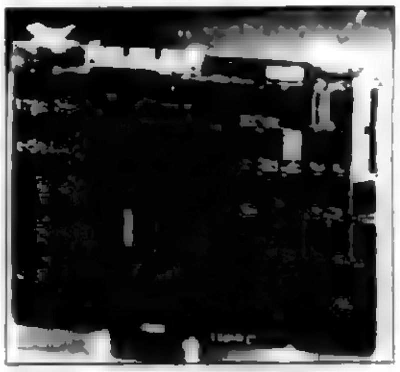
Xpoint, 5600 Oakbrook Pkwy., Norcross, Ga. 30093.

Able Computer has announced the **VMZ/LP II**. The product is said to be a dedicated direct memory-accessing line printer controller.

The controller is said to support print speeds of 5,000 line/min at a column width of 132.

The VMZ/LP II is said to feature a 256-char. buffer that can be enabled or disabled through an on-board switch.

Formatting capabilities include tab expansion, line wrap, upper-to-lower-case conversion and form-feed to line-feed conversion, according to the vendor.



Able Computer's *VMZ/LP II*

The VMZ/LP II is said to emulate Digital Equipment Corp.'s DMF32 controller's line printer functions.

The VMZ/LP II line printer controller is priced at $1,795.

Able Computer, 3080 Airway Ave., Costa Mesa, Calif. 92626.

Interpreter, Inc. has announced the **Laser Xchange**. The product is an interface product that is said to allow Xerox Corp. Memorywriter documents to be printed on the Xerox 4045 Laser Printer.

The Laser Xchange is said to read Xerox Memorywriter diskettes and send specified documents to the Xerox 4045 for printing.

According to the vendor, one Laser Xchange unit in combination with a Xerox 4045 provides walk-up printing capabili-

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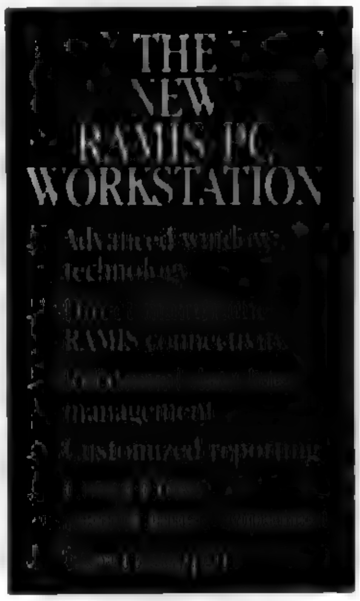

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Continued from page 57

ties to any number of Memorywriter users.

No special format coding is required.

Laser Xchange is priced at $3,995.

Interpreter, 11455 W. 48th Ave., Wheat Ridge, Colo. 80033.

Power supplies

Mendon Electronics Corp. has announced the **Monitron 2000** power-line monitor.

The monitor is said to detect and classify power-supply irregularities such as spikes, high and low voltage, dropout and power failure. According to the vendor, response time is 0.5 microseconds.

It was designed to provide constant visual access for checking its functioning status and power-supply condition. It can be plugged into a standard electrical outlet and is compatible with computer systems and power protection equipment.

Monitron 2000 costs $299.

Mendon Electronics, 3800 Monroe Ave., Pittsford, N.Y. 14534

MPL Power Systems, Inc. has announced its **Load Isolation Set** (LIS) for protection of critical computer loads.

According to the vendor, LIS protects from up to 98% of all electrical aberrations. Stored energy is said to allow the LIS to ride through total power outages of up to 500 msec.

The LIS consists of a motor generator set. Sizes range from 30 to 1,000 kVA and can be paralleled for redundancy or capacity without the use of additional paralleling cabinets.

Single modules are priced from $19,000 to $140,000.

MPL Power Systems, 3011 Lincoln Ave., Richmond, Va. 23228.

Auxiliary equipment

Secure Technologies, Inc. has announced the **Stationlock security lock** for Digital Equipment Corp.'s VT200 family of terminals.

The Stationlock replaces the on/off switch with a key-operated Medeco security switch lock. It prevents access to systems by securing access to the unattended terminal.

The Stationlock keys can be individually appointed or master keyed.

The Stationlock costs $89.95 per unit.

Secure Technologies, 297 High St., Dedham, Mass. 02026.

Huntron, Inc. has announced the **Huntron Tracker 5000**, a troubleshooting system based on a personal computer.

The Tracker 5000 is said to be a benchtop circuit-tester that identifies substandard components in electronic devices by energizing solid-state devices with an AC signal across two points and reporting abnormal responses.

According to the vendor, the system consists of a smart diagnostic system controlled by an on-board microprocessor and an external personal computer operating under Tracker 5000 software for test-sequencing and data analysis.

The Tracker 5000 costs $7,995.

Huntron, 15720 Mill Creek Blvd., Mill Creek, Wash. 98012.

Maintenance equipment

Datatec Industries has introduced the **Loop Diagnostic Panel** (LDP) to aid in the troubleshooting of IBM point-of-sale (POS) retail systems.

The manual switching cabinet features built-in IBM diagnostics that simulate the IBM POS data stream. The LDP accommodates from eight to 64 terminals and can be programmed to handle loop speeds of 2,400, 4.8K and 9.6K bit/sec. Multiple loop systems can be handled by the product, the vendor said.

Available in increments of eight, the LDP is priced from $515 for an eight-position model to $1,260 for a 64-position model.

Datatec Industries, 45 Smith St., Englewood, N.J. 07631.

Tektronix, Inc. has announced the **1205**, **1220** and **1225** general-purpose logic analyzers.

The logic analyzers are said to feature a user interface with a large display, Apple Computer, Inc. Macintosh-like pop-up menus and on-screen Help.

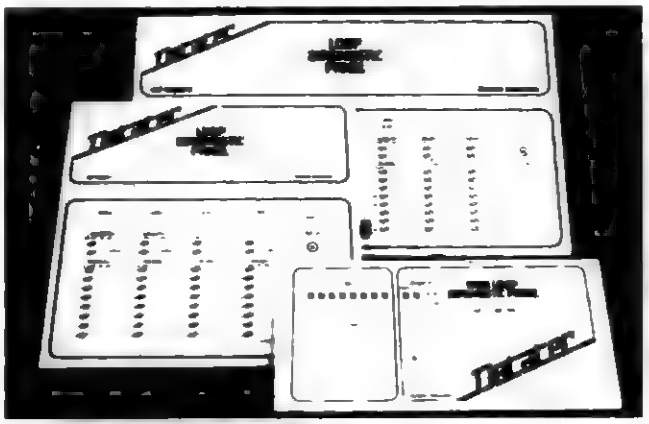
The 1225 logic analyzer acquires data at up to 25 MHz on 48 channels or up to 100 MHz on 12 channels.

According to the vendor, the 1220 logic analyzer offers the same mainframe package, display, software and user interface as the 1225. It also offers 32 channels of data acquisition, eight external clocks and four external qualifiers.

The 1205 logic analyzer acquires 24 channels of state data: eight channels at 25 MHz, four channels at 50 MHz or two channels at 100 MHz.

The 1225 costs $5,395. The 1220 costs $3,995 and the 1205 costs $2,495.

Tektronix, P.O. Box 12132, Portland, Ore. 97212.



Datatec's *Loop Diagnostic Panel*

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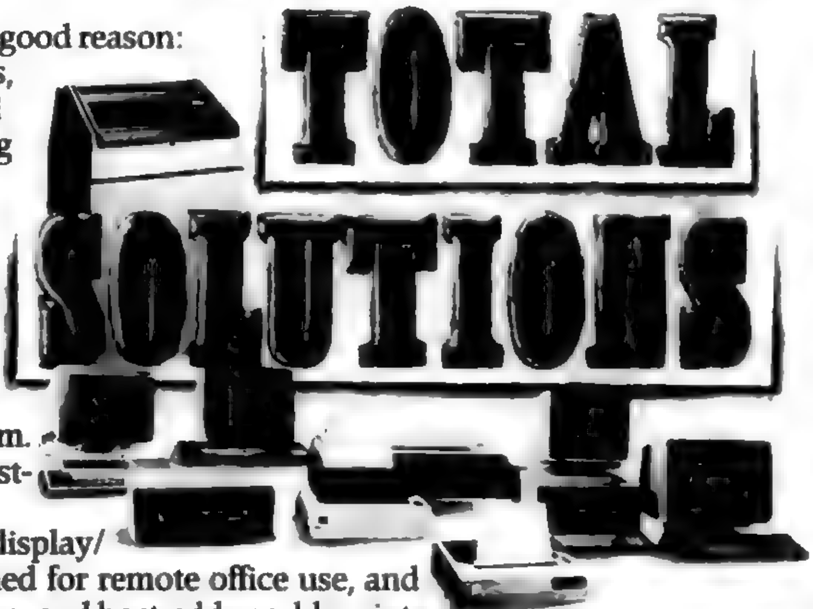

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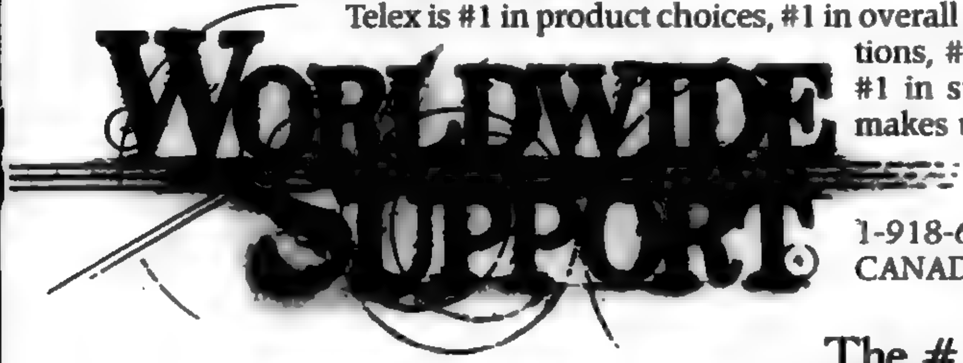

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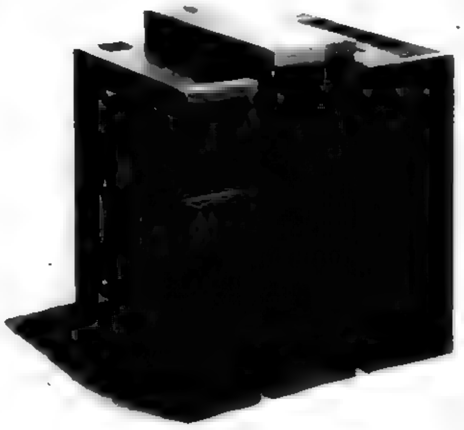

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*286A and 286B bundled with SFT NetWare Level II. 68B bundled with SFT NetWare Level I.

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IN DEPTH

Maintenance manager: How to be a drill sergeant and a good guy, too

BY RICHARD LEFKON

Bill's first call after being made systems maintenance manager for catalog sales came from Frank, the vice-president handling cost containment. Could Bill switch the weekly goods pricing tape by the end of the quarter, which was in six weeks? he asked. It would save the firm at least a thousand dollars a month.

"Sure," Bill replied, "a tape's a tape."

The next week, Bonnie, a systems analyst, headed straight for Bill's office after she finished talking with Frank.

"This guy has already given notice to the old pricing-tape vendor but hasn't signed with the new one," she said to Bill. "I don't have the booklets to compare the fields — I don't even have the formats. How will we run next quarter's catalogs?"

Since Bonnie was on vacation by the time Bill got the layouts and thick explanatory books, he gave them to Howard, a good junior programmer, who, by the time Bonnie returned to work two weeks later, had a read-and-print program running.

"I'll need another programmer this week," Bonnie told Bill, "and then I want to test the whole batch process in the final week."

"I can take Howard off the Social Security regulations reprogramming," Bill replied, "but the head of sales himself wants the year-end employee bonus modification tested *next week*."

Because of the usual delays, as well as a lack of vendor coordination, the pricing enhancement barely reached production in time to update prices in the quarterly catalog. The programmers themselves at least made sure that each number got into a similarly labeled field in the data base.

The firm was hit with a federal reprimand for missing the final implementation date on its Social Security reprogramming; the dollar repercussions from that did not appear until months later. Much sooner — two days into the new quarter — came an avalanche of phone calls from salesmen frantic that the published quarterly catalog prices were way off.

"That's because while the new tape gives quantities in dozens, the old one used quantities in scores [twenties]," said Hank, one of the old-timers. "I did notice that — I'm just not big on volunteering information."

This story, a composite based on the real experiences of several companies, raises a number of questions. Did this maintenance manager do any of the following:

- Define his tasks before committing resources?
- Make sure the service agreements were final?
- Perform cost/benefit analyses?
- Get the users to rank their priorities?
- Require adequate testing and allow for regression testing?
- Get user validation of results?
- Coordinate testing by different user areas?
- Guarantee adequate technical input?
- Provide for staff continuity?

Nobody likes to hear the alarm clock in the morning. But we make sure it is on every night because we know it somehow benefits us. Similarly, reasonable controls on programming efforts may constrain the freedom of analysts, programmers and users, but they come to accept these controls because they realize the wisdom of implementing some safeguards, both on the work itself and on work flow emanating from the users.

An inexpensive on-line tracking and management system provides documentation of these controls while holding down the required signed documents to less than one loose-leaf binder per year.

True, many status reports will be distributed, but only signatures need be preserved on paper — the detailed data can be hidden away on disk.

Coping with the real world

Universal thoroughness is more important in maintenance and enhancement programming management than in new development, where you get to invent your own world.

Maintenance management must cope with a world that already exists, inhabited by users, resources, code and personalities, none of which the manager has created and none of which is

P. CHARLES LADOUCEUR

Lefkon, an assistant vice-president for Citibank N.A. in New York, is president of the Financial Industries Chapter of the Data Processing Management Association. He also leads systems and management seminars for New York University's Information Technologies Institute.

……

- **Managing a maintenance staff**
- **Four checklists help keep control**
- **Priorities: There are no 'special cases'**

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The difference between the two worlds is a study in contrasts in four areas: task definition, scheduling, standards and continuity.

Task definition. In new development, the objective should be determined at the start; in maintenance, user perceptions of fixes and enhancements may change constantly.

Scheduling. In development, the long-term project completion date is the only deadline carved in stone; enhancements often must be made in time to keep user products competitive or to comply with new regulations.

Standards. Development teams are selected in part because they will do things in the way the project mandates.

By contrast, at least some maintenance staff members may not cooperate fully, feeling their own ways are more beneficial to themselves or the organization than the new manager's.

Continuity. Personnel with similar skills tend to behave as equals when a development effort gets rolling; however, in maintenace, there is the risk that certain veteran staff members may exercise negative influence over otherwise productive colleagues.

These four areas are ones in which the newly arrived manager of software maintenance and enhancements may be greatly challenged.

The responsibilities of this rich but often unappreciated position can be held to reasonable proportions by setting up a firm structure to make most procedures routine. This practice is preferable to treating each software event as unique or, as in development, trying to mesh all tasks into a single, patterned whole. Crucial to the establishment of this structure are the forms that would be used to explain, control and expedite the tasks.

A clear understanding

In many ways, the definition of a task is more urgent than its subsequent management. If the work agreed upon is not clearly understood — by user, technician or manager — even a well-structured control system will leak like a well-structured sieve.

Perhaps the most valuable advice managers can gather from this article is to *request* from users, *write down* and *publish* the most detailed paragraph possible concerning the task.

> IF THE work agreed upon is not understood — by user, technician or manager — even a well-structured control system will leak like a well-structured sieve.

The more the planned change is defined in user — not programmer — terms, the more likely users will be to approve completed work. This way, they can see that nothing less, more or different was requested initially.

The first defense for scarce systems resources is the service request form, on which the user first asks that a specific task be done.

Next, a user test plan is completed up front; users who know what needs to be done define their topics objectively.

Finally, while most shops differ on the subject of formal programming specifications, maintaining a standard required form of some sort ensures that at least minimal investigation and planning take place.

Service request form. Basic to any successful maintenance and enhancement effort is the initial service request form.

This form should identify the relevant system, category of change, dates submitted and received, name and telephone number of user contact and authorizer, other departments potentially affected, a sequential tracking number, a brief title and a longer description and business justification for the change.

On the form's reverse side, a second page might be printed, consisting of two large columns for each of a dozen or so categories.

For each major category affected by the request, users de-

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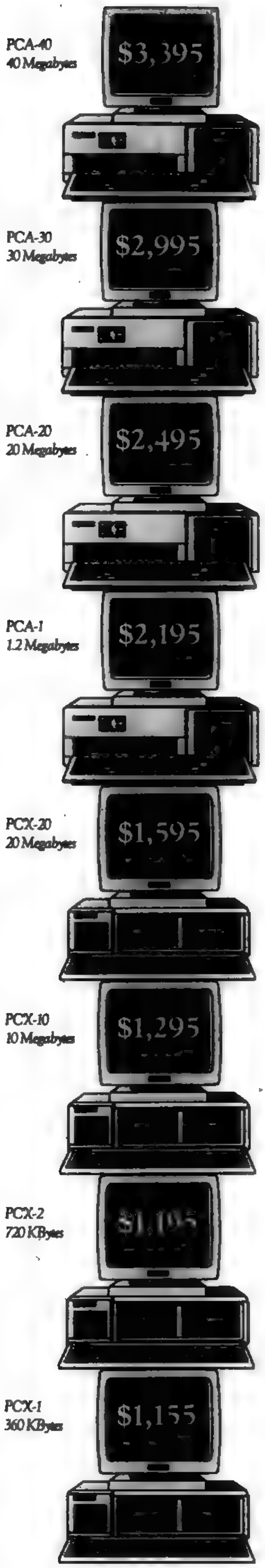

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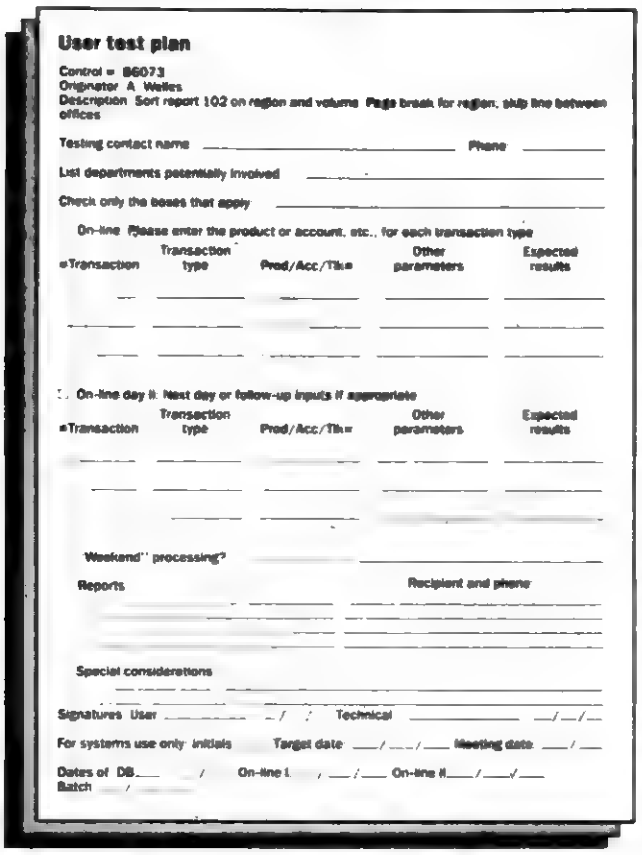
Sample maintenance forms



User test plan

Control = 86073
Originator A. Welles
Description Sort report 102 on region and volume. Page break for region; skip line between offices

Testing contact name ______ Phone ______

List departments potentially involved ______

Check only the boxes that apply ______

On-line Please enter the product or account, etc., for each transaction type

#Transaction	Transaction type	Prod/Acc/Title	Other parameters	Expected results

☐ On-line day II: Next day or follow-up inputs if appropriate

#Transaction	Transaction type	Prod/Acc/Title	Other parameters	Expected results

"Weekend" processing? ______

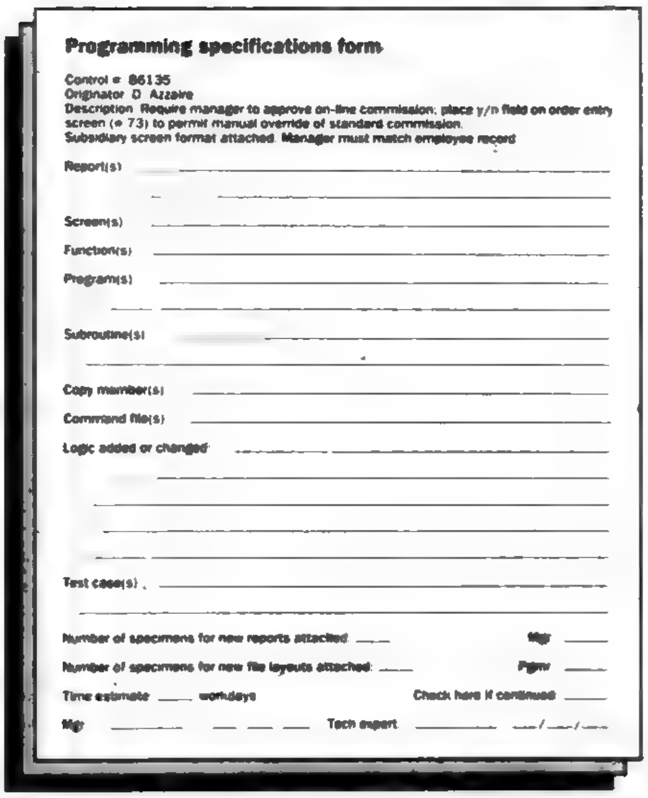
Reports	Recipient and phone

Special considerations ______

Signatures User ______ __/__/__ Technical ______ __/__/__

For systems use only: Initials Target date __/__/__ Meeting date __/__

Dates of DB __/__ On-line I __/__/__ On-line II __/__/__
Batch __/__



Programming specifications form

Control = 86135
Originator D. Azzaire
Description Require manager to approve on-line commission; place y/n field on order entry screen (# 73) to permit manual override of standard commission.
Subsidiary screen format attached. Manager must match employee record

Report(s) ______

Screen(s) ______

Function(s) ______

Program(s) ______

Subroutine(s) ______

Copy member(s) ______

Command file(s) ______

Logic added or changed ______

Test case(s) ______

Number of specimens for new reports attached ___ Mgr ___

Number of specimens for new file layouts attached: ___ Pgmr ___

Time estimate ___ workdays Check here if continued ___

Mgr ______ __ __ __ Tech expert ______ __/__/__

CW CHART

Even the best planned forms *require accompanying instructions to cut down on costly individual training and to thwart potential misunderstandings. For example, the category "On-line day II" on the sample user test plan form does not refer to instances in which the testing clerk had to go home and will finish inputting the test cases the next day. Rather, it points to planned follow-up, typically to verify that the programming change actually had the anticipated effects on the overnight batch run.*

scribe the present function or data on the left and the desired outcome on the right. Any unaffected categories are marked "OK" in the right column, thus permanently eliminating them from the scope of the request.

After all, users may not understand a data base structure, but they know better than programmers whether, for instance, the sales contest rewards deduced from the orders file are simply to be stored somewhere in payroll or are to be printed on checks right away.

And when priorities must be debated, the additional recorded detail means that users can vie with each other over the value of a task; leaving the programming manager out of the debate.

The sequential tracking number is the keystone of honest and orderly task management. Just the fact that the brief title and its number are displayed regularly on a pending requests report makes users feel good, eliciting such responses as, "I haven't been ignored," and "The whole world knows I've asked the systems people to do this."

This number may also prove helpful to users jockeying for priority among other requests.

Service requests that are not well formed should be sent back to the user.

This does not really require all that much backbone on management's part. If the user complains, "Why are you sending this back to me?" the software manager can simply explain why the request was returned and will, in general, receive a more concise submission containing such items as sample screens, reports and so on.

The fact that the users themselves scope out much of the task helps to distinguish maintenance and enhancement programming from new development. So, sometimes, does the urgent nature of things.

> IN THE classroom, it is not always desirable to focus all efforts on what will be tested. But in programming, this restriction works well.

Joseph Rooks, director of data processing for the Oklahoma Corporate Commission in Oklahoma City, explains, "No matter what the emergency, our major new development projects go forward because they are large and are on a four-year plan that is revised annually.

"But we sometimes have to respond much more quickly with maintenance and enhancement staff," he continues. "The state legislature might pass a new law that will take effect as soon as the governor signs it. If it affects our automated programs, we have no recourse but to push other tasks aside and make the changes in a way that doesn't disrupt the normal operations of state government."

User test plan. Those who have children in school may recognize the phrase, "teach to the test." In the classroom, it is not always desirable to focus all efforts on what will be tested. But in programming, this restriction works well.

Formalizing the user test plan validates the outcome or fix (see chart at left). Once programming is complete, one of two things will happen during acceptance testing: Either the system will work as described, or it won't. If it does work, users approve it because they can see it is correct — from the user test plan form — as well as complete — from the initial service request form.

Specifying details on the user test plan also means that during coding the programmers can simulate the kinds of results for which users will be looking.

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> "WE ISSUE addenda to the specs all during the project. If the coders don't get the addendum, the system doesn't get the change."
>
> BRENDA WILLIAMS
> COLUMBIA HOUSE DIVISION OF CBS, INC.

If users complete the test plan before any programming specifications are written, they will still recall clearly what system features failed, under what conditions they failed, how the requested change will better the situation and exactly what would have happened had the fix or enhancement been in place.

The process of thinking things through may bring to light either limitations or other related tasks that can be noted easily and publicly documented as a service request modification.

Although scheduling "changes to changes" as the second phase of the project is generally the best practice, sometimes users' test planning uncovers an urgently needed realignment.

"We were phasing in a new method to track costs," notes Barbara Shaver, manager of programming for Revco Drug Stores, Inc. in Twinsburg, Ohio. "The analysts said, 'We don't need that part of it until Phase III.' But in speaking with the user, we discovered we needed it in Phase I or else the whole Phase I system would not work.

"We had to write an addendum," Shaver continues. "If we had not, we probably would have spent another four months fixing the original Phase I. As it was, it only took us one additional week."

Specification. After users describe the business use and desired test results of a requested change, it is generally up to a systems analyst to translate the business need into a programming specification. A checklist or fill-in form is a good place to start (see chart page 65). Listing items such as files that will be affected is worthwhile, even for small or quick jobs. Such a form is very easy to fill out for the simplest tasks, essentially by writing "NA" (not applicable) in almost every category. This helps the programmer by clarifying which system or code components can safely be bypassed.

Whatever format is used, coding specifications should stand on their own; a coder should not have to consult the specifications' author. Also, the specifications should be updated and reissued if the functional need changes.

Brenda Williams, project manager with the Columbia House Division of CBS, Inc. in Terre Haute, Ind., points out, "Every time the programming specs have been written before a project, if the project changes and the specification does not, you cannot take that document as what actually happened.

"We issue addenda to the specs all during the project," Williams continues. "If the coders don't get the addendum, the system doesn't get the change."

At the discretion of systems management, users may be given a copy of the completed programming specifications form. They may not understand all its contents, but it provides documentary support, both for the time estimate it contains and because of its relevance to user requests.

Straightforwardness also helps when describing resources. Showing three real available days per programmer per week rather than five padded ones offers two benefits: It is, and appears to be, honest, and it prevents cutting into the bone if and when the day arrives that new enhancements are drastically curtailed.

Scheduling: A definite work flow

In situations in which high-level users compete for scarce programming resources, the maintenance manager must be a tactician — regularly saying no, saying nothing or saying yes but stalling any action.

All of these tactics are made less uncomfortable and more credible by having a definite flow of stages through which every work request must pass.

Initial service request and establishment of priority. The first stage starts with the initial service request. If a report is needed, the user sends a sample of the desired format. If a new federal regulation must be implemented, it, too, should be attached, with apppropriate user markup. Once the user submits the service request, the systems manager, or designee, decides whether the documented request is feasible. Nothing is wrong with a calm assertion that something is impossible if it is.

Fair treatment of all users requires that, aside from production emergencies, no service requests be initiated formally over the telephone.

The sequential tracking number provides measures of currency and date priority. Regular public documentation of the descriptive title, extended detail and allocated workdays, including testing, helps focus attention on the agreed task and its cost.

Priority screening can be done within the systems department. Even if a request goes on the back burner, users will not feel totally ignored because the sequential number and title are distributed to all users every week.

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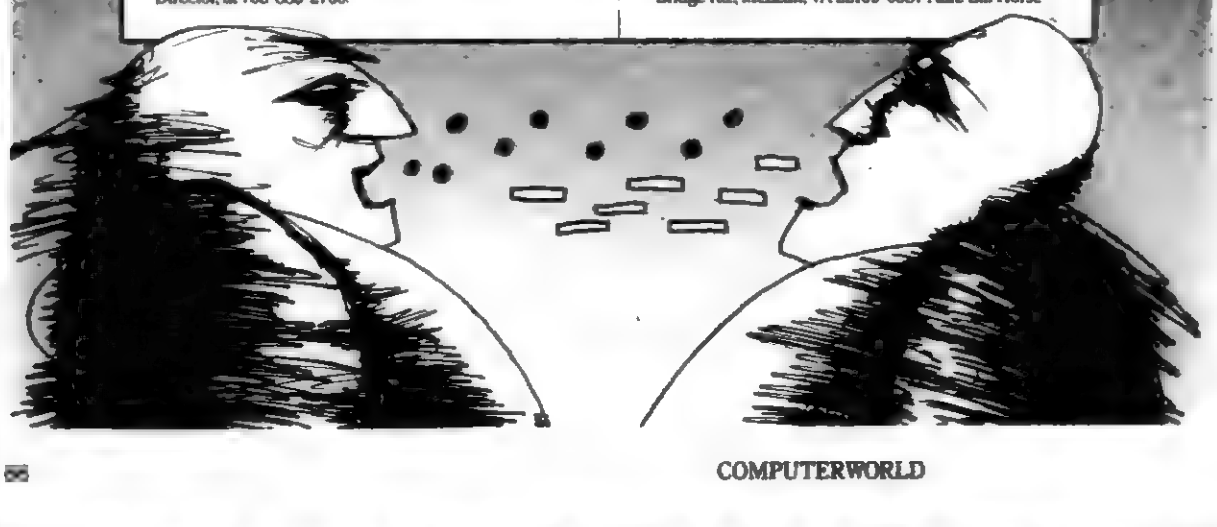

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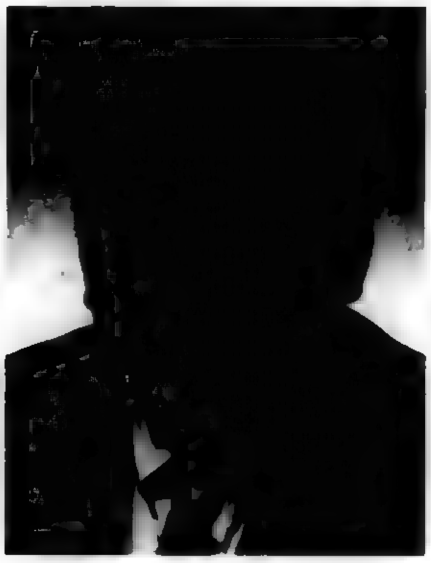

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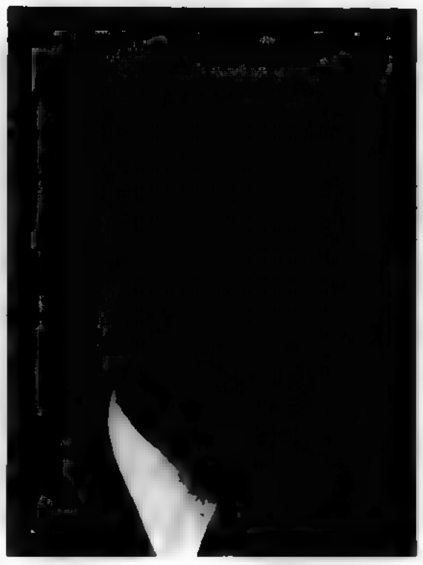

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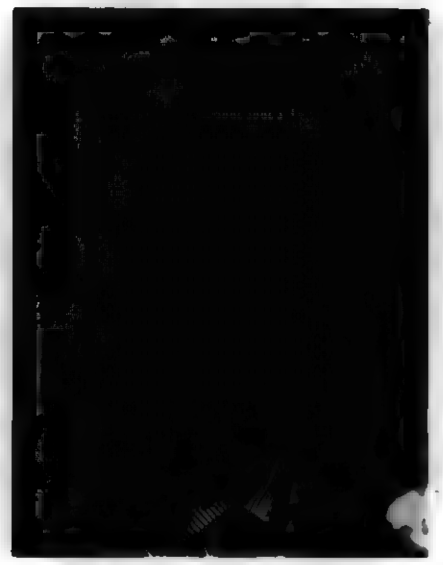
Volvo North America Corporation



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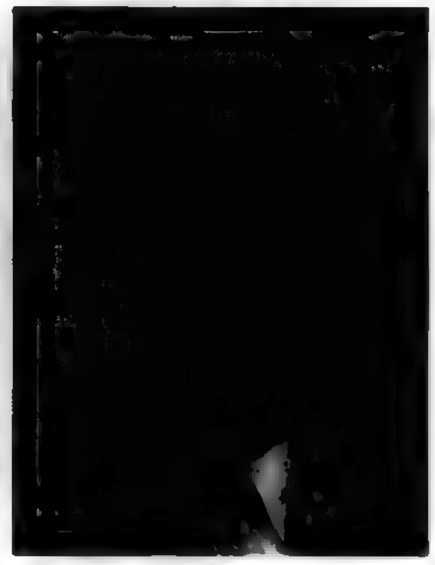

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Design and time estimate. After preliminary setting of priorities, a functional design and estimated time frame for the request is established. Ballpark figures for completion — for example, six to 18 months — are recommended for large projects.

Such a project could itself require at least a day or two to estimate. This time should not be expended if users do not confirm that the request warrants immediate estimation. The time is better spent producing a one-time report of moderate importance rather than a cost estimate for an unsponsored project.

Through a weekly meeting or a central coordinator, users now establish the priority of their requests, listing which should start next. It is important that the attendant systems manager concentrate on giving honest technical advice and not intrude on lively discussions of priorities among the users.

"I make sure not to be the bad guy when I attend the steering committee meeting," notes James Ripplinger, director of MIS for Grenada Mailrite Services, Inc. in Richmond, B.C.

"I go in there carrying my list of proposed work items with their anticipated costs and benefits to the company," he explains. "Representatives of the various divisions then decide collectively what is best for the company. Nobody feels there is any favoritism because — whether or not they like it — they understand why efforts are being directed toward those specific tasks."

Detailed design and user test plan. Next, the detailed design and the user test plan for each user-approved project are developed hand in hand.

After programming and unit/integration testing, users meet to work to improve upon the original user test plan. Whether in an ad hoc or regular meeting, representatives of departments that affect each other consider the change. Accounting, computer operations, programming and various other functional departments of the business pick through and upgrade the test plan.

Collectively, this group may well enhance the plan by raising issues that the person making the original request had not thought about. The group's varied viewpoints can help reveal different dangers and benefits.

STANDARDS' aim is not to force programmers into lockstep but to make products routine so that they can be maintained by a trained technician.

Helpful standards

The user work requests and scheduling discussed so far require interaction with external departments. But within the systems department itself, steps must be taken to ensure quality and maintainability of the software produced.

Standards for coding and internal program documentation are important for maintainability. The aim is not to force programmers into a lockstep but rather to make each programmer's products look and perform in a manner sufficiently routine that they can be maintained by another trained technician.

This task is a bit more difficult to do in maintenance than in development. In the latter, the bulk of the application software has already been written. It may be undocumented, styled poorly or tailored to yesteryear's machine limitations and technology. And even if the logic flow were clear originally, it may have become concealed by years of successive patching.

In this case, some rules have special merit.

For instance, simply requiring the placement of a four-column modification log — date, programmer, change, purpose — at the top of each old program that has been modified means that the next programmer or other investigator knows something about the least seasoned parts of the code.

Another documentation standard — requiring an average of one comment line per procedure

Continued on page 72

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Use the right language to boost DP's perception of maintenance

BY MARK DUNCAN

Terminology that has always been biased toward development must be extended and balanced to address maintenance.

This is easy to accomplish, for in most cases, a simple word change from "development" to "maintenance" offers a convenient technique for defining the latter in the same terms as the former. For example, a development life cycle is a typical component of DP departments. But how many departments have maintenance life cycles defined with the same degree of formality and structure?

Four features characteristic of development life cycles might appear in an equivalent maintenance life cycle — structure, scope, teamwork and tools.

Structure. Generally, development is rigorously structured. It proceeds in phases, and formal sign-offs are required.

Maintenance can take on this structure, too, via a simple checklist that defines maintenance tasks as corrective, adaptive or perfective. Each type of maintenance should have specific approaches to follow, deliverables to be produced and so on.

Scope. Development work is always defined as a project. It begins with the first phase and progresses in orderly fashion through to implementation.

Maintenance work should also be defined as a project; it must be given a definite restarting point in the development cycle, and its scope should be clearly defined.

Teamwork. Development work is generally carried out in teams. If special skills are needed, they are acquired by hiring or training. A team engenders supportiveness and sharing; roles and responsibilities are defined and documented.

Maintenance programmers should also have the luxury of a support team. Designated personnel should be available to offer additional help to maintenance programmers. These support personnel must be given appropriate training in the applications they are to support.

Tools. The development process is generally supported by the latest software tools. But maintenance needs software tools specifically designed to facilitate maintenance work, instead of programmers having to make do with those tools that were purchased with development in mind.

Listed below are some software aids that might have been purchased for development. Included are questions relating to the software tools' usefulness in a maintenance context — questions that might not be part of typical selection criteria.

- Interactive debugging aids. In a development context, these tools enable source code to be "stepped through" in a controlled fashion, giving users the ability to alter data values and logic paths dynamically. For maintenance purposes, does the tool also offer help on potential causes of program abends? The maintenance effort can be greatly reduced if abends are diagnosed comprehensively and remedies are suggested.
- Program code generators. These packages generate structured code from system design parameters. In terms of maintenance, can the tool also restructure existing code? As old, unstructured code is maintained, it should be cleaned up and modernized whenever the opportunity presents itself.
- Flowchart generators. These tools generate graphic representations of the system from specifications or from source code. Can they also generate system flowcharts from job control language for maintenance?

Job control language is very susceptible to changes that go undocumented. A job that originally ran one program and produced one report may now run several sequence-dependent programs, update several data bases and initiate other jobs — and none of this may be documented. The maintenance programmer will need to know the scope of the whole job, not just the program containing the error.

- Source library managers. These packages offer control, security and efficient storage for source code as well as easy, standardized access.

For maintenance, does the tool offer a built-in utility for comparing two or more source modules? Often, maintenance solutions require knowledge of the infinitesimal differences between modules, which can only be revealed by automatic, rather than visual, comparison.

Tools for software maintenance must begin to command as much budget attention as development tools. Almost instinctively, MIS departments search for ways of streamlining their development processes with software automation tools.

But before grabbing for the latest and greatest package that is going to solve all your development problems, try modifying your selection criteria to consider maintenance activities as well. If the software tool still sounds suitable, you are probably getting your money's worth.

Duncan is a systems analyst in the quality assurance section of a major Dallas bank.

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Maintenance

CONTINUED FROM PAGE 70

KEEPING coders and the on-line system at peak availability involves human relations at least as much as technical effort. In negotiations, the confirming memo can be just as important as the deal struck, for without it, an agreement can evaporate.

line, not rigidly interleaved — encourages coders to leave blank comment lines that guide the eye and to write boxed descriptions at the start of major processes.

A good practice is to hold one or more sessions in which the programming staff consider a set of proposed standards in a meeting chaired by the systems manager. The staff is given the opportunity to modify, reword, add or delete standards subject to the manager's approval.

Such a process gets the programmers working as a group under management supervision, demonstrates to junior staff that certain good practices are industry-wide and avoids having the staff members perceive the standards as something meaningless that management has thrust upon them.

David Weeks, currently a systems analyst with Borg Warner Chemicals, Inc. in Parkersburg, W. Va., recalls a situation when half the programmers liked the standards but half did not.

"Nine years ago, I was a programmer at Columbus and Southern Ohio Co. in Columbus, Ohio. We had a senior programmer who brought with him the idea of structured code.

"We at Columbus and Southern Ohio hadn't heard of it up to that point," Weeks recalls. "Management liked it, so we were trained on it. We development programmers liked it and wrote all the new programs this way.

"But all the maintenance programmers didn't like it because it makes you think differently; for instance you can't branch all over and produce spaghetti code. After a year of working with it, though, they grew to like it, too, because it was much easier to maintain."

Testing

In the simplest installations, enhancements are programmed in a development environment or system and are subsequently migrated to the production environment. Placing an additional two or three distinct environments along this migration path may be preferable. Each successive library — or complete environment, including data and logon IDs — presumably maintains tighter control than the one preceding. Once a program is found to be satisfactory at a certain level of security, moving it onward protects it from inadvertent harm at that or a looser level of protection.

Once the programmer has unit-tested the code in development, an independent systems testing function can perform integration testing to ensure that individual transactions track properly through preexisting programs. This subclass of testing need not involve users directly.

In the next physically distinct environment, the assurance testing function performs individual transaction testing from the user's viewpoint, concentrating not so much on program flow as on confirming the correct regression of those transactions through the broader system. Systems testing staff may assist here, but the program's authors are strictly excluded.

Finally, acceptance testing involves users alone, possibly enhancing the assurance testing data but closely paralleling the real business situation in which systems assistance routinely does not take place. While some batch simulation packages do exist for building canned stress-testing data files, it is often as economical and more effective to bring in the usual data entry operators to perform a live parallel test if network volume is an issue.

The human element

Keeping coders and the on-line system at peak availability involves human relations at least as much as technical effort. In negotiations with other departments, the official confirming memo can be just as important as the initial deal struck, for without it, a good agreement can evaporate.

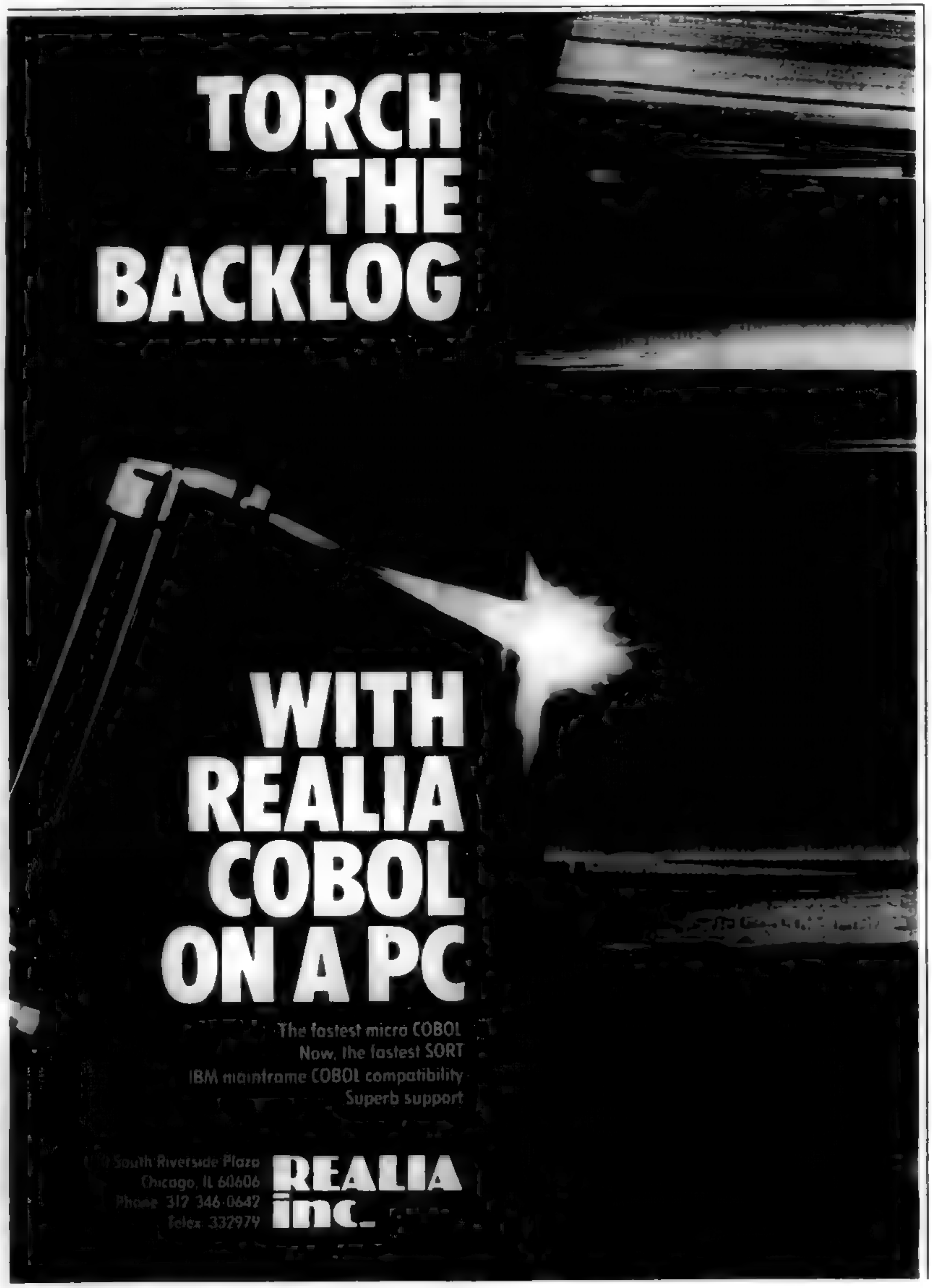
Within and outside the systems department, issues meetings ascertain status and identify open issues. No deal or resolution is expected in these meetings, and the manager has to control the urge to reach such a conclusion.

In fact, unbiased observation and controlled communication are just as relevant as a resolution in dealing with staff supervision and system crises.

A standard requirement made by the corporate auditing department is that a proven backup site and disaster plan be established for physical plant mishaps.

This idea may also be valid for staff members: Individuals who are reputed to be indispensable should be made replaceable as soon as possible.

In a major New York financial services conglomerate, a 3,000-module real-time sales support system had been partly built up from the original minicomputer. Many of the batch reports now ran on IBM mainframes, and a mid-level outside consulting programmer had been trained in



User support: Beyond the technical fix

BY BERNIE NACHSHEN

Aside from basic problem-tracking systems, a DP manager needs applications that show how well his technical support staff is performing. An inexpensive, personal computer-based system can uncover problems surrounding how end users and technical support staff are working together and can answer questions such as the following:

- Why is it taking an average of three days to resolve severe problems?
- Although it appears as if end users are reporting different problems, do the problems actually all relate to a single problem?
- Why is technical support swamped with so many general inquiries about facts that end users should already know?
- How many problems and inquiries are still "open" — no one has resolved the problem or no one has gotten back to the end user — and why?

Recognition of these problems can lead to the installation of corporate programs and resources that can result in a more efficient and effective MIS technical support operation.

To set up such a system, DP managers should develop a form that can be displayed on the screen, ready for data input (see chart above). Most field meanings are obvious, but some are not:

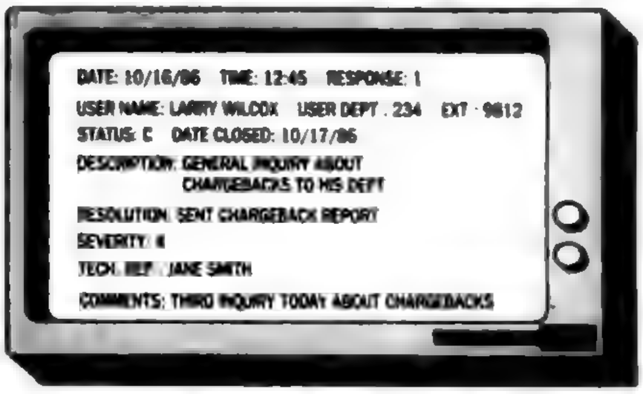
Status. This is either an "O" or a "C," indicating the problem or inquiry is open — a response is pending — or closed.

Date Closed. Compare this date with the open date to see how long MIS took to get back to the end user with the resolution. This calculation determines the value for the Response field.

Description. This is a problem or inquiry description using a key word or words, such as "logon," "password" or "abend." Staff members can search this field to focus on specific problems or identify trends.

Severity. In this case, the range goes from 1 to 4, with 1 signifying a severe problem — "My CICS application blew up" — and 4 representing a general inquiry — "Can I have a new password?"

Sample technical support screen



DATE: 10/16/86 TIME: 12:45 RESPONSE: 1

USER NAME: LARRY WILCOX USER DEPT . 234 EXT · 9812

STATUS: C DATE CLOSED: 10/17/86

DESCRIPTION: GENERAL INQUIRY ABOUT CHARGEBACKS TO HIS DEPT

RESOLUTION: SENT CHARGEBACK REPORT

SEVERITY: 4

TECH. REP.: JANE SMITH

COMMENTS: THIRD INQUIRY TODAY ABOUT CHARGEBACKS

CW CHART

If technical support personnel *create a PC data base like this one when support requests come in, then support managers can gauge the success of their end-user support using hard numbers. They can also use the data in report form to justify additional resources or reallocation of staff.*

Possible applications

If MIS technical support receives and records 20 calls a day, by the end of the month the staff has accumulated a significant data base. In report form, this information can justify additional resources for technical support or perhaps initiate a training program that can reduce technical support's burden.

A number of possible applications are available for a technical support tracking system. One important set of statistics, for instance, is how many end-user inquiries were handled in a month, how many were closed and how many are still open. The ones that are still open may indicate that a number of end users are steaming because no one has gotten back to them.

Using some simple data base management features, all Os or Cs in the Status field of all records would be counted for each department serviced and a table produced. For example, a table in which status is matrixed against user departments (see chart below) clearly indicates that Department 460 probably feels the technical support staff provides good service.

On the other hand, I would not want to be the person calling Department 817 to ask how the employees felt about technical support. Also, someone should call the manager of Department 288 and ask if he knows why so many calls to technical support are being made and if there is a way to cut them down.

The information in the Status field can be further broken down into each technical support representative (see chart below), clearly showing the following:

- Cathy Jones deserves a merit award.
- Someone should have a chat with Jack Haley.
- Jane Smith may be somewhat overworked.
- Work distribution among the technical support team seems to be uneven.

Is technical support getting the job done?

Summary by user department

Department	Status		
	Closed	Open	All
[illegible]	[illegible]	[illegible]	[illegible]
Dept. 456	6	8	14
Dept. 457	3	2	5
Dept. 458	6	2	8
Dept. 459	0	1	1
[illegible]	[illegible]	[illegible]	[illegible]
Dept. 477	0	1	1
[illegible]	[illegible]	[illegible]	[illegible]
Total	35	29	64

Summary by technical support representative

Representative	Status		
	Closed	Open	All
Bernie Jackson	7	9	16
Cathy Jones	20	0	20
[illegible]	[illegible]	[illegible]	[illegible]
Bob Trimble	0	1	1
Mary Brown	9	4	13
[illegible]	[illegible]	[illegible]	[illegible]
Lee Simpson	6	0	6
Ron Baker	0	1	1
Total	67	33	100

Monthly summaries *can signal overloads — such as 20 requests from Dept. 288 — and performance problems, such as all Jack Haley's tasks being left "open" or unresolved.*

With a bit of thought, key words could be used to further illuminate problems. For example, searching for the key word "password" in the description field produces a listing of records that meet this condition. These records reveal that end users keep forgetting their passwords, resulting in many unnecessary calls to technical support. Solutions to this can be passed on to end-user management.

The same could be done for "chargeback," where end users seem to have lots of questions about MIS chargeback costs or policies. Perhaps a memo to management or a clearer chargeback report is appropriate here.

Underlying factors

The MIS technical support role is usually driven by "fighting fires" and fixing the problem. Keeping the system up and allowing end users to do their jobs is MIS's No. 1 priority.

However, with the enormous power and simplicity of the PC, MIS management can look beyond the technical fix and analyze the underlying factors that drive technical support's performance.

Easily produced graphics, tables and record listings that profile performance and problem recognition can justify additional technical support resources, put into place end-user training programs that can reduce the number of unnecessary calls and provide better response to your end users — the paying customers. Use your imagination. The tools are all there.

Nachshen is head of BN Associates in Cupertino, Calif., a consulting firm specializing in customer support, systems analysis and technical training.

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batch IBM JCL.

As the designated JCL expert, the programmer frequently exacerbated the bottleneck situation by stating that he worked for the consulting house, not the company, and would not answer inquiries except on days that his firm's account representative appeared and authorized doing [illegible]

Noticing this, the new maintenance manager designated an enthusiastic trainee as resident expert.

With some coaching, this trainee absorbed the material and within two weeks truly was the corporate JCL leader.

Eventually all employees learned JCL, and the supposedly key consultant, who subsequently failed a concealed examination in his area of expertise, was released from his job.

Sometimes, a manager may hesitate to elevate — or demote — a staff member because of the person's current image.

But staff perceptions of each other can be changed, even reversed, as a result of visible management support and the showcasing of the individual's capabilities.

On the programming team just mentioned, a trainee manager mistakenly held in low regard by peers because of her meager skills on the minicomputer was considered a "good person to know" after she was asked to conduct seminars on an incoming IBM technology.

A real-time system that remains volatile long after installation need not have been poorly designed or poorly programmed. The constant pressure to install features may instead reflect a changing business product mix or a rapidly changing regulatory environment.

Testing real-time systems

User testing on a volatile real-time system requires tighter user coordination than on batch or even on a more stable real-time system.

A batch system — or the testing of distinct batch changes — could conceivably be done anytime the machine was available, as long as users were provided with comparison reports generated by the old programs against equivalent data.

Even a fairly static real-time system is easier to test because changes may be limited to one or two types of processing.

Testing changes to a volatile real-time system may involve such interaction issues as whether to implement one change on schedule when others tested in interaction with that change have failed.

Volatile real-time systems present unique scheduling problems in testing modifications and enhancements.

A planning roundtable of users is necessary because the system intermingles the effects of service requests from unrelated departments.

For example, placing this meeting on the first Monday of a two-week cycle facilitates scheduling of Day 1 on-line entry — with its follow-up batch — in the first week and Day 2 processing in time for the change to go live on the second Friday.

Rewards and crises

Maintenance/enhancement efforts depend on good upward communication. This is encouraged by showing that rewards go to those staff members who give high priority to the unit's announced needs and policies, even for small things like hand delivering the new report to a user so a human collects the "thank you" in person.

Otherwise, some individuals

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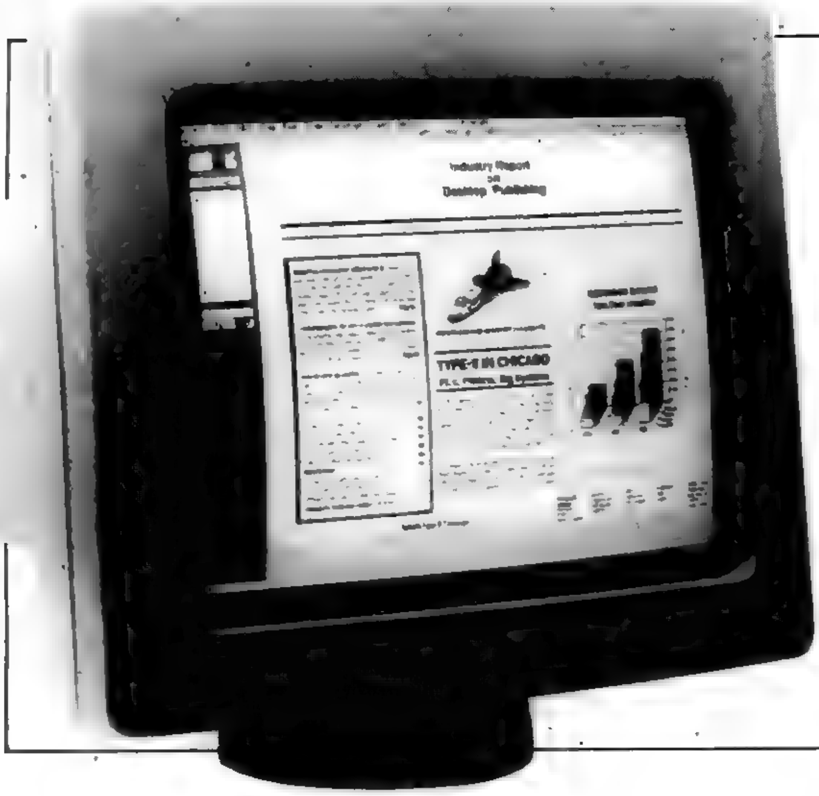

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may opt for different rewards, such as the feeling of importance that they may derive from a departmental crisis.

A challenge to management is to detect that staff member who is eager to announce both inside and outside the systems department that a crisis exists and who fellow workers consider to be "always calm during an emergency and knows just what to do."

The manager must resist the temptation to buckle before what may be an invented emergency: Some crises aren't.

Handling the crisis

Of course, crises do occur. The real-time system crashes; a key player on the team is hospitalized; the month-end profit-and-loss statement is found to be drastically wrong only two days after its electronic handoff; a routine mishap in the batch cycle cascades into round-the-clock data entry and the concomitant need for staff coverage.

After preliminary symptoms are gathered, the management team and relevant experts convene until all conceivable causes and actions have been listed and that list is reduced to a manageable size.

Specific staff members are made responsible for resolving the crisis, and the rest are sent back to their regular tasks but remain available to that crisis team.

A single contact point for users should be established, but all systems staff should be kept abreast of the problem's current status: When can the staff resume regular operations? How late will the reports be? Which reports will initially be corrupt? What cleanup work will the user have to do? The important point here is to satisfy the user's need to know.

Minimize disappointments

Maintenance and enhancement programming is a greater challenge to manage than new development.

Clearly, administered procedures minimize the disappointments in task definition, scheduling, standards and continuity. The familiar service request form can evolve within a simple automated MIS system to produce a variety of helpful reports: Next-to-Program, Recently Completed, Soon-to-Go-Live, Overall Requests, Requests by Department.

Where sufficient detail is available, the appearance of each item becomes an unambiguous, documented service contract.

Good instructions guide users in preparing a more definitive initial request, and an automatically produced test plan form gets users to supply an additional level of task definition before any systems resources are committed.

Automated programming specification forms deter serious omissions and help both users and the software manager to understand the extent of the task. Accurate costing is essential in establishing priorities for tasks that are competing for limited systems staff man hours.

> GOOD instructions guide users in preparing a more definitive initial request, and an automatically produced test plan form gets users to supply an additional level of task definition before any systems resources are committed.

Software documentation begins with placing a modification log in old programs as they are changed. In addition, new programs should implement full standard documentation and techniques.

Testing is standardized by securing the source code as it succeeds in progressively more realistic environments.

The scheduling of new programming is done primarily at a weekly users meeting, at which the maintenance manager serves primarily as a technical and feasibility advisor.

Continuity of system accessibility is increased by Help screens, on-line run books, automated source-code scanners and a definite approach to crisis management.

Continuity of collective staff expertise rests on cross-training, regular meetings, a clear chain of command and the elevation of those who help the organization.

The controls established by an automated management system encourage analysts, programmers and users alike to deal with the turbulence of new development.

Good controls also help these professionals think things through in a more organized fashion than they might otherwise.

Finally, a well-managed project engenders mutual respect between staff members and users — a necessity for its successful completion.

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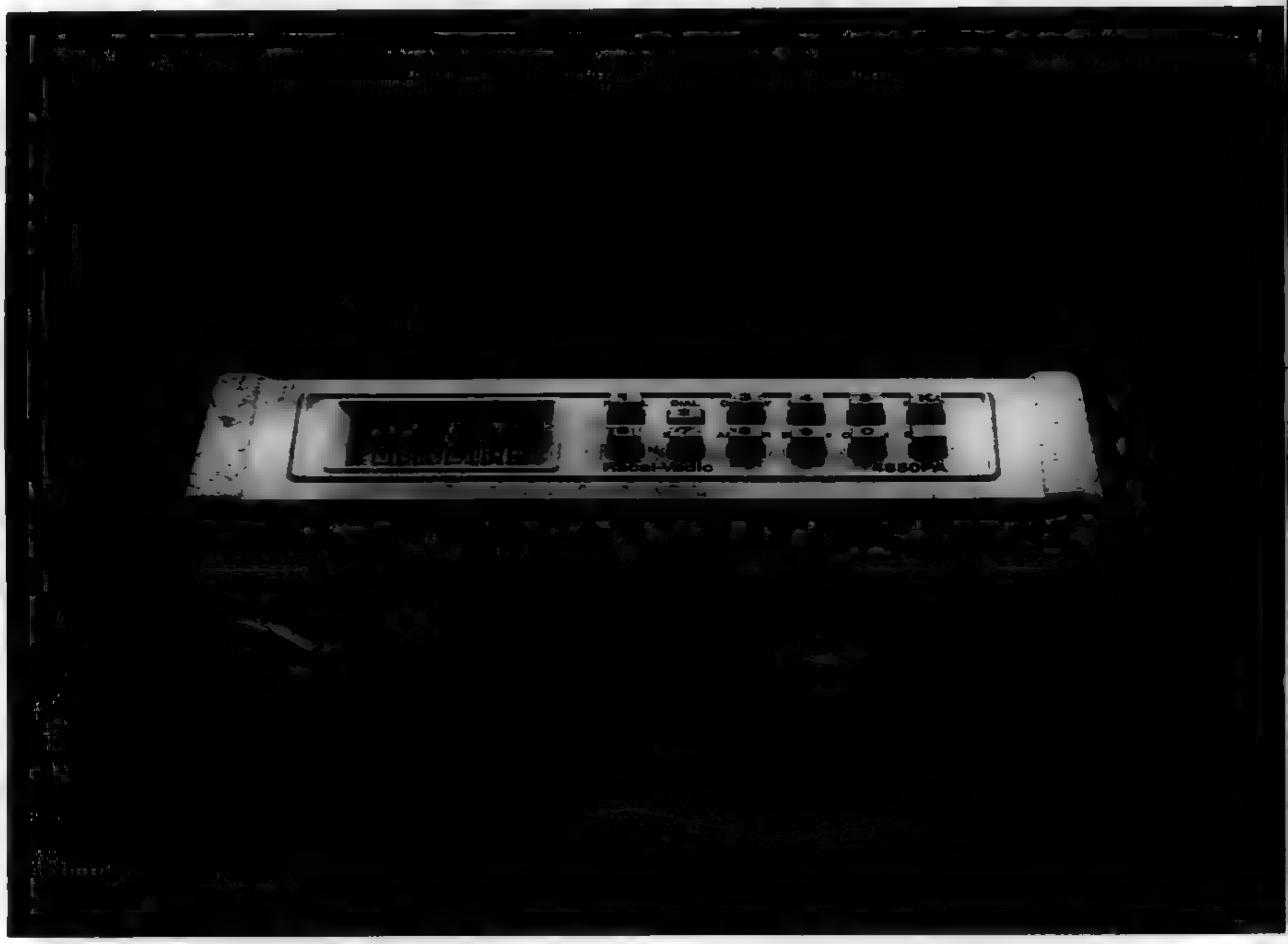

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EXECUTIVE REPORT

USERS GROUPS

The users group explosion: Do they really have influence?

BY GLENN RIFKIN

In the late 1970s, IBM decided that it no longer wanted to support VM as a system control program. It would turn its attention instead to MVS and other operating systems. News of the decision spread quickly through the user community, and both Share and Guide, the IBM large-system users groups, mobilized. Swayed in particular by several convincing presentations by Share members, IBM did something it rarely does: It changed its mind.

According to Share President Mike Armstrong, the rescue of VM from certain death is the users group's most visible success story in recent years. IBM, he points out, decided not only to save VM but, based on the enthusiastic user support, has since promoted it heavily. "As far as I know, it is now IBM's fastest growing operating system," Armstrong says.

Last year, a beleaguered Honeywell Information Systems pulled the plug on its longtime operating system, Multics. The Honeywell Large Systems Users Association (HLSUA) jumped in and formed task forces to try to dissuade Honeywell from its decision. According to HLSUA President Stan Lauck, it was the first time Honeywell had simply discontinued a product line without offering a migration path to those users.

The issue was a thorny one for Honeywell and its users group. Lauck points out that most HLSUA members — the great percentage of whom are GCOS users anyway — understood that Honeywell was making a business decision. Multics was losing money, and no large company was willing to step forward and buy into a salvation plan.

Nonetheless, Multics had a fiercely loyal user base, and those users were stunned and angry. "It became as much an emotional issue as a business issue," Lauck says. "Multics is not just an operating system. It's a culture."

ISTVAN BANYAI

INSIDE

Users groups: A sampling
PAGE 78

The Boston Computer Society turns 10
PAGE 80

Internal groups: Past their prime?
PAGE 84

Honeywell, Inc., which later in the year announced that it was selling its information systems business to NEC Corp. and Compagnie des Machines Bull, was clearly not changing its mind on Multics. HLSUA is now concentrating on finding a migration path for Multics users. "We represented them as best we could," Lauck insists. "We've done everything we can to help find them a migration path."

The above illustrations are not meant to compare Share with HLSUA. Each is a viable and active users group. The two stories do, however, point out the legacy of users groups in general — that is, you win some, you lose some.

Since 1955 when Share was founded as the first computer users group, similar groups have proliferated throughout the information systems industry. Find a product, and you will undoubtedly find a users group attached to it. Find a large computer vendor, and you may find two or three users groups drawn to the company like moths to a flame.

And nowadays, neither a product nor a vendor is even necessary. Find a proposed industry standard such as Manufacturing Automation Protocol (MAP), Technical Office Protocol (TOP) or Unix, and you will likely find a vociferous users group pushing hard behind it.

Users groups are the computer industry's political action committees, but they also serve as institutes of higher learning and as social clubs. While virtually every users group has its own diverse set of rules, parameters and relationships with the vendors — Share and Guide accept only corporate members with certain IBM mainframe installations — the common aim is twofold: to influence the vendor and to share knowledge.

"My main reasons for attending Guide is to influence IBM and to gain information from other attendees," says a payment delivery systems manager at an Arizona bank who asked not to be identified. "We've used those equally. Three years ago, our main thrust was to influence and enhance IBM's check processing system, which we did through Guide. And now, we're into sharing information — passing codes back and forth, developing new products and learning what directions others are taking."

"The user community is always doing more than what the vendors can see," adds Phillip Thordarson, senior traffic engineer for the city of Seattle's engineering department and a member of the North American Data General Users Group (NADGUG). "The users group helps me stay abreast of what is going on, find good contacts and lets me resolve problems by bouncing ideas off others," he says.

It is not unusual to find enthusiastic reviews of users group experiences from both leaders and rank-and-file members. The commitment of time and energy alone to a users group bespeaks a member's point of view.

Yet, these members — whether from totally independent groups like Share or Common, an IBM small-systems users group, or vendor-supported groups like NADGUG or Digital

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Rifkin is a senior editor for *Computerworld.*

Great moments in users groups history

LATE 1970s — About to discontinue its VM operating system, IBM is persuaded by the Share and Guide users groups that this decision is unwise and changes its mind. Today, VM is arguably IBM's most popular operating system.

1983 — Despite a wide and loyal following for the Decsystem-10 and 20 and the heated protests of its Digital Equipment Computer Users Society users group, DEC decides for business reasons to discontinue development of that product line. Ironically, current users group President Clair Goldsmith ordered two Decsystem-20s weeks before the announcement.

1983 — Relying on input from resolutions by the Common users group and its 4300 corporate members, IBM introduces the System/36 mid-range machine as a follow-up to the System/34.

1984 — Based on input from its Interact User Group, MSA, Inc. incorporated a Human Resources Taxing Subsystem into its Human Resources Package that allowed nontechnical people to use the package without enlisting the aid of a programmer.

1984 — Because of users group pressure, IBM formally releases the Professional Office System, a product that had previously been restricted to internal IBM use.

1985 — DG users, frustrated while installing software on weekends and at night, use the influence of their North American Data General Users Group to convince the company to install a 24-hour hot line.

1986 — Honeywell, despite the major effort by its Honeywell Large Systems User Association, dropped its longtime operating system Multics, leaving a small but loyal group of customers with no migration path.

1987 — Frustrated with Wang's internal administrative problems, the International Society of Wang Users will set up the LINCS toll-free line to help customers with billing, maintenance and other administrative problems.

CW CHART

User influence

FROM PREVIOUS PAGE

Equipment Computer Users Society (DECUS) — while tending to extol the virtues of users group participation, are unable to pinpoint specific instances of users group influence. A common refrain among members goes something like this: "We can't say for sure that the change was due to our recommendations, but we know the vendors listened."

It is impossible to gauge just how much vendors do listen, especially in recent years when outside market pressures have guided product development and direction more strongly than any other factor. But they do listen.

IBM said through a spokesman that "Share, Guide and Common have the objective of influencing the future design and capability of IBM products. They also provide many valuable suggestions to us to assist us in improving our current product line.

"IBM has made many improvements in our products as a result of our dialogue with the user groups," he said. "Their 'requirements' process is quite helpful to us in focusing our product development resources on specific actions we can take to improve customer satisfaction. It's simply good business judgment to listen to your customers and try to accommodate their suggestions."

Digital Equipment Corp. puts heavy emphasis on the 50,000-member DECUS users group. The company provides the group with a 40-person staff and office space in its Marlboro, Mass., facility. In addition, a DEC employee sits on the DECUS board. That board member, Peter Jancourtz, says he believes that the users group ensures good and useful two-way communication between users and DEC. DEC goes as far as providing preannouncement product and strategy information to DECUS steering committees on a nondisclosure basis.

"It's important to let them understand what the environment might be like in 12 months if they are planning an agenda for a national symposium," Jancourtz explains. "Personal integrity and trust is demanded, and we are blessed with exceptionally good people to work with at DECUS."

DEC's product engineers are working on a series of projects with DECUS members in the area of product development. "We need to understand where users think they are going," Jancourtz says. He acknowledges, however, that DEC does not turn just to DECUS for ideas. "Is that the only input we use? No. But it is of great value in planning from the user perspective," Jancourtz says.

Most vendors agree that users groups provide valuable input, but it is not the only input.

Users groups do have influence. It is the users, after all, who are spending money and

Continued on page 82

A sampling of users groups: Memberships for every interest

Why do users groups get started? Most form because a number of users of one vendor's products feel compelled to get together and talk about common problems. The following list provides a sampling of the largest such users groups.

Guide. Formed in December 1956 by representatives of 44 IBM 702 and 705 installations, Guide remains an organization dedicated to large-scale users of IBM data processing equipment.

The minimum hardware configuration required for Guide membership is the IBM 4300 processor or IBM 3030 series and 3080 series processors. The group focuses on IBM's MVS, VM and VSE operating systems.

Today, despite a flattening of attendance at its major meetings, Guide has 2,850 member corporations.

To attract membership, the users group offers symposia on a wide range of DP-related topics, including technical and managerial issues.

Guide, like most users groups, has a formal process for presenting ideas and suggestions to IBM. For an idea to become a so-called Guide "requirement," a member must bring that idea to the Guide project most closely tied to that technical area and convince the members that the suggestion is worthwhile to pursue.

That done, a vote is taken at the next level of the organization to determine whether it gets formally presented to IBM as a requirement. IBM has guaranteed that it will respond to any Guide requirement within two Guide meetings.

According to John Nack, Guide president, an idea that does not get the required number of votes can be lobbied for the next time around. In addition, IBM representatives attend virtually every project meeting at Guide and are likely to respond to suggestions whether they become formal requirements or not.

The users group is working hard to bring together its international forces and to forge closer ties with other users groups.

Share. Share was the first organized users group in the computer industry and held its first meeting in Santa Monica, Calif., in August 1955. Today, it boasts 2,300 corporate members and attracts close to 5,000 attendees to its semiannual meetings.

Like Guide, membership in Share is contingent on IBM mainframe installation; in Share's case, the configuration must be the 3031 or higher or 4341 or higher, and the operating system must be MVS or VM.

According to Share President Mike Armstrong, the group started out primarily as a scientific/engineering organization and still retains that flavor. Conversely, Guide began as a commercial organization and continues in that mode today.

"Share is much more entrepreneurial and focuses on technology and the way things are done. Guide is more pragmatic and doesn't focus as much on the underlying technology," Armstrong says.

Although the two groups work jointly on certain projects, efforts to merge have failed. "Each group realizes that it does a pretty good job at what it's good at, but that they are different enough so that they wouldn't be particularly effective as one big organization," Armstrong says.

Corporate members very often belong to both Guide and Share, but the companies tend not to send the same people to both users groups meetings. A minimum of one meeting must be attended each year to retain membership in Share.

> "SHARE is more entrepreneurial and focuses on technology. Guide is more pragmatic and doesn't focus as much on the underlying technology."
>
> MIKE ARMSTRONG
> SHARE

Share surveys its members annually on the hot issues of the day. The 1986 poll of executive members showed that the No. 1 concern was security, followed by cooperative processing, office systems and end-user computing.

Common. Founded in 1960 as the users group for smaller IBM configurations than those required for membership in Share and Guide, Common now claims to be the world's largest users group with 4,300 corporate members.

The organization is broken down into three divisions: applications, systems and management. Common focuses on System/36 and 38, Series/1, 4300 and the IBM Personal Computer.

Common is credited with influencing IBM to follow up the System/34 with both the System/36 and 38. Similar to Guide, Common has a resolution process to present its ideas to IBM. IBM has agreed to accept, reject or consider each resolution.

According to Robert Sutherland, Common president, the group annually submits hundreds of resolutions, which IBM reviews and distributes internally. In addition, IBM representatives are on-hand at all Common projects at the semiannual meetings.

As IBM customers begin to focus more on departmental systems such as the System/36, the mainframe groups like Guide and Share have sought closer ties with Common.

International Society of Wang Users. ISWU is an independent organization with more than 2,200 individual members in numerous local chapters throughout the country. The national organization is supported by the local chapters, according to ISWU President Bill Sturgeon. The group sponsors one annual meeting called Technotron each fall.

According to Sturgeon, Wang Laboratories, Inc. has a full-time director for users group support, who meets regularly with Chairman An Wang to express the concerns of ISWU. Wang Labs provides software to users group members as well as library and magazine support.

The vendor works closely with the users group and has representatives at all meetings and special interest group gatherings. The company provides advance product information to ISWU on a nondisclosure basis.

Sturgeon points out that Wang Labs informed the users group of its current financial problems in advance of the public announcement. He says that users group members have not expressed nervousness with the company's problems. "We get an awful lot of support from local Wang offices," Sturgeon says. "Wang representatives spend a lot of time at our meetings. We expect they'll survive."

North American Data General Users Group. NADGUG, unlike most large users groups, was started by the company itself 11 years ago. According to NADGUG President Calvin Durdin, comptroller of the Tractor and Equipment Co. in Birmingham, Ala., the group floundered until 1980 when Data General Corp. users themselves made a concerted effort to push the organization.

The group now boasts more than 2,300 individual members and continues its formal ties with DG. DG provides office space and staff as well as computer equipment for NADGUG.

The users group has its own independent board and publishes a monthly magazine called *Focus.*

According to Durdin, there was a period of tension when the users took control of the organization, but that has eased. "Both sides gave in a little," Durdin explains. "We get good support from DG. They listen to us."

NADGUG has a semiformal process for presenting suggestions to DG. Each spring, the group surveys its regional and special interest groups to assess their concerns. The advisory board takes those issues and boils them down to the top half-dozen items. The board then meets to discuss those items with senior management at DG.

Durdin points out that NADGUG has made a concerted effort to grow through membership drives and the implementation of new data base software for cleaning up membership lists. "We've grown 100% in the past 18 months," he says.

Digital Equipment Computer Users Society. DECUS was founded in 1961 and now boasts nearly 50,000 individual members worldwide.

Unlike groups like Guide, which charges $400 per corporate member, DECUS membership is free to any individual, regardless of what Digital Equipment Corp. equipment is installed.

> "WE ARE seeing the user base changing. A wider scope of people are coming to the meetings wanting our products."
>
> CLAIR GOLDSMITH
> DECUS

According to DECUS President Clair Goldsmith, the group grew out of ties with DEC's engineering department, and that bond is still strong today. "A lot of DECUS members are on a first-name basis with DEC engineers," Goldsmith says.

In fact, in the past 18 months, those ties have been more formalized, and DECUS members are now working closely with DEC engineers on certain product development efforts.

Like NADGUG, DECUS has a formal working relationship with DEC. The company provides space and staff, and a DEC employee has voting rights on the DECUS board.

"We want to promote an exchange of information, from user to user, user to DEC and DEC to user, about DEC and its products," Goldsmith declares.

Goldsmith points out that DECUS attracts 6,000 attendees to its semiannual meetings but that there is an entire base of users who attend only the local users group meetings.

DEC, Goldsmith says, uses DECUS in a number of ways for input into product development and strategy planning.

Taking a cue from the company, DECUS runs its own "woods meetings" — spawned from DEC's 1960s meetings in DEC President Ken Olsen's cabin in the New Hampshire woods — to discuss future products.

DEC's recent success in the marketplace has caused no noticeable changes in its relationship with DECUS, Goldsmith insists.

"I can't tell any difference in the way we are treated. We are still getting the people we want to come to our symposia," he says. "We are seeing the user base changing. A wider scope of people are coming to the meetings wanting our products."

Honeywell Large Systems Users Association. HLSUA is facing an uncertain future as its raison d'etre, Honeywell Information Systems, is selling out to two foreign computer giants, Paris-based Compagnie des Machines Bull and Japan's NEC Corp.

Stan Lauck, HLSUA president, says he believes that the move is a positive one for the users group.

"Honeywell, Inc. wasn't paying enough attention to the Information Systems division to make it a viable competitor," Lauck states.

"Now, the main focus will be on building hardware and software and meeting customer needs. We don't believe it will negatively affect the product line."

Nonetheless, the heyday of Honeywell seems to be over, and that is reflected in its users group. HLSUA currently has 500 corporate members, down from 600 in the late 1970s. The annual meeting draws anywhere from 800 to 1,600 attendees.

While Honeywell has supplied some services to the group, it is essentially independent of the company.

Lauck recalls that the HLSUA had strong influence with Honeywell in the late 1970s when it created a task force on data communications needs and submitted its findings to Honeywell.

"We believe we had great influence on the data communications product they offered," Lauck says.

More recently, the group did a survey to study what application software Honeywell users wanted but could not get. The results showed a sore lack of financial, business and engineering packages, needs that the company has begun to address.

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Boston Computer Society, one decade later

After emerging from the school library, Rotenberg's group captures the imagination of PC users

BY MICHAEL SULLIVAN-TRAINOR
CW STAFF

In 1977, back when personal computers were little more than toys for teenagers, an enterprising 13-year-old decided to form a club for Altair enthusiasts.

In 1987, Jonathan Rotenberg is celebrating the first decade of his club, the Boston Computer Society (BCS), which has grown into the largest and most powerful personal computer users group in the world.

With subgroups dedicated to every brand of personal computer, the society's 23,000 members wield more than $30 million worth of buying power for personal computers and related products. This kind of influence causes vendors to sit up and take notice.

For example, when IBM finally introduces its next personal computer, BCS members will likely be among the first potential users to see it, according to Gene Barlow, IBM's manager of PC users group support.

"We consider them near the top of the list, if not at the top, and we would certainly treat them appropriately. We have demonstrated some of our new systems before the society in the past, and we consider them a key player for anything we do in the future," Barlow says.

Other vendors, such as Apple Computer, Inc., occasionally call BCS President Rotenberg to discuss the features a new product might have. In fact, the first public presentations of Apple's Macintosh, Lisa and Apple IIe computers were made at BCS meetings.

> "I LOOK at the society as a place for the curious to come and learn about personal computers. You don't have to have six engineering degrees to fit in."
>
> DEL YOCAM
> APPLE COMPUTER, INC.

'Bellwether of market response'

"Users group members generally tend to be very vocal because they have a passion for the products and the industry. I see the BCS as a bellwether of the general market response to our products," says Del Yocam, Apple's chief operating officer and executive vice-president.

As a member of the BCS, Yocam attends annual meetings to present Apple products and uses the society's extensive information services to learn about new software products.

"I applaud the BCS for its independence from any one particular manufacturer. I look at the society as a place for the curious to come and learn about personal computers. You don't have to have six degrees in engineering to fit in," Yocam says.

In addition to the wide range of PCs used by its membership, the society's strength also lies in its policy of opening its doors to anyone interested in learning about computers.

The BCS counts technical enthusiasts, consumers and businessmen among its members. This diversity is another attraction for the vendors.

Debuts happen here

"Most of the significant personal computer products introduced in the last five years have had their first public showing here," Rotenberg says.

Among these have been Commodore Computer Corp.'s Amiga and Lotus Development Corp.'s Human Access Language. In most cases, these introductions have benefited the vendors by helping them spread the word about new products.But there have also been "some famous mess-ups," Rotenberg says.

"Our meetings are covered by the business and trade press and industry analysts," he explains. "So it's very important that a company's presentation be successful. But when Coleco Corp. introduced its Adam home computer, the word processing program wasn't finished, and the product just didn't work properly. After the meeting, a scathing article appeared in *The Wall Street Journal*, criticizing it."

Product introductions at the general meetings often rival trade show appearances by major vendors. For example, Apple, with Steve Jobs as the celebrity master of ceremonies, spent more than $60,000 on the multimedia presentation of the Macintosh in 1984.

However, unlike trade shows, the BCS meetings are governed by rules requesting vendors to focus on the attributes of a new product rather than on promoting the company. Company logos are not allowed to be posted, and no actual selling is permitted.

Half of the typical BCS meeting is a question-and-answer session directed by the members. Because anyone in atten-

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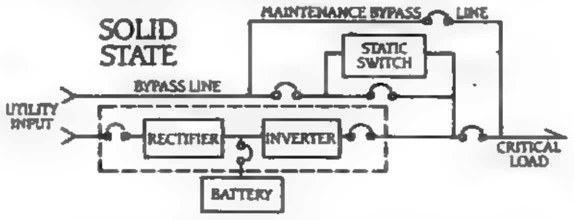

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Stanford's Edward Feigenbaum (l) and author George Gilder at a BCS meeting.

dance can direct questions to the vendor from the floor, the session more closely resembles a town meeting than a product introduction.

"Often when a product is shown to BCS members, it has not yet been released, and the vendors are making the last changes to it. The manufacturer tends to listen very carefully to the feedback he receives," Rotenberg says.

Exercises influence

Rotenberg also says that the BCS has played a role in persuading vendors to remove copy protection from software. "That's a message that was pretty clearly communicated from our members to the manufacturers," he says.

Rotenberg attributes the BCS's influence to the combined buying power of its members and the fact that it fills a gap in the PC market by providing information and services to users. "There's more economic clout within the membership of the BCS in terms of personal computer purchases than any other affinity group in the world," Rotenberg says.

"There's also nothing else like the BCS as a forum for getting the industry together with consumers," he adds. "Most of the other users groups tend to be focused on specific technical problems and not on major new technology and products. In our case, the special interest groups within the society are focused on specific technical or educational needs. This allows the general meeting to deal with broader issues and new product developments."

The BCS hosts more than 1,000 meetings annually in the Northeast, each dealing with a different subject. Meetings range from detailed special interest group sessions to general meetings attended by more than 500 members. More than 1,000 are expected to attend the 10th anniversary celebrations this year.

Humble beginnings

From its humble beginnings in a school library, the society has risen to a suite of offices in Boston's Government Center and has chapters in 50 states and 40 foreign countries. The BCS is operated by nine paid staff members and 500 volunteers.

Rotenberg still stands firmly behind a principle developed early in the society's history: "We don't pay for anything." Everything in the BCS offices has been donated to the society, according to Rotenberg. Donations account for more than $500,000 of the society's equipment and facilities.

> "THERE'S more economic clout within the membership of the BCS in terms of personal computer purchases than any other affinity group in the world."
>
> JONATHAN ROTENBERG
> BOSTON COMPUTER SOCIETY

The BCS annual operating budget totals about $1 million, and funding comes from donations, member dues — which are $35 per year for regular members and $28 for associate members — and advertising in the organization's publications.

To celebrate its birthday, the society plans to mark the event at two general meetings and at a party in May.

The first meeting, held Jan. 28, featured a film on "The Age of Intelligent Machines," based on an upcoming exhibition at the Boston Museum of Science. A panel discussion among leaders in the artificial intelligence field was also featured. Panelists included Ray Kurzweil, chairman of Kurzweil Applied Intelligence, Inc., Edward Feigenbaum, chairman of computer science at Stanford University, and George Gilder, author of the book, *The Spirit of Enterprise*.

After presenting their views, the panelists responded to BCS members' questions, which ranged from the impact of AI on the arms race to how expert systems will be useful for home personal computer users. ●

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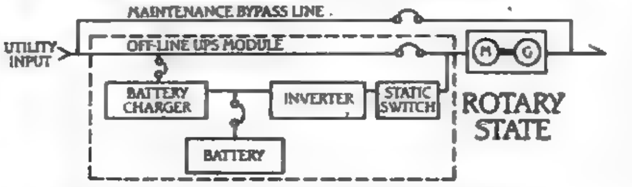

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User influence

CONTINUED FROM PAGE 78

buying products, and vendors want desperately to keep their installed base happy. Users groups not tied to one specific vendor, like the Boston Computer Society, exert influence due to their sheer size and the scope of their interest (see story page 80).

Merv Adrian, who chairs a special interest group for the New York PC Users Group, points out that the personal computer users groups are very different from mainframe groups. "The people who attend are generally there for their own personal interest," he points out. "And you tend to get a lot of senior DP people.

"In my micro-to-mainframe special interest group," he continues, "we attract some serious vendor reps and product managers who are glad to have a forum to get their message out. It's in our interest to serve their interest." Potential buyers all gathered in a single place tend to get vendors not only listening but salivating.

Never was that more clear than in the 1950s, when groups like Share and Guide formed. "If you go back to 1955 when we were organized, Share had enormous influence with IBM," Share's Armstrong says. "In fact, Share and Guide worked very closely with hardware and software designers for a long period of time. We were really the principal source of input for much of the software those machines used at the time. In reading the notes and working papers of Share meeting number one, it's phenomenal to see the level of detail they were getting into to define the IBM 704. That couldn't happen today," Armstrong says.

"Share *did* the work back then," adds Philip Dorn, former Share president and a New York-based consultant. "IBM didn't know how to program the machines. The 704 was coming down the road, and no one knew how to compile for it. The relationship was very close. I knew who was developing the product, and I knew who to call. They're not that close anymore."

Armstrong says that while Share and Guide still have influence, the nature of that influence changed dramatically after the IBM 360 was announced in the 1960s.

"We had much less direct contribution in the building of products," he explains. "The amount of influence we have in the definition of products continues to be very strong. But in terms of recommendations as to how to build products, that's gone down markedly."

However, the level of specific influence, as in the VM case, has become much more muddled and difficult to isolate. "IBM gets input on user demands from a large number of sources, and users groups are just one of them," Armstrong admits. "It's very difficult to tell how much we contributed, how much came from Guide and how much came from individual customers. I don't know."

John Nack, president of Guide, points out that recently IBM has begun to note in its product announcement letters when a product release satisfies certain Guide requirements. "Our influence seems to have increased," Nack says. "At least, it gives us some clear indication of our influence, which is something they seemed unwilling to acknowledge before."

> "OUR INFLUENCE seems to have increased. At least, it gives us some clear indication of our influence, which is something they seemed unwilling to acknowledge before."
>
> JOHN NACK
> GUIDE

IBM, in fact, recently reorganized internally so that its representatives to Guide, Share and Common now report to IBM's manager of customer relations rather than to the manager of users group relations. How this will affect the users groups' influence is still unknown. According to an IBM spokesman, "We do not expect this change to significantly change our relationships with our users groups."

What is known is that users groups tied to large vendors are experiencing a change. Large, vendor-specific users groups have seen a decline in membership growth and meeting attendance in recent years. Armstrong reports that fewer IBM staff members are attending Share meetings than in the past because of IBM's industry troubles and budget constraints.

Times have changed since the early days of computing when the industry was technology driven and vendors formed partnerships with users to develop products. Forced by market-driven pressures, vendors in the late '70s and early '80s put less stock in users group demands. Responses from the vendors were due to the influence of all customers whether they belonged to users groups or not, and large customers tended to do better dealing one-on-one with the vendor than through

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the users group. But like crew cuts and folk music, users groups may be making a comeback.

Consultant Linda O'Keeffe, director of office systems industry service for Dataquest, Inc., says she believes that the power of large-vendor users groups has dramatically increased in the past couple of years. Users groups, she says, are exerting more pressure today and are using buying power to back their demands. The change, she says, is due to the influence of cross-vendor users groups like the MAP/TOP User Group.

"There used to be a real symbiotic relationship between the vendor and people in the users group," O'Keeffe explains. "The inside guy was making the vendor successful, and the vendor was making the inside guy successful — very much a one-to-one symbiosis.

"But once you get the acknowledgment within a company that it is a multivendor environment," she continues, "that symbiosis doesn't work nearly as well. You now have broader concerns. The MAP/TOP User Group showed people that. Users started saying, 'This is broader than a DEC issue or an IBM issue, and I need to start waving my flag within the proprietary users group for things like standards. It's no accident that all major computer system vendors have made major commitments to standards compliance. It's not because they wanted to do it. The users groups pushed them,'" she says.

The MAP/TOP crusaders

Not so much a users group as a crusade, the MAP/TOP User Group has, as O'Keeffe points out, gone a long way toward changing the image of users groups in general. Conceived by Mike Kaminski, manager of General Motors Corp.'s MAP program, the MAP/TOP User Group took a calculated but unique risk.

"When you form a users group, there is usually something to use," Kaminski says. "There was certainly nothing to use when we put this group together in 1984. My own people asked, 'Why are you calling this a users group?' And I said, 'If we don't call it that, people will think we are never going to use this stuff.'"

Kaminski says he believed strongly that to get the various vendors' attention, there was power in numbers. With the financial backing of GM, Kaminski lobbied to get other major user companies into the fold.

The idea was to spur the International Standards Organization to move its model for factory automation from the drawing board into reality.

"We felt we had three options at the time," Kaminski recalls. "We could have gone with a single vendor, but there was no single vendor to provide all the equipment. The second option was to get the vendors to come up with a GM proprietary solution, which would have been expensive, redundant and hard to maintain, and the third was to create MAP as a standard."

In the past 2½ years, Kaminski and his staff at GM have poured tremendous amounts of time and effort into attracting users and vendors into the group. They initiated independent groups in Europe, Japan and Australia. From one very large member, GM, the international group now numbers close to 1,400 member companies.

> "IT'S NO accident that all major computer system vendors have made major commitments to standards compliance. It's not because they wanted to do it. The users groups pushed them."
>
> LINDA O'KEEFFE
> DATAQUEST, INC.

Chuck Gardner, coordinator of system standards at Eastman Kodak Co. and chairman of the MAP/TOP User Group Steering Committee, seeks to dispel the criticism that GM — in the case of MAP — and Boeing Computer Services Co. — in the case of TOP — were acting out of selfish interests.

"I hope it is to their benefit," Gardner states. "We feel at Kodak that what's being done is to our benefit as well. It's an open process, and we have members on all the MAP and TOP committees. I can think of a number of needs for Kodak that weren't being addressed, and the process responded. One of the prime justifications for the time Kodak puts into this is the knowledge we get back in return. It's true that GM has some of its own interests, but if those are met, then others can be met as well," Gardner says.

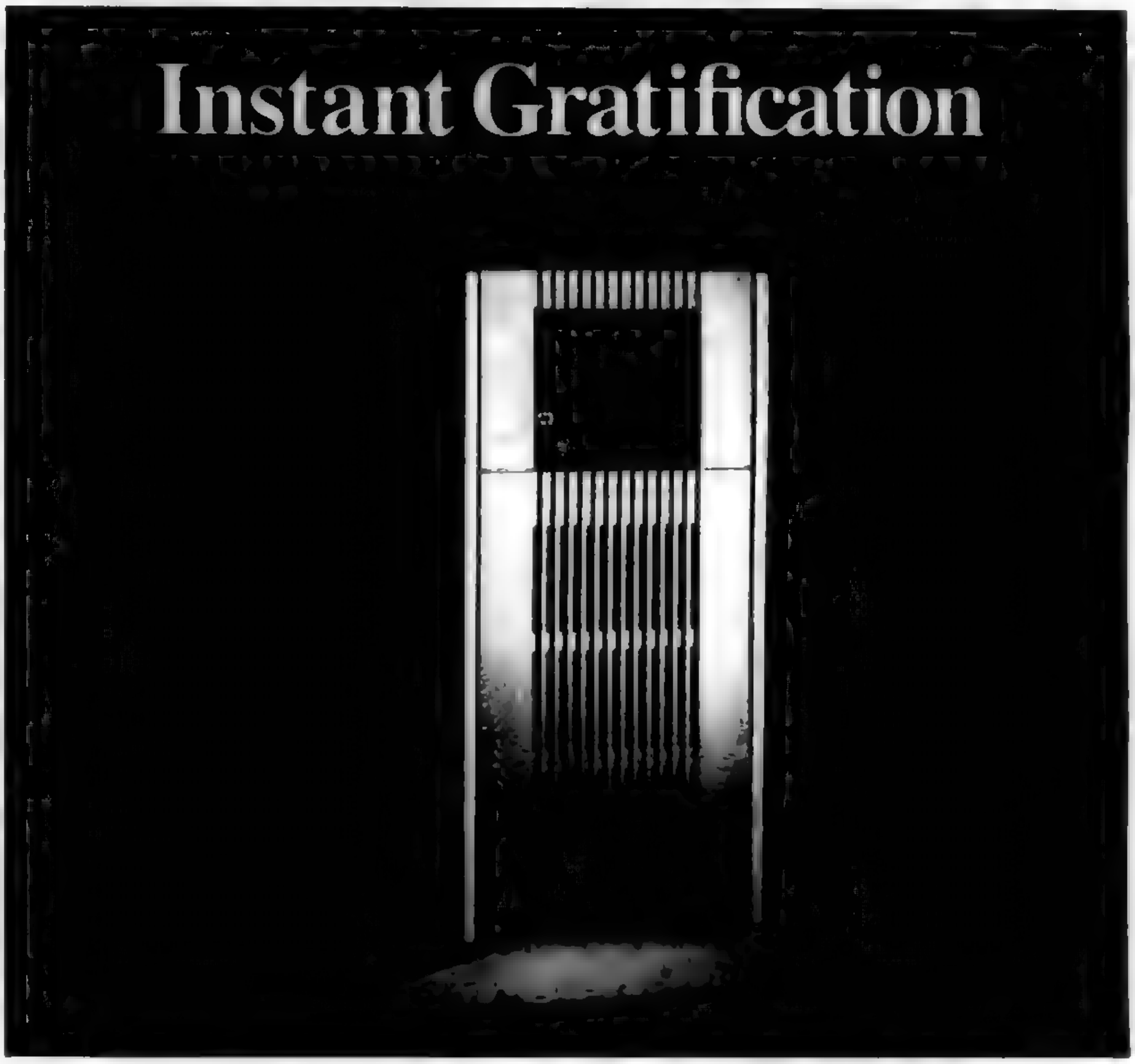
As acceptance of TOP, a set of office standards, gains momentum, it is bringing more traditional DP types into the movement. To this end, the MAP/TOP User Group has formed ties with the recently formed Corporation for Open Systems.

"They are helping to spearhead and focus some of the traditional DP and communications issues and people into this whole thing," Gardner says.

The quest for knowledge, parties

Influence, however, is not the sole reason for joining a users group. These groups offer their members a chance to interact

Continued on page 88



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Internal users groups: That was then, this is now

BY DEBORAH COOPER

Corporate users groups of old faced an important mission: to get novice computer users over that first technology hurdle. In some corporate settings, internal users groups based solely on the personal computer became popular. These prototypes were generally informal and loosely organized, according to Naomi Karten, a Randolph, Mass.-based consultant specializing in end-user computing. But few organized training programs for PCs existed five years ago, so these internal groups served a purpose.

However, now that users and their equipment have become more friendly and many companies have established comprehensive training centers, most of those original groups have vanished. In their place are application-specific groups run either by or for MIS departments.

Internal users groups that exist today bear little resemblance to their predecessors. Instead of being held after hours and presided over by passionate hackers, these organizations have formal agendas, guest speakers and vendor presentations. Sanctioned by upper management, they meet during work time to discuss issues and trends, not nuts and bolts. And their opinions are actively solicited by the MIS departments and information centers that map out DP strategy and support end users. In fact, in companies where the idea is still viable, internal users groups are becoming more a part of the strategy of self-sufficiency espoused by information centers.

"The information center can't do everything for everybody," Karten says. "These users groups are the best way to get users more involved."

At Dana Corp., an automotive and truck parts manufacturer in Toledo, Ohio, the information center is organizing a corporatewide internal users group.

According to Matt McCarty, a PC specialist within the Computer Services Division, the group will act as a focal point for the company's hundreds of PCs — a place where users can share information and provide support for colleagues.

Dana's Fluid Products Division already has an internal PC users group. This small and informal group began several years ago, McCarty says, when its members discovered a common bond — the PC — and sought each other's advice and knowledge. "They've been really effective in sharing information," McCarty claims. "I'm in charge of a local-area network installation for their division, and their knowledge and familiarity with the computers has made my job a lot easier."

When they work

Karten agrees that users are eager to share their triumphs and knowledge and says that this alone can ensure the success of an internal users group.

"Often, the information center will initiate the group, but the users will quickly take over," she says. "They want to do it for themselves." In fact, in larger installations with bigger users groups, subgroups — like the special interest groups in major external users groups — will spin off.

In addition, Karten says, the more successful internal groups will have little corporate involvement, and the informality of brown-bag lunch meetings, for example, seems to help foster enthusiasm.

Structure, she adds, is necessary in the form of agendas, presentations, newsletters and product demonstrations, but in environments where MIS exerts tight control, the relationship with the end user can become adversarial. "And people will share information anyway around the coffee machine or in the lunchroom," Karten adds. Company size has a lot to do with how well users' communication channels are organized and how well internal users groups will fare.

At Dana, which is made up of several autonomous divisions, one of the major obstacles to the formation of a companywide users group is crossing those divisional lines. "We can't just send an edict down from the information center," McCarty says. "It's really like starting an external group."

When they don't work

With more than 1,200 PC users in New York Life Insurance Co.'s home office, regular corporatewide users groups are out of the question.

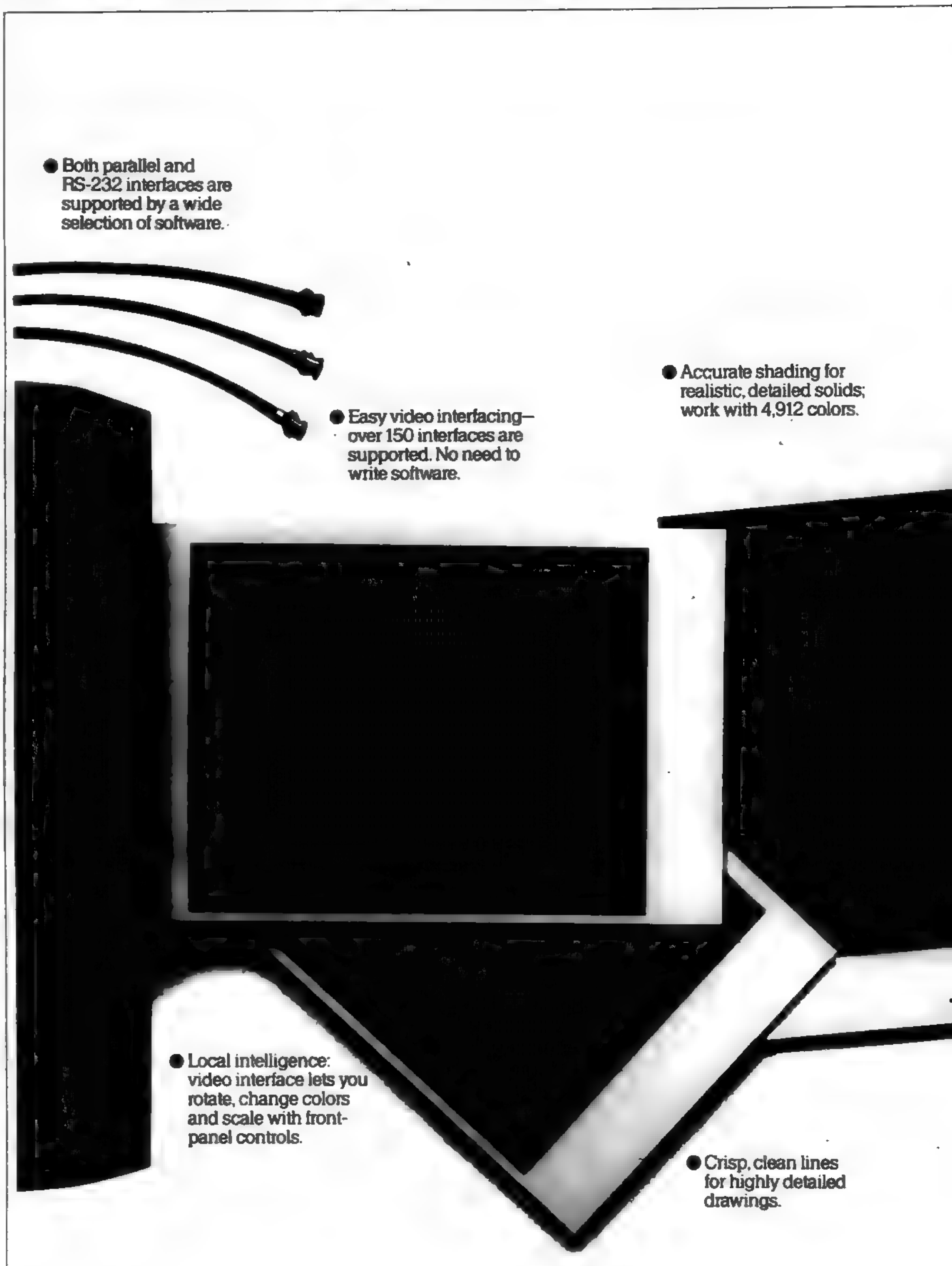
One answer to this is departmental meetings.

"These meetings are smaller. Everyone has more in common, and they can relate better to each other," says Patricia Farkas, project engineer in the End-User Computing Division.

On the other hand, smaller companies such as Dow Jones & Co. have not seen the need for any version of an internal users group.

"We don't have any formal groups because we are small enough to share and disseminate information informally," says Tom Kull, director of computer services of the Princeton, N.J., company, which employs 4,000 nationwide.

Newly hired reporters are offered for-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Cooper is a free-lance writer based in Boston.

mal hardware and software training by the computer services staff, but subsequent questions or problems are handled as needed within the news department itself, Kull explains.

Large or small, some companies simply cannot make a users group fly. Indeed, companies with access to powerful outside users groups often find it difficult even to get internal groups started. For many companies in metropolitan Boston, for example, the Boston Computer Society has nullified the need for internal users groups.

"We tried to start one in our Trust Department," says Danielle Barr, vice-president of corporate systems for the Bank of New England Corp. "But with good access to the Boston Computer Society and with no one wanting to stay after work, it failed."

Ron Brzezinski, vice-president of information systems at Quaker Oats Co. in Chicago, says the establishment of its information center made PC users groups obsolete. "The information center has replaced users groups and has become the focal point of activity for PC users," he says. The company's information center activities include a quarterly newsletter, a full-time trainer and a well-staffed hot line.

Alternatives

More companies are establishing information centers to oversee end-user activities. But others have chosen different methods of exchanging information. At some organizations, two or three people are identified as computer gurus.

"These are technology enthusiasts who are more than happy to share their knowledge with colleagues," says Walter Ulrich, a partner with Coopers & Lybrand in Houston, who specializes in strategic business services. "When the basic technology is understood, these user-fermented activities displace the need for groups," he explains.

At Bobst Group, Inc. in Roseland, N.J., a Swiss manufacturer and distributor of printing machines and spare parts with approximately 500 U.S. employees, these savants are called "chief users." "They are like systems analysts," says Gary Gittleson, electronic data processing manager.

"We have one in each department, chosen for their knowledge of the department as well as for their flexibility and willingness to learn new ways of doing things," he says.

This cooperative spirit between DP and MIS departments and micro users is a recent phenomenon, many DP managers say.

Whereas minicomputer and mainframe user needs have always been taken seriously, the needs of microcomputer users have been regarded with suspicion.

"Once the 'we vs. they' atmosphere and anti-personal-computer paranoia faded, communication between the MIS departments and end users markedly improved. They began to band together," Quaker Oats' Brzezinski observes.

Ed Landry, manager of the Business Consulting Group for Boston-based John Hancock Mutual Life Insurance Co.'s Financial Services Division, says he sees a change in the end users themselves. "Hackers are still around, but now they are interested in how the computer's power can be used for business applications."

Hancock continues to run an informal monthly PC users group, Landry notes, but attendance fluctuates by meeting topic.

"Since everyone is interested in getting the most out of Lotus Development Corp.'s 1-2-3 software, anything dealing with it draws a big crowd. A demonstration of Lotus's Human Access Language brought in more than 100 people." Other times, Landry says, fewer than 25 people attend.

> "USERS NOW are serious business professionals and no longer hobbyists, so their input is very valuable to us."
>
> BERNARD WEINSTEIN
> E. F. HUTTON & CO.

Some companies such as Smith Barney, Harris Upham & Co. in New York do not encourage internal users groups at all. "We found them to be takers rather than givers. They take up too much time without contributing enough. If people want to learn, there are many outside professional seminars and meetings they can attend," says the brokerage's Technology Vice-President, Len Carlson.

E. F. Hutton & Co.'s Bernard Weinstein, first vice-president of information systems and telecommunications for the New York-based firm, admits his company is not looking for "coffee-klatch-type" groups either. "But the users now are serious business professionals and no longer hobbyists, so their input is very valuable to us."

E. F. Hutton recently ran a user focus group called "EDP and the Account Executive." The company wanted input on different workstation specifications before making a final purchase decision.

Although many in the group could not be considered techies, they had a good understanding of system function.

"We were interested in first-hand appraisals from this group," Weinstein says. "We know what's under the hood, but we wanted people who could test drive."

The focus group paved a road to these people.

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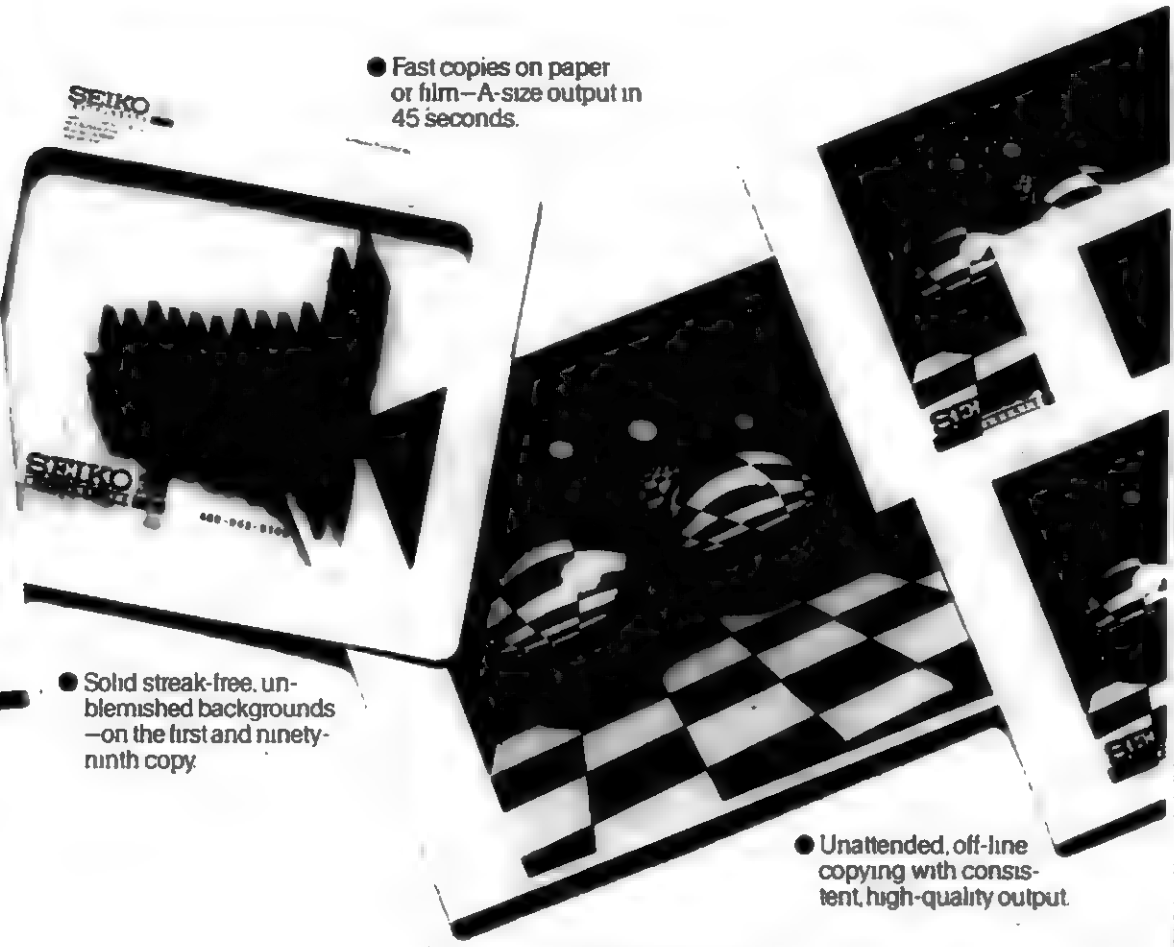

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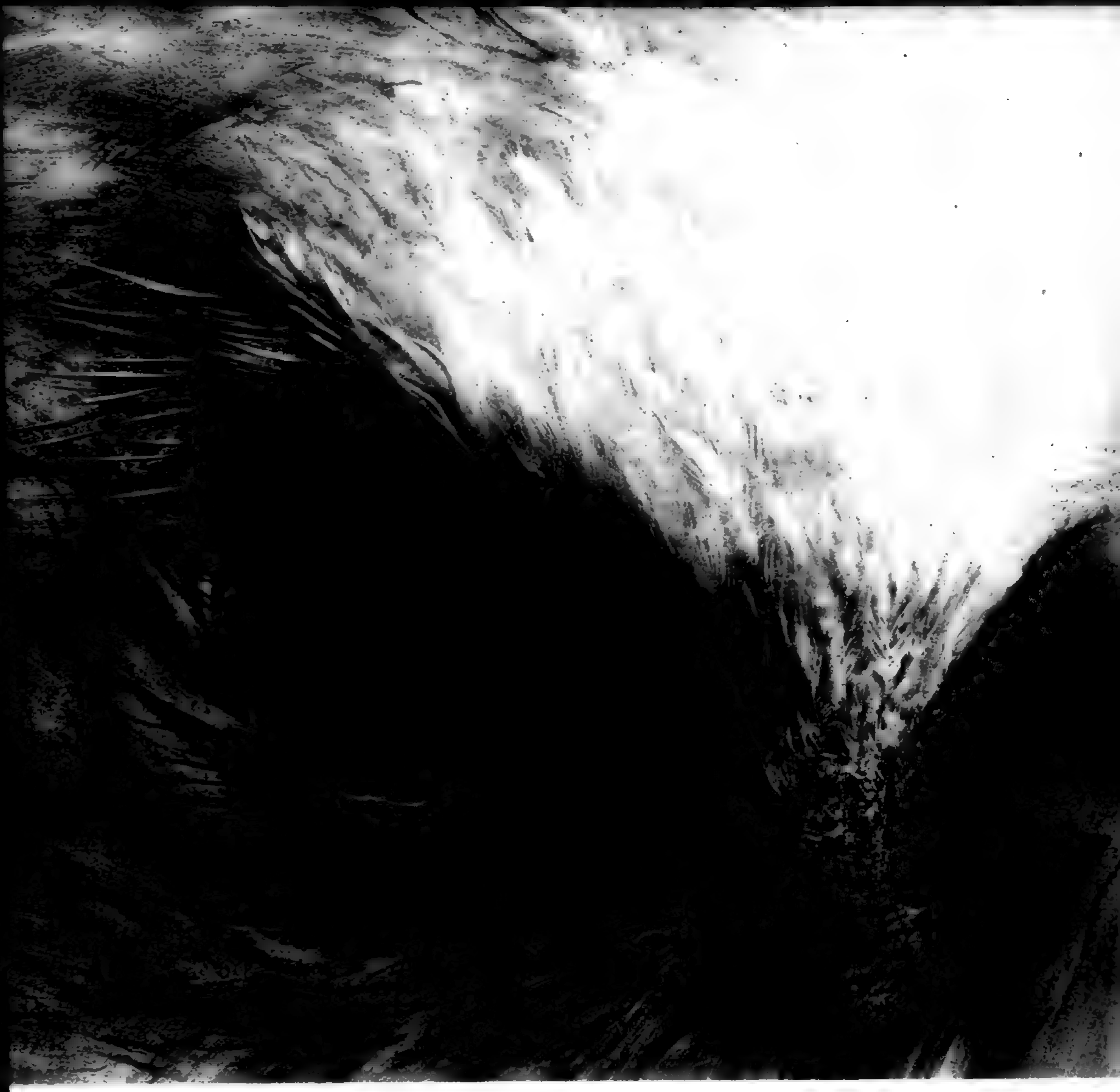

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"What we used to call competition, we're now calling prey."

User influence

FROM PAGE 83

without the "all-things-to-all-people" atmosphere of industry-wide conventions like the National Computer Conference or Comdex. Members know that at the annual or semiannual users group gatherings they will find the systems or products they are using along with professionals who are using them.

Session programs are designed along specific, controlled lines to enhance the relevance and value of presentations. Special interest groups, formed around virtually any technical or business need, attract users seeking answers to unique or specific questions. And many meetings are actually shopping bazaars where members can find thousands of dollars worth of free, public domain software.

Many users group members find the annual national or international meetings to be excuses simply for social drinking and three-day excursions to San Francisco. The regional chapters or local spin-offs to the large users groups often accomplish more for members than the parent organization.

> "THE BENEFIT is the dialogue with others. It's a formal way to get people together by systems, by locality, by business."
>
> BILL STURGEON
> ISWU

"The national conference is basically a social gathering," says New York PC Users Group's Adrian, who is a project manager at Shearson Lehman Brothers, Inc. in New York and also a member of the Information Builders, Inc. software users group. "The real hands-on people go to the regional meetings."

Whether at national or local meetings, the value of users group gatherings tends to be found not only in the symposia or special interest groups but also in the social affairs.

Guide goes as far as organizing Social Communication and Informal Discussion Sessions, which essentially tell attendees it is time to grab a beer and find a friend with some useful information.

"I find it's the best way to meet people and learn about their problems," the Arizona Guide member says.

"DECUS started as an organization of frustrated people," adds Mitch Brown, a senior business systems analyst at Genrad, Inc. in Concord, Mass., and a member of a DECUS special interest group on office automation.

"The support channels at DEC varied: Some were good, some bad. You wanted to tell the company, 'Hey, you only wrote the thing; I have to live with it.' And through DECUS, I have access to people with my same frustrations."

At the International Society of Wang Users (ISWU), the national meetings tend to be a feeding ground for all types of Wang Laboratories, Inc. product users. According to ISWU President Bill Sturgeon, a senior computer systems specialist for Solar Turbines, Inc. in San Diego, "Some people just want to show how smart they are, and others are strictly there to learn. Some are just there for the social reasons. But the benefit is the dialogue you have with others. It's a formal way to get people together by systems, by locality, by business."

Participating in users groups, despite their reputation for parties and good times, is not taken lightly by individuals or corporations. Some groups such as Share or Guide accept only corporate memberships. For Guide, those memberships cost $400 each, and companies must also pay the way for each employee it sends to the meetings. Guide requires members to attend a minimum of one meeting per year.

Beyond cost is the time commitment. Even the least active users group member must devote a significant amount of free time to the activity to get any benefit.

And those on steering or advi-

A banker's solution

W. Ben [illegible]
Executive Vice-President
Texas Commerce Bank

The Problem:
We faced a five year backlog plus an estimated three year invisible backlog. Our solution came from a source we didn't expect.

Pressures to resolve the backlog problem (within budget) required special attention because of our unique cost/performance history and aggressive corporate profitability goals.

In terms of profitability, Texas Commerce Bancshares (TCBK) consistently ranked first or second in the nation, until the oil problems of 1985. During the preceding 18 years, TCBK continuously increased earnings, quarter over quarter. In 1985, expenditures of the Data Services Group totaled less than its budgets for either 1984 or 1983. Since 1983, on an aggregate basis, Data Services has been under budget by $5 million, on an approximate $32 million base. These records posed a formidable mandate to find or develop a highly cost-effective solution for the backlog problem.

Texas Commerce Bancshares, a holding company, owns 70 member banks in Texas. These comprise the Texas Commerce network. Statewide, it ranks fourth largest in asset size. Nationally it ranks twenty-fifth.

Headquarters of the Data Services Group are located in our Houston data center. We also operate major regional data centers in Austin and Dallas, plus 12 remote centers throughout the state

We streamlined development procedures and exercised all appropriate efficiency measures. But during the same time, user sophistication in terms of the number and complexity of requirements offset our productivity gains. At this point, we recognized two alternatives: Radically increase our programming staff (which would not have completely solved the problem), or acquire a productivity tool.

Product Evaluation:
We created a product study team which outlined and prioritized our selection criteria. During this process we discovered Transform Logic Corporation — a relatively young company that developed and markets Transform,® which was claimed to automatically create and maintain complete, efficient, structured COBOL application systems directly from preliminary, non-procedural design input, without use of a special high level language.

Our original product selection criteria included the following major items:

- Online design capabilities, using graphics.
- Prototyping.
- COBOL generation in batch, IMS and/or CICS.
- Screen painter.
- Support all major access methods.
- Generate code which runs in a stand alone environment.
- Generate code that can be modified and recompiled, without having to regenerate the entire system.
- Self documenting.
- Generated systems which run as efficiently as hand coded systems
- Automatic Generation of Help screens.
- Generated code should be structured.
- Generated code paragraph names and data names should be meaningful and easily maintained by a programmer, if required.

Transform Logic invited us to participate in what it calls a "Prove-It" demonstration. The vendor asked us to bring an application which had taken approximately three months to develop by conventional programming methods. They warranted that, using Transform, the application would be generated in two days, precisely to our specifications.

We had recently completed such an application, our Business Development system. It tracks certain types of customers, their locations throughout our network, types of services we provide, key contacts, and related information. We took this system and the programmer who wrote it to Transform Logic's headquarters in Scottsdale, Arizona. Within a day and a half, we had a complete generated COBOL system. It consisted of 20,000 lines of generated code and five lines of hand written code. It had three different databases and three different transactions. One transaction used one database. Another used two databases, and the third transaction used all three databases. Transform automatically generated Help screens and field editing.

Back in Houston, the author of the application analyzed the generated code. Of course it had different data names. But in many instances, he found the generated code almost identical to what he had written. In some instances he admitted that it was better than what he had written. He further remarked that if he had more than three months, he too could have included Help screens. This analysis convinced us that, using Transform, we could meet our rather ambitious goals. But at this point, our attention shifted to other issues.

First, Transform used a new technology. That fact maximized our dependence on the vendor. We wondered how Transform Logic would stand behind its product. Would our people be able to pick up the knowledge needed to use this product? How responsive would Transform Logic be to our questions? What impact should we expect Transform to have on our people, our departmental structure, our daily routine, and our basic departmental approach to doing business? What fundamental do's and don'ts surround the transition to Transform?

We "introduced" Transform by presenting it to a steering committee, a priority setting group, which meets each month to evaluate new products and track progress on large projects. Our internal documentation included capabilities of Transform, its costs, its benefits and its pay-back. The steering committee approved the proposal. Then, because of the dollar expenditure, it went to the Strategy Committee, which also approved it. That gave me authorization to enter into a contract with Transform Logic. During the contract meeting we defined scheduling, training, installation timing and procedures, and other details.

Use & Features:
Transform Logic installed the product over a weekend, then returned for a

A Superior Way for Organizations to Solve Key Data Processing Problems.

sory committees, as well as the regularly elected executives, must put in weeks of their own time each year. Genrad's Brown estimates that he puts in two business and two personal days per year for just the satellite group. "That doesn't count the time I have to put in for preparation," he adds.

And the rewards are tempered by the obstacles that every users group seems to encounter. Among the most troublesome is attracting new members.

Large users groups like Guide have seen membership level off. Three years ago, the national Guide meeting attracted more than 5,000 attendees, but that number has dropped since then to less than 4,000.

Guide's Nack admitted that the organization was not very good at profiling attending members, but he says he believes that although the numbers are down, a higher corporate-level member is beginning to attend. "I believe we are attracting more of the managers of DP sites rather than just staff people. It's very difficult to measure," he says.

Nack acknowledges that user sites have grown and that Guide must grow if it is going to continue to represent a significant percentage of corporate users.

But ironically, it is the new members themselves who pose a big problem at meetings. DECUS, for example, attracts 5,000 members to its annual meetings each year, but of that number, more than 40% are first-time attendees.

And with new faces at each seminar or symposium, discussions that have been ongoing for several months or even years must grind to a halt to fill in historical details.

Another roadblock to the open sharing of information is the recent revelation that has taken hold of the MIS world: the use of information as a strategic weapon. A decade ago, users group members thought nothing of sharing any and all details of their operations. Today, that liberal distribution of the family secrets is more dicey.

Members must keep a closer check on what they discuss. Often, that can cause discussions to come to an unsatisfying end.

"In the users groups I participated in, the level at which the information was traded was definitely not strategic," Dataquest's O'Keeffe says. "It tended to be things like, 'When I'm in this environment, I always get a system error' or 'I'm having trouble analyzing my capacity needs. How do you do it?' "

According to O'Keeffe, the attendees tend to be technical support staff rather than MIS managers — people who are not privy to strategic direction. "They tend to be people with very specific technical concerns," O'Keeffe says.

> "I DON'T have time to waste on meetings, but I can justify my participation in the users group pretty easily."
>
> PHILLIP THORDARSON
> NADGUG

Despite this, the open environment is changing. The Guide member from the banking industry says. "It's becoming a problem. Sharing information is not as free as it used to be."

Genrad's Brown reports that he feels free to share ideas and methodologies but stops short of getting into strategic areas. "Everybody has to deal with their own company," he acknowledges. "In fact, a lot of us are in DECUS for the greater glory of our own company, so you have to tread a fine line. It certainly is an issue."

Despite the obstacles, users group members seem to have little trouble finding issues and concerns to discuss. As NADGUG's Thordarson points out, "I don't have time to waste on meetings, but I can justify my participation in the users group pretty easily. I list what I want to get out of it before I go, and I'm usually fulfilled.

"I know I'm ahead of the game," he says. "We have a multivendor environment now, and you can save a lot of time and money by learning from others about efficiency and different approaches to a problem." ●

can reduce your backlog.

two week training session. Meanwhile, positive acceptance of Transform spread by word of mouth from those who had knowledge of it. We presented it to the staff as an upgrade for them, from analyst/programmers to analyst/designers, and much closer interaction with users. Internally, that is the product's most obvious impact. This success-oriented scenario defused any "cultural shock" or perceived "threat."

Because Transform automates programming, it forces emphasis on design. Taking the team approach, we benefit from very high quality design. To accomplish this we established a core group — those familiar with IMS and its internal details and those also well versed in Transform and its internals. Our core group trains about 10 staffers per month. When not involved with training, members of the core group serve as consultants to Transform design teams. They also assume some database administration and technical support functions to avoid potential bottlenecks in these areas.

Our use of Transform included two very aggressive pilot projects; an online inquiry system for our Trust department, and a data entry front end for our customer information system. The first system draws information from 11 databases, and consists of approximately 45 online and batch programs. The customer information system allows one entry point for setting up new accounts and for maintaining existing accounts for our Demand Deposits, Savings, Certificates of Deposit, Installment Loans, and Commercial Loans systems. This consists of 15 online programs and 18 batch programs. Each of these two pilot projects included competitive advantages and user friendly extras such as the automatic transaction reversal feature, special notes added to the Help screens, plus other refinements.

With this experience behind us, we have identified aspects of the product which we like.

- Excellent prototyping capabilities.
- Code generation in COBOL is very good. It meets all of our original expectations.
- The product supports all major access methods.
- IMS code generation is excellent.
- Generated code can be modified and recompiled in a stand-alone environment.
- The generated system is very well structured and easy to follow.
- The generated system automatically provides Help screens.
- The generated procedure and data names are well structured and meaningful.
- The generated system runs as efficiently as if hand coded.
- The generated system typically has more features than a hand coded system.
- The product has its own active data dictionary.
- Support from Transform Logic has been excellent. Problems/questions are usually solved/answered in a matter of hours.

Results:

Our product evaluation continues by carefully measuring our performance with Transform. As we progressed through the first few system developments, we **experienced productivity gains from 2.5:1 to 10:1.** We estimated 3,800 hours to complete the customer information system by hand. Actual hours using Transform totaled 1,850 for an approximate savings of $100,000 of staff time plus a quicker installation. However, we expect improvement in this area as we become more familiar with Transform. During the next 12 months, we plan to complete four major projects using Transform: A cash disbursement subsystem for Trust, data entry and validation front end system for Trust, commitment accounting subsystem for Commercial Loans, and adversely graded and charged-off loans subsystem for Commercial Loans. We **have estimated our savings through the use of Transform on these projects will exceed $500,000.**

Helpful Hints:

If you contemplate using this product, I can reaffirm some aspects and recommend others. First, the product performs substantially as advertised. No big surprises. Second, vendor support (on site and telephone) is excellent. Third, Plan ahead. Plan for a core group to learn everything it can about the product. The group should be comprised of experienced people who know IMS or CICS database design principles, and who know your standards for developing systems and moving the systems into production. Plan to let them teach others. Programmers with one or two years of experience have no trouble learning the concepts of developing systems with Transform. Plan on making adjustments in your database administration and technical support areas. We now have the capability of generating systems so rapidly that sometimes the user can't verify that they are correct in a timely manner. We can create a backlog on the users' side. So a balance of organizational functions becomes important.

Procedurally, I recommend small non-critical development efforts for your first two or three projects. These should access no more than three databases, and should include no more than 10 programs. This practice will allow time to develop internal procedures. It builds morale and confidence. And it reduces the learning curve. Set a limit of five to seven people who work on the initial projects, and select these people with the intent that they will comprise the core group that I mentioned.

These measures should place your organization in an optimum position to take advantage of Transform's capabilities, in the least amount of time.

One Final Point:

One final point. To date, our use of Transform has focused on development of application systems. However, system maintenance typically consumes a larger budget than development. Since Transform also automates ongoing maintenance, we have no doubt about achieving our goals.

Product Data:

To learn more about this expert system approach to automation in IMS and CICS environments, contact David Orchard, Product Information Dept., Transform Logic Corporation, 8502 E. Via de Ventura, Scottsdale, AZ 85258 or call (602) 948-2600

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MANAGEMENT

TAKING CHARGE

Michael B. Packer

Talk business with brass

Information services executives recognize the need to build better relationships with corporate and line managers. Unfortunately, much of the advice they receive on the subject is impossibly vague — "Think about how technology can contribute to the business's competitive success" — unhelpfully narrow — "Send your chief executive officer to a seminar on technology trends" — or mildly insulting — "Wear all-wool suits."

Instead, when information systems executives talk with their CEO or line managers, they need to concentrate on three basic tasks.

First, contribute to discussions about what's at stake in your firm. Most information systems executives want to participate with general and line managers in key business decisions; the question is how to get invited to the party. Spouting techno-talk about new technology or price/performance trends and religious statements about the importance of information technology in today's world won't do it.

Instead, try what the chief of information systems at a leading bank did: He built a model for himself of each business and how his costs would change with business volume and product mix. His annual plan, based on the research, so impressed the corporate management group that they asked him to join them for all their future meetings.

The lesson: In order to be invited to participate in key decisions, you must contribute to the facts underlying those decisions. Admittedly, doing this isn't easy. But a few key exercises can help.

Try building a picture of the chain of business activities in your firm and its relationship to the outside world. For each activity, identify the cost, the support now provided by information technology and the cost dynamics of that as demand changes, the impact on customers if the activity is performed poorly and the keys to success. Then ask yourself three questions:

Continued on page 100

Merrill Lynch grabs RCA staff

BY DAVID A. LUDLUM
CW STAFF

NEW YORK — Merrill Lynch & Co. has hired a team of "rocket scientists" from RCA Corp. to form a Management Science Group that will recommend strategies for Merrill Lynch's systems and other operations.

The group will apply the quantitative analytical techniques of management science to Merrill Lynch's current systems and future business opportunities, emphasizing the context of an expanding global marketplace, officials said.

The new organization will be headed by H. Newton Garber, a 31-year veteran of RCA and most recently its director of operations research. Merrill Lynch has also hired six members of Garber's RCA staff.

"We have seized a unique opportunity to deploy a functioning management science group," said DuWayne J. Peterson, Merrill Lynch's executive vice-president for operations, systems and telecommunications, who hired the group and will oversee it.

Garber approached Peterson about employing the group members, who were concerned about a lack of enthusiasm for their work on the part of executives of General Electric Co., which bought RCA last year, Garber said.

The move adds to a trend toward the use of so-called rocket scientists performing quantitative analysis of operations for financial institutions, according to Garber.

The group will examine all of Merrill Lynch's trading and operations and develop a strategy for enhancing them, according to William Clark, a spokesman for the company.

One of its top priorities will be to develop a systems architecture policy with greater emphasis on Merrill Lynch's business

Continued on page 98

Software maintenance doesn't get any respect

BY DAVID A. LUDLUM
CW STAFF

ORLANDO, Fla. — The bad news for data processing shops is that companies participating in a survey last year said they expected software maintenance backlogs to grow an average of 26% during the next 12 months.

The good news is that growth in budgets and staffs was expected to offset some of the demand. Growth of maintenance budgets was pegged at 15% and expansion of maintenenace staffs at 17% in a survey by Quality Assurance Institute, Inc., which recently released the results of the software survey.

The growth was projected as some data processing managers continue efforts to spruce up the image of software maintenance, which is regarded as less prestigious than development of new programs, according to the institute.

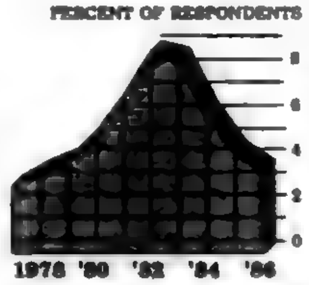
Respondents indicated their greatest software maintenance problems are needs for quantitative evaluation of their expenditures and for more formal procedures, according to William Perry, executive director of the institute.

Continued on page 98

Data View

Future programmers/analysts

The percentage of surveyed college freshmen interested in a career as a computer programmer or systems analyst



INFORMATION PROVIDED BY UNIVERSITY OF CALIFORNIA AT LOS ANGELES AND AMERICAN COUNCIL ON EDUCATION, 1986

Security body inks blue chips

BY DAVID A. LUDLUM
CW STAFF

MENLO PARK, Calif. — Twenty major computer user and vendor organizations have joined a new information security institute launched by the not-for-profit research and consulting organization SRI International.

Among the user members of the new group — the International Information Integrity Institute — are Aetna Life & Casualty Co., Amoco Corp., Chemical Bank, Sears, Roebuck and Co. and 3M Corp.

Members, who pay $19,000 a year, also include vendors Digital Equipment Corp., Honeywell Inc., IBM, ICL PLC. and NCR Corp.

The institute offers members an advisory hot line, on-site clinics, forums and guest research fellowships at SRI as well as contacts with government agencies and reports on cases of lost information, technological developments, security standards and management issues such as security expenditures.

Computer security has not kept pace with the threats posed to it by technologies such as networking, microcomputers, electronic funds transfer and electronic mail, according to Donn Parker, an SRI information

Continued on page 99

BOOK REVIEWS

End-user computing meets competitive advantage

The Information Edge
By N. Dean Meyer
and Mary E. Boone

Two of the most pronounced trends in the field of information management today are the placement of processing power in the hands of users through personal computers and the drive to use information technology for competitive advantage.

Increasingly, these developments are feeding off each other as end users themselves are able to reach for the competitive advantage, following the examples of well-chronicled corporate systems that captured market share.

Perhaps that is the most significant — yet unstated — lesson to draw from *The Information Edge*. The authors, partners in the consulting firm N. Dean Meyer and Associates, Inc., catalog 60 applications of information technology credited with generating competitive advantage, with heavy emphasis on end-user computing in an office setting.

Meyer and Boone estimate dollar benefits for most cases and add methodologies for identifying relevant strategic applications and estimating the potential payoffs, along with a discussion of obstacles that might be encountered in implementing them.

They acknowledge the book considers only successful cases. "Our purpose is to understand the measurable benefits of [office automation] — not how to implement new systems," they write. "Issues of organizational change are already well-treated in the literature, and there is no further need to study failures and report on the mistakes of the past."

The cases appear in seven chapters devoted to business functions: selling, marketing, operations, people management, finance, new products and negotiations. There is a separate consideration of teleconferencing.

They deal with companies of various sizes in a range of industries. Many of the companies are anonymous, and the accounts are based primarily on assessments by users within them. At least a quarter of the cases involve use of a spreadsheet, and a greater portion employ a personal computer.

In a case in the chapter on operations that the authors call one of the most dramatic in the book, "a medium-size chemical company" made long-sought improvements in the quality of a product after a PC and spreadsheet enabled an engineer to track 128 production parameters rather than the 25 he had been following. The improved quality is credited with boosting annual sales from $5 million to $50 million and raising yearly

Continued on page 95

CALENDAR

FEBRUARY 15-21

Electronic Imaging '87. Anaheim, Calif., Feb. 16-19 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

15th Annual Association for Computing Machinery Computer Science Conference. St. Louis, Feb. 16-19 — Contact: Department of Computer Science, University of Pittsburgh, P.O. Box 13526, Pittsburgh, Pa. 15243.

Electronic Data Interchange. Alexandria, Va., Feb. 18 — Contact: American Trucking Association Management Systems Committee, 2200 Mill Road, Alexandria, Va. 22314. Also being held April 30 in Kansas City, Mo., and May 20 in Chicago.

Resource Planning for Central File Conversion. New Orleans, Feb. 18-20 — Contact: Innovative Systems, Inc., 341 Fourth Ave., Pittsburgh, Pa. 15222.

Expo-IV (for Pick-based system users). Atlantic City, Feb. 18-20 — Contact: Expo-TMS, 22951 La Cadena, Laguna Hills, Calif. 92653.

Interactive Instruction Delivery. Kissimmee, Fla., Feb. 18-20 — Contact: Society for Applied Learning Technology, 50 Culpeper St., Warrenton, Va. 22186.

Electronic Data Interchange. Arlington, Va., Feb. 19-20 — Contact: TDCC, Suite 712, 1101 17th St. N.W., Washington, D.C. 20036. Also being held March 26-27 in Washington, D.C.

FEBRUARY 22-28

Leasing: Techniques & Analysis. Chicago, Feb. 19-20 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held March 5-6 in Washington, D.C., and March 26-27 in New York.

Electronic Printing Systems/Directions in Digital Imaging Conference. Miami, Feb. 22-26 — Contact: Electronic Printing Systems, Directions in Digital Imaging, Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

1987 User Group Conference. Marina del Rey, Calif., Feb. 22-25 — Contact: Trax Software, Inc., 10801 National Blvd., Los Angeles, Calif. 90064.

Automating Systems Analysis and Design. St. Paul, Minn., Feb. 23-25 — Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held in Des Moines, Iowa.; Lansing, Mich.; Austin, Texas; Toronto; Boston; Kansas City, Mo.; and Toledo, Ohio.

Exchange Carriers Standards Association Technical Subcommittee T1Q1. Orlando, Fla., Feb. 23-27 — Contact: Radisson Plaza Hotel Orlando, 60 S. Ivanhoe Blvd., Orlando, Fla. 32804.

IBM: Mastering the Transition 1987-1992. New York, Feb. 24-25 — Contact: The Yankee Group, Seminar Division, 200 Portland St., Boston, Mass. 02114.

Competing With Computing. Dallas, Feb. 24 — Contact: Education Registrar, Nolan, Norton & Co., One Cranberry Hill, Lexington, Mass. 02173.

Computer Aided Software Engineering Symposium. Atlanta, Feb. 24-26 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Third Annual Champs Users' Group Meeting. Crystal River, Fla., Feb. 25-27 — Contact: SCI Software, 1255 N. Vantage Point Drive, Crystal River, Fla. 32629.

Introduction to Performance/Capacity Management. Phoenix, Feb. 25-27 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

Phoenix Conference on Computers and Communications. Scottsdale, Ariz., Feb. 25-27 — Contact: Arizona State University, College of Engineering and Applied Sciences, Tempe, Ariz. 85287.

ICIA '87/Commtex International. Atlanta, Feb. 25-28 — Contact: International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

X/Open Demonstration of Portability. Luxembourg, Feb. 26 — Contact: X/Open Office, Sterling Public Relations, 1 Chelsea Manor Gardens, London, England SW3.

MARCH 1-7

Second International Conference on CD ROM. Seattle, March 2-3 — Contact: Microsoft Corp., Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

Seventh Annual Computer Operations Conference. New Orleans, March

2-5 — Contact: Association for Computer Operations Management, Suite 201, 11501 Brookhurst, Garden Grove, Calif. 92640.

Eighth Annual Conference on EDP Performance/Capacity Management. Phoenix, March 2-6 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

Corporate Electronic Publishing Systems Show and Conference. Chicago, March 3-5 — Contact: Cahners Exposition Group, 999 Summer St., Stamford, Conn. 06905.

DEXPO Europe '87. London, March 3-5 — Contact: Expoconsul International, 3 Independence Way, Princeton, N.J. 08540.

Securicom '87 Congress on Computer and Communications Security and Protection. Paris, March 4-6 — Contact: Securicom-Sedep, 8 rue de la Michodiere, 75002 Paris, France.

Data Communications Network Management. Boston, March 5-6 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held April 30-May 1 in Seattle.

Taxation of Intellectual Property. Chicago, March 5-6 — Contact: Deborah Gordon Public Relations, Inc., 320 N. Michigan Ave., Chicago, Ill. 60601.

MARCH 8-14

Cullinet Applications and End-User Computing Conference. Dallas, March 8-10 — Contact: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, Ma. 02090.

Spring 1987 Conference of the North American Honeywell Users Association. Charleston, S.C., March 8-13 — Contact: NAHU, Inc., P.O. Box 2037, Willingboro, N.J. 08046.

CICS/VS Internal Structures & Control Flows. Atlanta, March 9 — Contact: American Data Group, Inc., 1770 Indian Trail Road, Norcross, Ga. 30093.

Automated Manufacturing: Computers, Communications and Controls in the Factory. St. Petersburg Beach, Fla., March 9-10 — Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

New Technologies. Beverly Hills, Calif., March 9-10 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

CAD/CAM, CAE Executive Workshops '87. Cambridge, Mass., March 9-10 — Contact: Cynthia Wolfram, Daratech, Inc., 16 Myrtle Ave., Cambridge, Mass. 02138.

Electronic Banking: The Challenges of Tomorrow's Bank Within Yesterday's Legal Framework. Brussels, March 9-10 — Contact: Alan Galaski, Conference Office Brussels, 19 rue de l'Orme, B-1040 Brussels.

11th Annual BRS User Meeting. Kansas City, Mo., March 9-10 — Contact: BRS Information Technologies, 1200 Route 7, Latham, N.Y. 12110.

Computer Technology and the Law: Protecting Your Rights. Arlington, Va., March 9-11 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Federal Office Systems Expo (FOSE). Washington, D.C., March 9-12 — Contact: National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

Effective Management Skills for the MIS Manager. Cambridge, Mass., March 9-12 — Contact: American Management Association, 135 West 50th St., New York, N.Y. 10020.

Open Network Architecture: Computer III Status Report. Arlington, Va., March 10-11 — Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

Corpcon East. New York, March 10-12 — Contact: Linda Morris, Corpcon, P.O. Box 3727, Santa Monica, Calif. 90403. Also being held April 28-30 in Chicago and Sept. 21-23 in Los Angeles.

Software Performance Engineering. Denver, March 10-13 — Contact: Performance Engineering Services, P.O. Box 9802, Dept. 120, Austin, Texas 78766. Also being held June 2-5 in Washington, D.C.

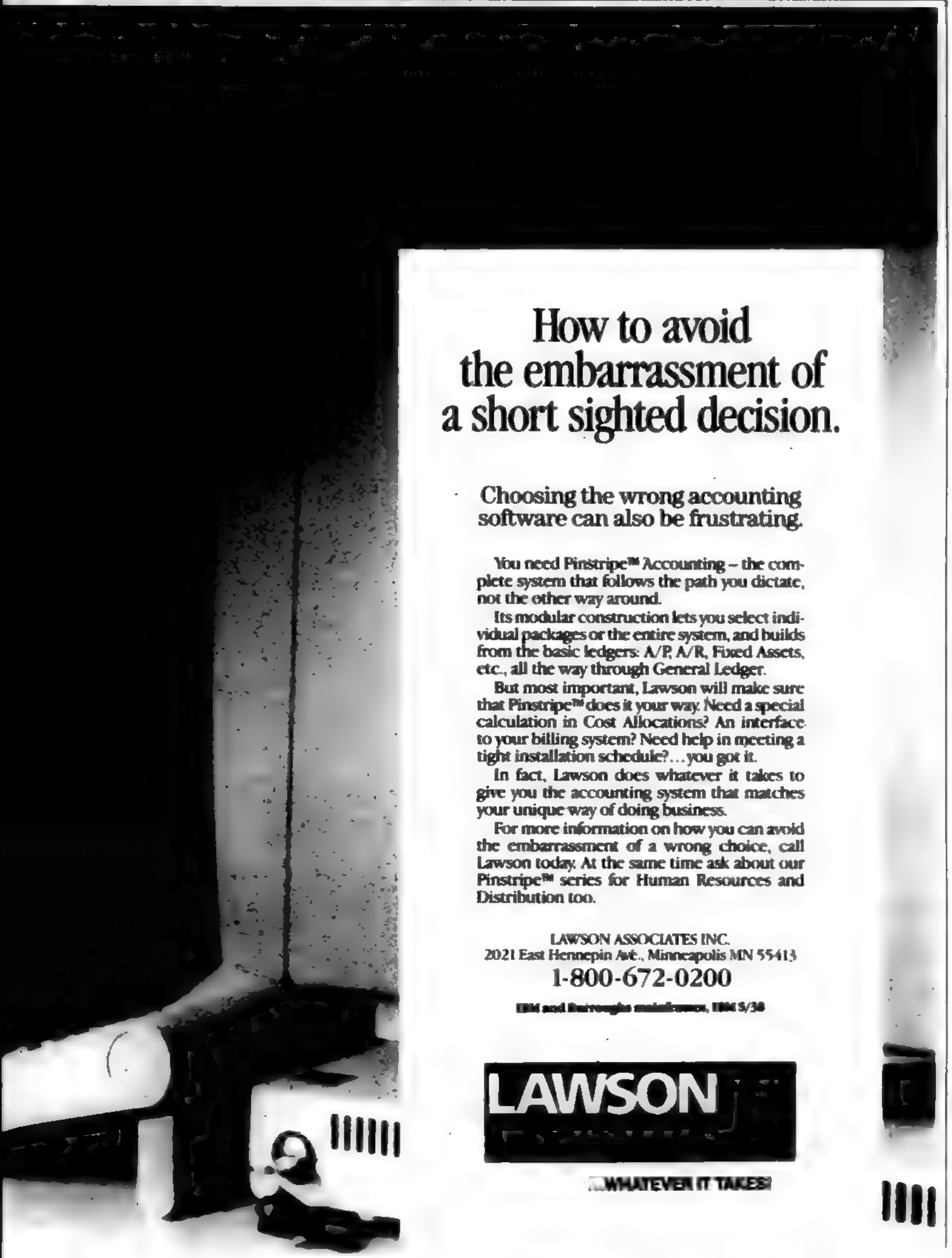
Optical Information Systems. Long Beach, Calif., March 11-13 — Contact: Meckler Publishing, 11 Ferry Lane W., Westport, Conn. 06880.

MARCH 15-21

The 1987 National Automated Clearing House Association Conference. San Diego, March 15-18 — Contact: NACHA, Suite 640, 1901 L Street NW, Washington, D.C. 20036.

Fifth Annual Computer Based Training Conference and Exposition. Atlanta, March 15-18 — Contact: Julia Sta-

Continued on page 94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Continued from page 93

sio, Conference Registrar, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

Software Quality Assurance. Los Angeles, March 16-17 — Contact: U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903. Also being held March 23-24 in Washington, D.C., March 30-31 in Chicago and April 6-7 in New York.

1987 West Coast Manufacturing, Accounting and Production Information Control System (MAPICS) Users Conference. San Diego, March 16-17 — Contact: Salem Corp., 1654 Poplar Lane, Annapolis, Md. 21401.

Artificial Intelligence and Expert Systems. Cleveland, March 16-17 — Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held in Louisville, Ky., Dayton, Ohio, Portland, Ore., Ft. Worth, Texas, Baltimore, Richmond, Va., Concord, Calif., Tulsa, Okla., St. Paul, Minn., Cincinnati and Toronto.

Fifth National Conference on Measuring Data Processing Quality and Productivity. Orlando, Fla., March 16-18 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Electronic Data Processing Audit Mangers' Roundup III. Orlando, Fla., March 16-19 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

TCP/IP Interoperability Conference. Monterey, Calif., March 16-19 — Contact: Advanced Computing Environments, 21370 Vai Ave., Cupertino, Calif. 95014.

Tutorial Week. Kissimmee, Fla., March 16-20 — Contact: Computer Society of IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Open Systems Interconnection. Washington, D.C., March 16-20 — Contact: Omnicom, Inc., 501 Church St. NE, Vienna, Va. 22180. Also being held April 27-May 1 in Minneapolis.

Workshop on Factory Communications. Gaithersburg, Md., March 17-18 — Contact: Robert Rosenthal, B217 Technology Building, National Bureau of Standards, Gaithersburg, Md. 20899.

The Fifth Technology Opportunity Conference on Optical Storage of Documents and Images. Washington, D.C., March 17-19 — Contact: Rothchild Consultants, 256 Laguna Honda Blvd., San Francisco, Calif. 94116.

The National Association of Bank Servicers Semiannual Meeting. Tampa, Fla., March 17-20 — Contact: National Association of Bank Servicers, Suite B, 5008 Pine Creek Drive, Westerville, Ohio 43081.

The International Phoenix User Group Meeting. Atlanta, March 18-19 — Contact: Livingston & Associates, P.O. Box 30619, Cleveland, Ohio 44130.

Testing Computer Software. Los Angeles, March 18-20 — Contact: U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903. Also being held March 25-27 in Washington, D.C., April 1-3 in Chicago, April 8-10 in New York and April 29-May 1 in San Francisco.

1987 Template User Network (TUN) Annual Conference. Arlington, Va., March 18-20 — Contact: Template, 9645 Scranton Road, San Diego, Calif. 92121.

Innovative Systems, Inc. 1987 User Group Conference. San Francisco, March 18-20 — Contact: Innovative Systems, Inc., 341 Fourth Ave., Pittsburgh, Pa. 15222.

MARCH 22-28

Electronic Computing Health Oriented. Hot Springs, Va., March 22-25 — Contact: Electronic Computing Health Oriented, 10401 Fernwood Road, Bethesda, Md. 20034.

National Computer Graphics Association's Computer Graphics '87. Philadelphia, March 22-26 — Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

Managing the Information Resource. Los Angeles, March 22-27 — Contact: Nolan, Norton & Co., One Cranberry Hill, Lexington, Mass. 02173.

Sixth Annual International Spectrum U.S.A. '87. Las Vegas, March 23-25 — Contact: International Data Base Management Association, Suite 104, 9740 Appaloosa Road, San Diego, Calif. 92131.

National Capacity Planning Conference. Washington, D.C., March 23-26 — Contact: NCPC, 3825-I South George Mason Drive, Falls Church, Va. 22041.

Walker Inter/Actions Users Conference. Denver, March 23-26 — Contact: Walker Interactive Products, 100 Spear St., San Francisco, Calif. 94105.

Continued on page 98

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Book reviews

CONTINUED FROM PAGE 91

profits by $20 million.

In trying to catalog the variety of applications here and identifying dollar benefits, the authors come up wth some farfetched ones. In one, from the chapter on selling, $10 million of a $100 million budget for a unit of the U.S. armed forces has been lost when the military budget was totaled. The authors credit the use of a spreadsheet in the preparation of the original budget to the unit's ability to identify what was missing overnight as Congress was acting on an appropriation. The request was restored and funded, generating a return on the computer investment, the authors calculate, of 59,900%.

To their credit, Meyer and Boone facilitate access to their 150 pages of cases with separate indexes for tools, industries and names and other key words.

In contrast to the raft of cases, they pack a methodology for identifying strategic opportunities into one 20-page chapter. In a business- and people-oriented approach, it calls for identifying a key business function and an individual involved with it who is likely to be an effective user, then helping him attain his goals. The reader is left on his own in selecting the appropriate technology to address the goals, except for some insightful words on why workers sometimes resist the introduction of new technology.

Hardcover, $24.95, 322 pages, ISBN 0-07-041782-2, by McGraw-Hill Book Co., New York.

DAVID LUDLUM

BOOKS IN BRIEF

Technology's Crucible
By James Martin
Predictions cast as history as the author projects us to the year 2019 and then looks back to the 1980s. The book explores the questions, Is man at the mercy of technology or his own human nature? and, If man could understand where technology is leading society, could he control his future?

Paperback, $15.95, 206 pages, ISBN 0-13-902024-1, by Prentice-Hall, Inc., Englewood Cliffs, N.J.

How to Develop Business Information Systems for End Users
By John Garland
A basic book on developing business information systems that meet specific corporate goals, address user needs and let the manager be accountable for costs and user productivity.

Hardback, $32.95, 240 pages, ISBN 0471-84999-5, John Wiley & Sons, Inc., New York.

People and Computers
By James Danziger
The machine's influence on man, based on a study of 2,500 managers, professionals and clerical workers. The book explores how computers are used, their effect on productivity and the problems and environmental changes that are created for the worker.

Hardback, $32.50, 268 pages, ISBN 0-231-06178-1, Columbia University Press, New York.

Applying Expert Systems in Business
By Dimitris Chorafas
Information for company presidents as well as MIS directors on how to decide whether to develop an expert system and how to do so once the decision is made. The material manages to be comprehensive and insightful.

Hardback, $29.95, 232 pages, ISBN 0-07-010880-3, McGraw-Hill Book Co., New York.

Dictionary of Artificial Intelligence and Robots
By Jerry Rosenberg
An easy-to-use, A-to-Z guide to 4,000 terms used in robotics, AI and computer-controlled technology.

Paperback, $14.95, 203 pages, ISBN 0471-84981-2, by John Wiley & Sons, Inc., New York.

Douglas Cobb's 1-2-3 Handbook
By Douglas Cobb
More than you probably will ever need to know about Lotus Development Corp.'s program.

Paperback, $22.95, 720 pages, ISBN 0-553-34389-0, by Bantam Books, New York.

Publishers wishing to have their books considered for review can direct books, prepublication galleys, press releases, catalogs or other information to George Harrar, Book Review Editor, Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Computing exam dates released

The Institute for Certification of Computer Professionals (ICCP) last week announced that examinations for four professional certifications will be given on May 9 and November 11 this year.

The examinations will be given at 160 sites in the U.S. and abroad. The deadlines for receipt of applications are April 1 for the May tests and Oct. 1 for those given in November.

The certifications are associate computer professional, certified computer programmer, certified data processor and certified systems professional.

Further information is available from the ICCP, Suite 268, 2200 E. Devon Ave., Des Plaines, Ill. 60018.

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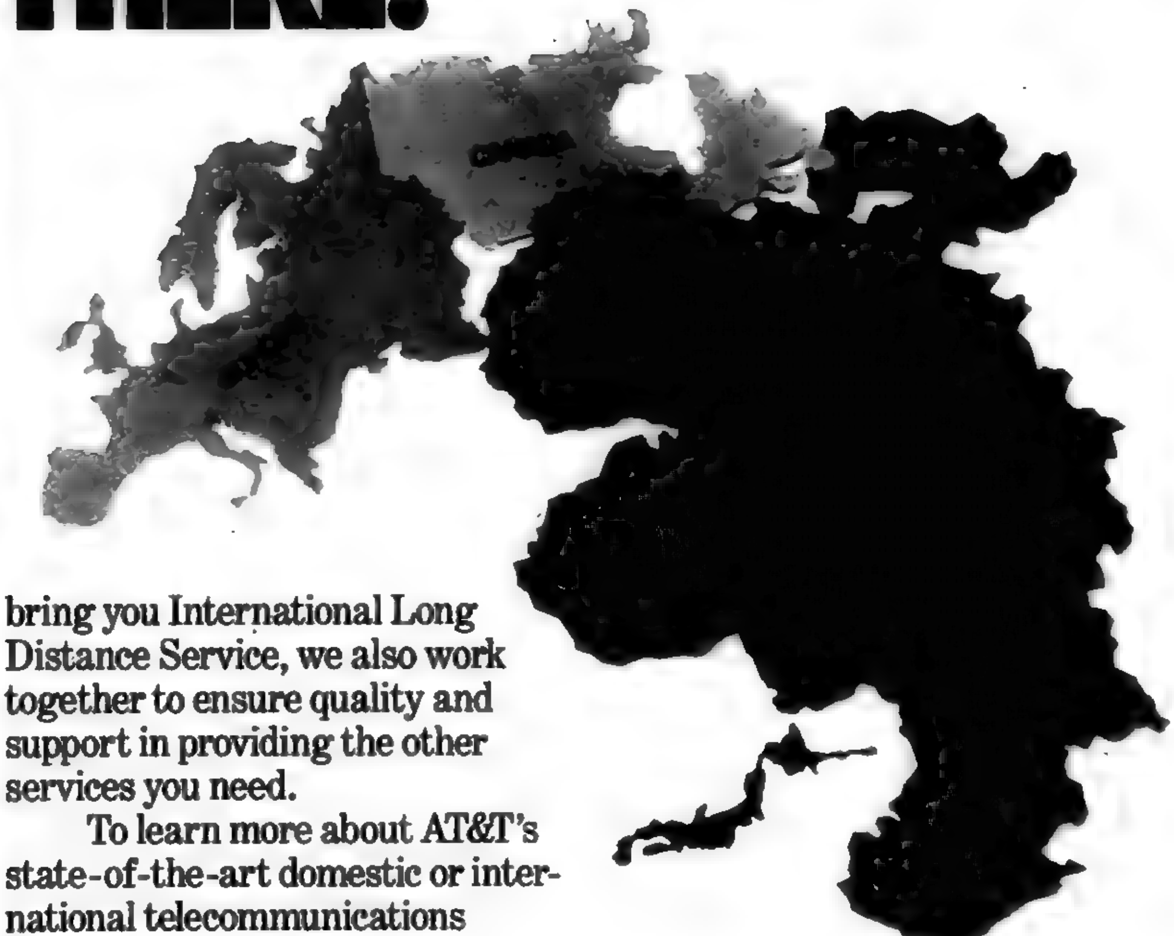

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PC Magazine noted: "The COMPAQ DESKPRO 386 does it with class, with speed and with sound hardware and software design. In a market where it often takes a few tries to get a new product right, Compaq has clearly done it right the first time."

USA TODAY reported that the COMPAQ DESKPRO 386 "marks a new generation of PC's that will make previous desktop models look like slide rules."

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MICRO MARKET
FORTUNE
COMPAQ BIDS FOR PC LEADERSHIP
BYTE
PC WORLD
Compaq Deskpro 386 Dare to B
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Software

CONTINUED FROM PAGE 91

While use of methodologies for new software development has grown extensively in recent years, use of them for maintenance has lagged, Perry said.

"It is a problem that has grown and been totally ignored. [Companies] concentrate their efforts on new systems development," he said. "It would be safe to conclude there have been no significant moves for the better in the last year."

Companies have individualistic approaches to maintenance. Within many, it is "a spontaneous type of process" negotiated with the user and lacking in direction from management, Perry explained.

The institute's survey did show an increase in the portion of respondents who designate a manager to oversee all maintenance — from 36% in 1985 to 45%. And on the average, they allocate 53% of their data processing budgets for software maintenance, up from 51% the previous year.

Nearly two-thirds — 63% — said they rely on one worker or group of workers for maintenance of particular software because no one else understands the code, although the portion was down from 78% a year earlier.

Nick Zvegintzov, editor of the "Software Maintenance News," and a director of the Software Maintenance Association, said he disagrees with Perry. Those in software maintenance need better training and tools more than formal procedures, he maintained.

"It's like the infantry in battle," Zvegintzov said. "It won't work unless you have the abilities, skills and equipment at the bottom level, and that's where I would concentrate."

Zvegintzov said there is a sense of prestige and high morale among those working in maintenance. "We believe it is the most difficult job in software. It relies on people's skills, technical ability and spirit," he said. "We do hear outside that there are a lot of people still unconverted," he added.

More than half of the respondents to the institute's survey said that at their organizations, new development is regarded as more prestigious than maintenance.

Continued from page 94

17th Conference on Computer Audit, Control and Security. Boston, March 23-27 — Contact: EDP Auditors Foundation, Inc., P.O. Box 88180, Carol Stream, Ill. 60188.

Datacon '87. St. Louis, March 24-25 — Contact: Datacon, P.O. Box 1401, St. Louis, Mo. 63188.

I/O Interface '87. Gaithersburg, Md., March 24-25 — Contact: National Bureau of Standards, A216 Technology Building, Gaithersburg, Md. 20899.

Third International Conference on Computerization of Medical Records. Chicago, March 24-27 — Contact: Registrar, Institute for Medical Record Economics, 121 Mt. Vernon St., Boston, Mass. 02108.

1987 SIM Institutional Member Conference. Miami, March 25-27 — Contact: Society for Information Management, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

12th West Coast Computer Faire. San Francisco, March 26-29 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

MARCH 29-APRIL 4

The Inevitable Partnership. Atlanta, March 29-April 1 — Contact: Life Office Management Association, 5770 Powers Ferry Road, Atlanta, Ga. 30327.

EFTA Expo. Las Vegas, March 29-April 1 — Contact: Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

Management Information Systems for Strategic Advantage. Philadelphia, March 29-April 3 — Contact: Office of Executive Education, The Wharton School, 200 Vance Hall, University of Pennsylvania, Philadelphia, Pa. 19104.

Applying the Records Management Technologies. New York, March 30-April 1 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held April 13-15 in Chicago.

Merrill Lynch

CONTINUED FROM PAGE 91

objectives than past efforts, Garber said.

The policy will address needs for future systems development, including compatibility. The group will define requirements for availability and currency of information, Garber explained. Among other approaches, it will use consensus management techniques, including an analytical hierarchy process, to develop a consensus from various views.

He said the group uses advanced personal computers "with a lot of soup in them" and advanced software packages ranging from office applications to tools for analysis of mergers and acquisitions.

Peterson said Merrill Lynch recognizes the importance of in-house specialists who can help refine operations and systems for more cost-effective services in a rapidly changing, increasingly complex environment.

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Interface '87. Las Vegas. March 30-April 2 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

Reducing the Cost of Software. Washington, D.C., March 31-April 2 — Contact: Performance Engineering Services, P.O. Box 9802, Dept. 120, Austin, Texas 78766.

The 1987 National Conference on Data Processing Quality Assurance. Chicago, April 1-3 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

1987 CDLA Spring Meeting. Orlando, Fla., April 1-4 — Contact: Computer Dealers & Lessors Association, 1212 Potomac St. N.W., Washington, D.C. 20007.

APRIL 5-11

CHI & GI '87. Toronto, April 5-9 — Contact: Human Factors in Computing Systems & Graphics Interface 1987 Conference Office, Computer Systems Research Institute, University of Toronto, 2002 - 10 Kings College Road, Toronto, Ontario M5S 1A4.

The 1987 Eastern Simulation Conferences. Orlando, Fla., April 6-9 — Contact: The Society For Computer Simulation. P.O. Box 17900, San Diego, Calif. 92117.

Real-Time Expert Systems: Artificial Intelligence at the Trading Desk. New York, April 7 — Contact: Waters Information Services, Inc., P.O. Box 2248, Binghamton, N.Y. 13902.

Fourth Annual International Conference on Technology and Education. Fort Worth, Texas, April 7-9 — Contact: Jimmie Thompson, International Conference on Technology and Education, 1400 One Tandy Center, Fort Worth, Texas 76102.

New Directions in Information Management. New York, April 8-9 — Contact: The Conference Board, 845 Third Ave., New York, N.Y. 10022.

Decision Support and Expert Systems: The Next Wave - A Developer's Perspective. Cambridge, Mass., April 9-10 — Contact: Decision Support Technology, Conference Registration Office, 51 Church St., Boston, Mass. 02116.

T-Carrier Networking Decisions. Washington, D.C., April 9-10 — Contact: The George Washington University, Washington, D.C. 20052.

California Educational Computing Consortium (CECC). San Jose, Calif., April 9-10 — Contact: Alexia Devlin, CECC Treasurer, San Francisco State University, Accounting Data, NADM-358, 1600 Holloway Ave., San Francisco, Calif. 94132.

Satellite Communications Status '87: Technology, Applications & Markets. New York, April 9-10 — Chairman: Mark Chartrand. Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

APRIL 12-18

Commercial Crime Conference. Hong Kong, April 13-17 — Contact: Computer Services, Hong Kong Productivity Council, 12th Floor, World Commerce Centre, 11 Canton Road, Tsimshatsui, Kowloon, Hong Kong.

Software Panorama. Atlanta, April 14-16 — Contact: Data Processing Management Association, Atlanta Chapter, P.O. Box 34, Atlanta, Ga. 30301.

APRIL 19-25

Standards: The Ties That Bind. New York, April 22-23 — Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114.

The Artificial Intelligence and Advanced Computer Technology Conference and Exhibition. Long Beach, Calif., April 22-24 — Contact: Tower Conference Management Co., 331 W. Wesley St., Wheaton, Ill. 60187.

Bar Coding Seminar Series. New York, April 23-24 — Contact: Automatic Identification Manufacturers, Inc., 1326 Freeport Road, Pittsburgh, Pa. 15238. Also being held May 18-19 in Chicago and June 8-9 in Atlanta.

In-House Consulting Skills for Systems Analysts. Chicago, April 23-24 — Contact: Data Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015.

APRIL 26-MAY 2

1987 Annual Systems Conference. Louisville, Ky., April 26-29 — Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

Software Licensing Agreements: Structure, Content, Law. Boston, April 27 — Contact: Data Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015.

The Branch of the Future, The Future of the Branch. Dallas, April 27-29 — Contact: Bankers Institute, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

1987 Association for Information and Image Management Show. New York, April 27-30 — Association for Information and Image Management, 1100 Wayne Ave., Silver Spring, Md. 20910.

DEXPO South '87. Nashville, April 28-30 — Contact: Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

Nineteenth Annual International Management Information Systems Conference. Cambridge, Mass., April 29-May 1 — Contact: Paper Industry Management Association, 2400 E. Oakton St., Arlington Heights, Ill. 60005.

Electronic Data Interchange. Kansas City, Mo., April 30 — Contact: ATA Management Systems Department, 2200 Mill Road, Alexandria, Va. 22314.

Security body

CONTINUED FROM PAGE 91

security consultant who has developed the institute during the past three years.

Recent legislation and insurance considerations add to the need for corporate officers and directors to protect company assets and customer records, Parker said in a statement.

"Business organizations must be concerned with the broader concept of information integrity, which means maintaining information in good condition and safeguarding it not only from unauthorized appropriation and use but also from such things as accidental [loss]," Parker said.

Creation of the organization reflects the maturing of the data security field, which has revolved around "kind of an old-boy network," said Joan Reynolds, vice-president and corporate data security officer for Chemical Bank.

"Data security has matured to the point where it needs an organization exploring strategic needs — what's coming down the pike five years from now," Reynolds said.

At Amoco, officials look forward to exchanging information with other members, spokesman Richard Judy said. "The reviews provided with the membership are considered a benefit, but the reviews provided by members through candid discussions may prove even more beneficial," Judy said.

Spokesmen for both companies said they hope the organization will prompt vendors to develop more of the data security products that users need.

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Talk business

CONTINUED FROM PAGE 91

- Are we measuring the right things? For instance, if pricing for a chemical distribution firm is a key lever on profitability, does information systems provide ad hoc analysis capability for customer and product profitability to the people who make pricing decisions? In an insurance firm, if turnaround time for customer claims is key, do your systems track the distribution of claims processing times?
- Are there opportunities to reconfigure the business process using information technology to collapse the time it takes to serve customers or to improve the consistency of internal decisions (for example, giving sales agents laptop computers to reduce order-to-shipment time)?
- Are there penalties for inaction? Investing in a library of reusable application code can take years but slash development time when completed. If you don't start work today, will competitors who do start obtain an insurmountable lead through their ability to introduce new information-based products faster than you?

The second task information systems executives need to focus on when they talk with their general managers is communicating effectively key issues the managers need to worry about.

General managers care about sales, profits and competition — so don't emphasize your successes managing the systems shop or abstract notions such as data resource management. Such discussions belong in performance appraisal sessions or general educational sessions, not in hard-hitting business discussions.

Instead, pick two or three key issues already on their minds — and add one or two you believe they must begin to worry about. Then communicate how information technology contributes to resolving those issues.

My nominations for your own issues are:

- Business management information and its interaction with systems architecture. What constraints does the current data architecture put on management's ability to understand the factors that drive profitability and competitive position? What specific help can be gained from new tools and techniques, such as data base management systems, personal computers and data policies, and what will they cost?

One MIS executive demonstrated the power of better management information by jury-rigging a key analysis that a business-sector executive had been seeking and then showed how better definition of product codes could enable the executive to run it again whenever he desired.

- Competitors' system activities. Are competitors doing anything that places your firm at a disadvantage, such as outspending you on development or using new tools and techniques that involve long lead times to imitate?

An insurance company's MIS director discovered that competitors had three to four times the development budget he had, far more than his firm could afford. This MIS director's conclusion: His own firm was probably too small to support the aggressive new product strategy increasingly being followed by the competition.

The third task is to build a shared vision of how your firm will manage technology. As the only executive in senior management with in-depth knowledge of information technology, it's your responsibility to get the management team to build a vision — a philosophy — of how the firm will manage its technology base. That vision can only be forged once the management team understands how information technology contributes to what's at stake for the firm (task 1) and to the few issues they really care about (task 2).

With those tasks under way, you can begin to orchestrate the firm's response to old nagging questions such as:

- How should the company structure its technology base, and what management processes are necessary to make that structure work?
- As technology evolves, how will the firm distribute responsibility among various business units for pieces of the technology pie?
- What policy framework and administrative mechanisms for issues such as conflict resolution, for example, must exist before that distribution can occur?
- Is the firm ready in skills and culture for decentralization without loss of control?
- How will the firm communicate the imperatives posed by its strategy to the technology groups responsible for implementing systems?
- How will the technology groups communicate the costs and capabilities of emerging technology to the businesses?

Finally, remember that most general managers don't yet know how to think about the information systems function, certainly not with the instinctive understanding they have about areas such as marketing. It's your responsibility to set the context for your relationship by focusing their attention on how information technology affects what's at stake for your firm and how it should be managed.

Packer is a senior associate with the information technology practice of consulting firm The MAC Group, Inc. in Cambridge, Mass.

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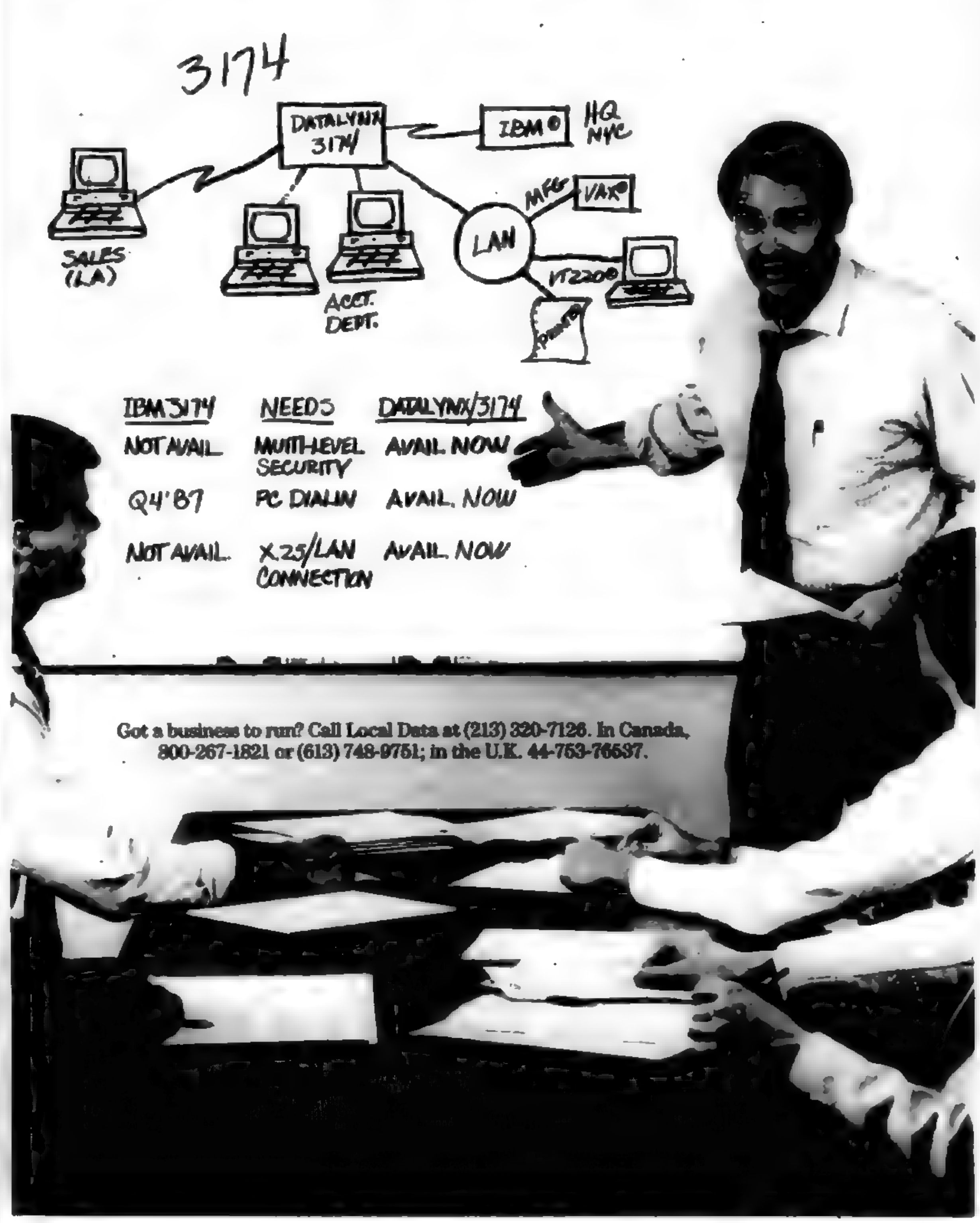

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Alan Alper

AI firms face maturity

For nearly 30 years, scientists have been developing ways to enable computers to mimic the human process of reasoning. These purveyors of so-called artificial intelligence have sought to transform computers from number-crunching machines to problem-solving systems.

Over the past decade, AI has left antiseptic university laboratories and become a commercial opportunity for many scientists-turned-entrepreneurs. Led by firms such as Carnegie Group, Inc., Inference Corp., Intellicorp and Teknowledge, Inc., the charge is on to bring AI into the mainstream.

The aforementioned vendors, known as the Gang of Four, are beginning to make some headway in providing efficient application development tools — and in making some money. They are touting the virtues of expert systems — systems that can reason with the help of human-derived knowledge — to an interested but somewhat overwhelmed commercial data processing audience.

As in the computer industry at large, however, it appears that the demand for expert systems may have temporarily crested. In short order, the young industry has penetrated those scientific and engineering firms and government institutions that had previously embraced any and everything that was AI-related.

"The market is in transition," suggests Tom Schwartz, a consultant and publisher of "Who's Who in AI." "The vendors have come close to saturating those who are concerned with R&D. It's now a project management issue — not magic anymore — and return on investment is the pressing question."

Dr. Alexander Jacobsen, president and chief executive of-

Continued on page 108

Banyan family tree firmly rooted in users' multivendor dilemmas

Banyan — An East Indian tree of the mulberry family with branches that send out shoots that grow down to the soil and root to form secondary trunks.

BY PATRICIA KEEFE
CW STAFF

Banyan's Mahoney

WESTBORO, Mass. — One of the lesser known challengers in the networking arena is a small East Coast company — named after a tree, of all things — that conceived a transparent linking system called Virtual Networking System (Vines) in the midst of a fog-shrouded Seattle airport.

It was an appropriate beginning, both in name and creation, for Banyan Systems, Inc., whose Vines provided a welcome solution to users struggling with an unruly tangle of multivendor, multitechnology installations.

The product line centers around Vines, a proprietary Unix-based network operating system that is ported to proprietary and industry-standard file servers like the IBM Personal Computer AT.

Much like the company namesake, Vines provides an anchoring trunk to a multitude of secondary shoots, those being local and remote departmental clusters, minis, mainframes and multiple local-area networks (LAN), all integrated together into one

Continued on page 112

Compaq has healthy '86

BY ALAN J. RYAN
CW STAFF

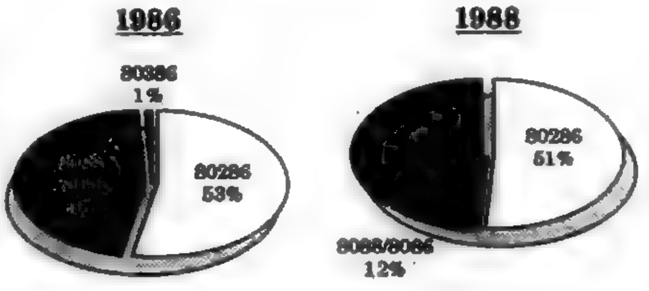
HOUSTON — Compaq Computer Corp. reported last week a 20% increase in sales and a 62% increase in profits for its fourth quarter.

Compaq President Rod Canion attributed the rise to the continued heavy demand for his company's Intel Corp. 80286-based portables and desktop systems and the Deskpro 386.

Canion said the high-performance systems accounted for

Continued on page 108

Data View



High-end micro growth

Projected breakdown of Intel Corp.'s IBM-compatible microprocessor shipments in U.S.

INFORMATION PROVIDED BY [illegible] RESEARCH, INC.
CW CHART: MITCHELL J. HAYES

Leasing woes hit IBM unit

BY CLINTON WILDER
CW STAFF

STAMFORD, Conn. — In another bellwether of slowing demand for IBM hardware, IBM's leasing subsidiary last week reported its first annual decline in overall business volume since its formation.

Although IBM Credit Corp. (ICC) posted a 14% gain in profits and a 27% revenue increase, its 1986 business volume — the total value of equipment for which it either wrote leases or financed through installment payment agreements — declined 8% to $2.85 billion.

ICC's purchases of IBM equipment to lease remained roughly flat with year-earlier levels of about $2 billion, but its installment payment agreements volume plummeted 21%.

Continued on page 111

Inside

- Apple strategy calls for rollouts, focused markets. Page 102.
- MSA reports revenue, profits up in '86. Page 111.
- Porteus on the wisdom of jumping on the LANwagon. Page 114.

Migent hits Ashton-Tate with return salvo

Antitrust action charges trade secret theft suit intended to delay data base

BY CLINTON WILDER
CW STAFF

INCLINE VILLAGE, Nev. — Microcomputer data base developer Migent Software, Inc. has fired a return salvo against market leader Ashton-Tate, filing an antitrust lawsuit in response to Ashton-Tate's recent trade secret theft suit against Migent [CW, Jan. 12].

In its antitrust suit filed in U.S. District Court in Reno, Nev., Migent charged that Ashton-Tate's suit was filed specifically to delay Migent's introduction of a new data base product, code-named Emerald Bay.

The Emerald Bay development team is led by C. Wayne Ratliff, developer of Ashton-Tate's original Dbase II. Several former Ashton-Tate executives now work for Migent, including Migent Chairman Carl Gritzmaker.

Ashton-Tate's suit charged that Ratliff illegally brought proprietary Ashton-Tate information to Migent and violated a three-year no-compete contract that he signed with Ashton-Tate. Ratliff has strongly denied the charge.

"We're not going to lie down and play dead," a Migent spokeswoman said. "Ashton-Tate has resorted to tactics which we believe are illegal and unfair. Ratliff's work is being done in fair and lawful fashion."

Stanley Witkow, Ashton-Tate's general counsel, called the Migent antitrust suit "balderdash. . . . Theirs was a very common response to a proprietary rights lawsuit, and we were not surprised by it," he said. "We don't file lawsuits to protect our market position, we file lawsuits to protect our proprietary technology."

Cases may merge

Although Migent's action was not technically a countersuit, the two cases may be joined together for trial, according to Witkow. He also alleged that Migent's suit was partially motivated by Migent's desire to "get a more favorable venue."

If the cases eventually go to trial, they may prove to be a critical legal test of the transfer of software concepts and code structures by software development professionals who change jobs. In addition, the legal controversy has thrust Migent, an obscure software vendor before Gritzmaker's arrival, into the forefront of the coveted micro data base market.

"I'm surprised that Ashton-Tate would be worried about competition from a small company," said Jeffrey Tarter, editor of "Softletter," a micro software industry newsletter in Chelmsford, Mass.

"Data base is not a technology-driven business at this stage," Tarter added. "Even if Ratliff were to pull a rabbit out of a hat tomorrow, the problem of converting everyone in large corporations to a new standard is formidable."

Ripened Apple plants seeds for future success

BY PEGGY WATT
CW STAFF

CUPERTINO, Calif. — Some observers diplomatically say Apple Computer, Inc. has matured. Others snort and say it has gone stodgy.

Its last two shareholders' meetings have no longer revolved around product announcements, nor have they resembled pep rallies. But earnings are up, inventories down and revenue at a plateau — and Apple's leaders say they look to the microcomputer company's second decade with both triumph and optimism.

"As we began fiscal 1986, a lot of people questioned our ability to exist," Apple President and Chief Executive Officer John Sculley said recently. "But when we closed the year, a lot of people were applauding our success and bright future."

And, other officials add, Apple's time is ripe. IBM's earnings have declined for two consecutive years, partly due to personal computer competition from clones. Big Blue's 5-year-old Personal Computer is finally past its peak, amid rumors and debate surrounding its next incarnation.

"IBM lost about eight market share points to the competition in the past six months," says John Zeisler, Apple's manager of business marketing. "The fragmentation of the market has helped Apple."

Filling pipeline

In order to seize the opportunity, Apple has filled its pipeline with products for the next three years, Sculley says.

"You'll never see three or 3½ years between improvements in our products," says Jean-Louis Gassee, vice-president of research and development, a department that was the beneficiary of some $126 million in Apple expenditures last year. This year, Apple has already announced its long-awaited server and software, with new models of the Mac due in March. Connectivity products promise to be among Apple's interests.

Zeisler says desktop publishing is still among Apple's priorities but that it will "move much more into the mainstream in 1987," reaching both the high- and low-end markets. "If we do a good job with desktop publishing, we won't have to talk about it as a separate application in a few years. It will be built into every Macintosh," he adds.

Invading turf

Apple's other market priorities are business management, with a relational data base reportedly under development, and engineering applications, which could invade the turf of workstation makers such as Apollo Computer, Inc. and Sun Microsystems, Inc.

"There is a tremendous acceptance of the Macintosh in aerospace and energy firms," Zeisler says. "We're not trying to compete against the Suns and Apollos of the world but in cost-reducing some of their characteristics for a wider customer base."

Apple has gotten help this year from third-party developers, who accounted for much of the early success of the Apple II family with add-ons and are now enhancing the Mac. Peter Friedman, marketing manager of the network and communications group, says Apple is considering a testing program to certify third-party products.

Apple's own engineering department includes several Digital Equipment Corp. VAXs, IBM 370s and a 4300, along with the well-publicized Cray Research, Inc. supercomputer purchased last year. "That's a significant change from three years ago," Friedman says. The new equipment is also the evidence of R&D spending that rose 75% in fiscal 1986, Sculley says. He expects R&D to account for about 8% of revenue this fiscal year.

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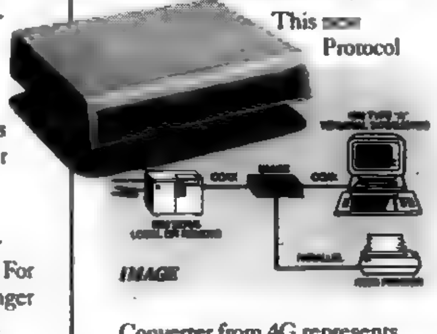

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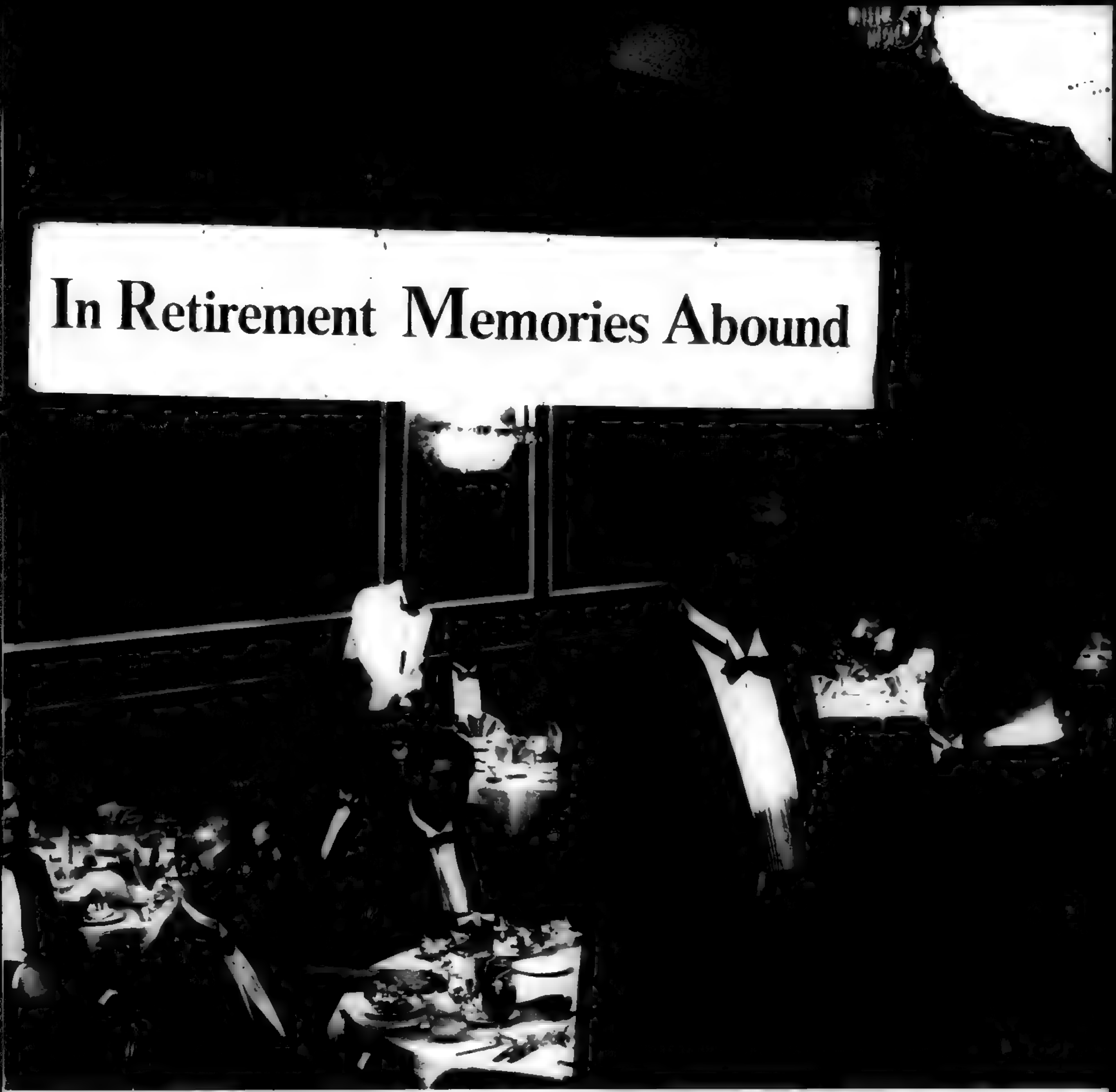

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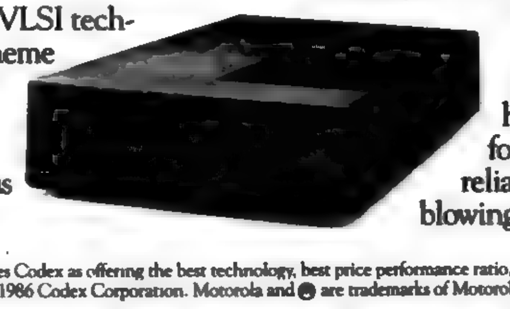

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Firm weathers financially stormy leasing industry

BY ALAN ALPER
CW STAFF

WESTPORT, Conn. — The swiftly changing currents of the computer leasing industry can be a challenge to negotiate. While numerous competitors have run aground, unable to avoid technological and financial hazards, Jerry Minsky, president of Technology Finance Group, Inc., has guided his company through the industry's murky waters for the better part of the last decade.

Minsky, a 13-year computer leasing industry veteran, has experienced the ebb and flow of a business that very often is controlled by external forces such as tax laws, interest rates and the underlying value of a particular vendor's technology.

Technology Finance Group, founded as Alanthus Corp. in 1972, was once among the largest computer leasing firms in the industry. However, the firm faded during the late 1970s and 1980s when cutthroat competition and the revelation that the New York-based firm OPM Leasing Services, Inc. had written phony leases and defrauded corporate investors of millions of dollars gave the leasing industry a collective black eye.

The value of Technology Finance Group's lease portfolio dropped during that time from about $150 million to about $100 million a year, as larger companies such as Comdisco, Inc., which formerly traded exclusively in used equipment, took the leasing industry by storm.

Some of these deep-pocketed firms tied their sails to selling leases for tax benefits via Wall Street syndicates. But Minsky says he was always wary of selling tax shelters through Wall Street underwriters.

"The difference between us and some of the others was that we didn't rely on syndicates; we sold our deals directly to investors, not through intermediaries," he says. "That single decision allowed us to survive some of the problems we inherited from the earlier time frame."

The repeal of the investment tax credit, which removes the tax benefit of financing computer leases, has forced smaller lessors that had used the investment tax credit to find new means of funding their businesses.

"Loss of the investment tax credit will have little effect on us," Minsky maintains. "In not more than 20% of our business has the investment tax credit been given to the lessor. We have other ways to shelter our income."

Minsky says he believes loss of the investment tax credit will be a healthy development for the leasing industry since the tax-benefit bargaining chip is eliminated. "Now the focus will be on credit-worthiness of the lessee, stability of the computer manufacturer and his ability to maintain and enhance the equipment, as well as the residual value of the equipment," Minsky observes.

Many believe the creation of income funds to finance short-term operating leases, however, is an unsettling development for the industry, since the promise of high returns on investments is often based on inflated residual value projections. The projected payoffs, particularly for IBM equipment in which the market is flooded and residual values are down, may end up being nothing more than a pipe dream, Minsky asserts.

"Everybody's complaining about the income funds, but everybody is doing them," Minsky says. "In some cases, people are being promised 12% and the return of their principal, when in reality that may not be the case."

To acquire equipment, Minsky is relying more on bank borrowing than ever before. As with many other leasing firms in the past two years, the ever-pressing capital demands of the business are also forcing Tech-

Continued on page 111

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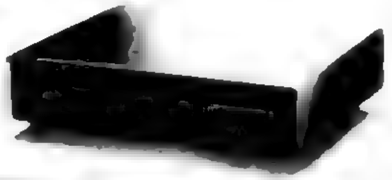

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Compaq's '86

CONTINUED FROM PAGE 101

72% of the company's sales during the quarter. He added that orders for the Deskpro 386 exceeded supply throughout the fourth quarter.

"The results obviously show that the customer set out there likes Compaq's high-end products," said John Dean, an analyst with Montgomery Securities in San Francisco. "We would expect them to continue their sales success in spite of rumors of an IBM 80386-based product floating around."

For its fourth quarter ended Dec. 31, Compaq recorded sales of $186.9 million, compared with sales of $156.3 million for the fourth quarter of 1985. Income for the period was $16.2 million, or 49 cents per share, compared with $10 million, or 32 cents per share, in the fourth quarter of 1985.

Sales were $625.2 million for the year, an increase of 24% over sales of $503.9 million in 1985. Income rose to $42.9 million, or $1.33 per share, compared with income of $26.6 million, or 90 cents per share, in 1985, an increase of 61%.

Analyst Bruce Lupatkin of Hambrecht & Quist, Inc. in San Francisco, said the results were "outstanding, but that was expected." He attributed the success to the strength of Deskpro 386 sales. Lupatkin said the first buyers of the Deskpro 386 were software developers and "people who were power hungry. But there are corporations that are considering the 386 as part of their overall strategy," he added. "It's making inroads everywhere."

Nibbles and big bites

While the influx of other 386-based machines may nibble at Compaq's sales, analysts said the competition will not take a big bite. "At this point in time, I don't think there is really anybody in the high channels that has a 386 product," Dean said.

"I think that any time there is additional competition and you are really the sole vendor shipping, it's going to have some impact," Lupatkin said, adding that that impact will likely be slight.

In the dealer channels, Compaq is the major 386 vendor, and that will probably not change, Dean said. "Compaq has solidified that shelf space," he noted.

According to a statement made last November by Mike Swavely, Compaq's vice-president of marketing, owner registration cards showed that the Deskpro 386s were being purchased for personal productivity applications, computer-aided design and engineering, network file servers, software development and use within Microsoft Corp. Xenix environments.

Compaq's overseas sales more than doubled during 1986, which led to the company's announcement of plans to establish a $23 million manufacturing facility in Erskine, Scotland. The facility is intended to enable Compaq to meet the needs of its European markets and is expected to provide duty savings.

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AI firms mature

CONTINUED FROM PAGE 101

ficer of 8-year-old Inference in Los Angeles, concurs. "The initial appetite has been met," Jacobsen explains. "There is a pause taking place as vendors reposition themselves."

Caught in a number of binds, Symbolics, Inc. in Cambridge, Mass., is one vendor looking for a better position. Symbolics recently laid off 17% of its 950-member work force and posted a second-quarter operating loss of $3.4 million on revenue of $26.5 million.

The firm, known for its special-purpose processor that uses LISP, is also up against a marketplace looking for standard hardware platforms for design and application delivery.

Users these days are seeking expert systems that run on general-purpose processors, such as a Digital Equipment Corp. VAX or IBM mainframe or Unix-based workstations. There is also the Intel Corp. 80386 microprocessor coming around the bend, which provides the power and speed well suited to expert systems development.

Howard Cannon, Symbolics' director of special projects, takes umbrage at such criticism, noting that their products do connect with VAXs via Ethernet and communicate with IBM processors via SNA links. "We've always believed you have to integrate into an existing environment to be successful," he says.

Symbolics, he says, has been hurt by the newer competitors' hype. "A lot of firms are saying, 'Oh, we do this, and we do that,' and it's creating confusion in the marketplace," Cannon says.

Perhaps, however, the second wave is ready to identify itself. At a recent conference for MIS executives and managers sponsored by Information Management Perspective, Inc. in New Brunswick, N.J., only four of the 60 attendees said their companies had begun implementing expert systems technology. But all, judging by the attendance at the conference, were planning to do so.

A data administrator at a major New York financial institution, summed up the feeling of many in attendance. "We're still trying to figure out how we're going to use this technology," he said, "but we already know that 70% of our processing is going to make use of it."

Such words of encouragement must have AI vendors chomping at the bit.

Alper is *Computerworld's* Mid-Atlantic bureau correspondent.

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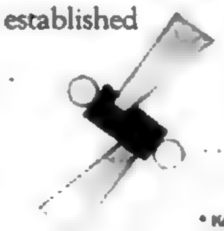

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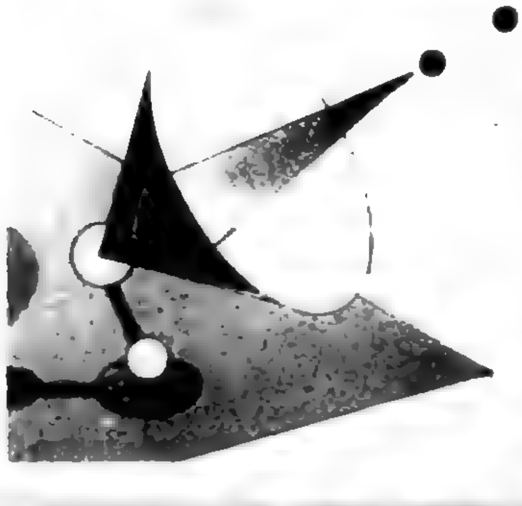

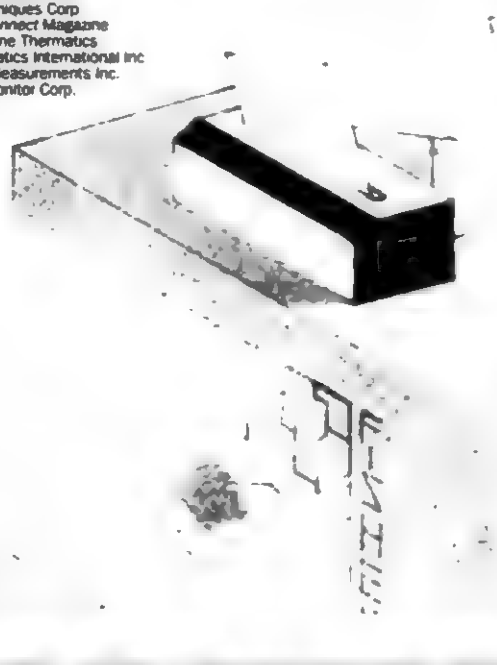

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NICKELS & DIMES

Duquesne Systems, Inc. reported revenue for the first quarter ended Dec. 31 of $8.6 million, compared with $4 million reported for the same period a year ago. Profits were $1.9 million, or 36 cents per share, compared with $941,000, or 21 cents per share, in the prior year.

Convex Computer Corp. announced revenue for the year ended Dec. 31 of $40.2 million, a 200% increase over $13.5 million reported in the previous year. Net income for the year was $4 million, or 26 cents per share, compared with a net loss in the previous year. For the fourth quarter revenue was $12.9 million, compared with $6.9 million a year earlier. Profits for the quarter were $1.4 million, or 8 cents per share, compared with $330,000, or 2 cents per share, for the like quarter a year ago.

Policy Management Systems Corp. announced revenue for the fourth quarter ended Dec. 31 of $43.6 million, compared with $26.3 million a year ago. Profits were $3.9 million, compared with $3.1 million in the previous year.

Revenue for the year was $150.6 million, compared with $102.8 million a year ago. Profits were $13.8 million, or 85 cents per share, compared with $14.4 million, or 89 cents per share, a year ago.

Software license fees cited as MSA reports 171% profit increase for '86

ATLANTA — Management Science America, Inc. (MSA) officially closed the books on a successful 1986 last week, announcing a 28% gain in revenue and a 171% rise in profits from the firm's relatively weak 1985.

The mainframe applications vendor reported net income for the year of $18.7 million, or $1.03 per share, which was up from $6.9 million, or 39 cents per share, in the previous year.

MSA sales reportedly approached the $200 million mark at $193.5 million, compared with $151.7 million in sales in the prior year.

MSA also noted that revenue from software package license fees, which represents new business, increased 37% to $120.6 million in 1986.

In the fourth quarter, MSA reported profits of $12.9 million, or 71 cents per share, compared to $10 million, or 56 cents per share, in reported profits for the fourth quarter of 1985.

Fourth-quarter sales rose to $77.7 million from $57.6 million.

Demand hits

CONTINUED FROM PAGE 101

from $1.11 billion in 1985 to $874.3 million.

"ICC is operating in the part of IBM's business that is not growing," said Bob Djurdjevic, president of Annex Research, Inc. in Phoenix.

ICC's business decline was particularly acute in the fourth quarter. The leasing unit fell far short of matching the huge volume of the 1985 fourth quarter, in which IBM shipped — and ICC financed — a record number of 3090 mainframes.

In contrast, in the fourth quarter of 1986, ICC did just $24.3 million in installment payment agreements business after $850 million in the first nine months of the year, according to Annex Research figures.

However, ICC continued to post considerable success at the bottom line.

Firm weathers

CONTINUED FROM PAGE 105

nology Finance Group to dig more deeply into its cash reserves.

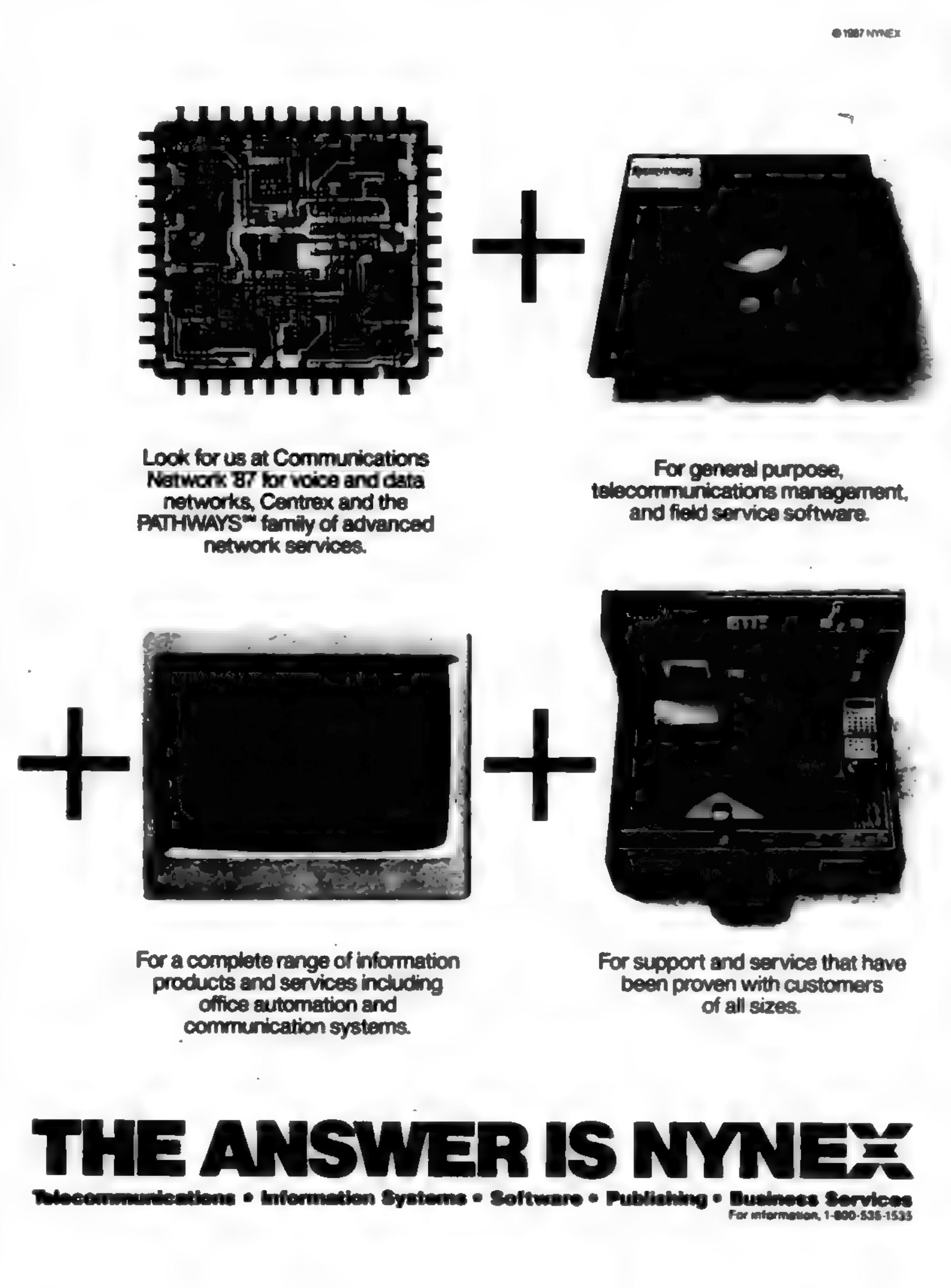
Minsky considered taking the company public late last year but opted against it for a variety of reasons, including a projected low valuation and mixed investor reactions to computer leasing firms.

The entry of IBM Credit Corp. (ICC) into the computer leasing business in 1982 has changed all the rules of handling Big Blue equipment, Minsky maintains. With the backing of "Bank IBM," Minsky says ICC is offering the lowest rates available on IBM equipment such as the entry-level 3090 mainframes. Independent lessors have shied away from the 3090 series because of projected skimpy residual values, Minsky says.

"IBM Credit Corp.'s charter is to help IBM install equipment," Minsky notes. "I don't believe their charter is to make money but to subsidize IBM. I'll never be able to prove it, but how can they borrow money at 6% and charge 7% when the world at large charges 9%?"

Like more and more independent lessors, Technology Finance Group has chosen to diversify its portfolio so that IBM equipment no longer represents a majority of its lease base.

The firm now handles Digital Equipment Corp., Honeywell, Inc. and Unisys Corp. computer equipment and is moving heavily into telecommunications gear and peripherals.



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Banyan

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comprehensive network. All network resources, regardless of where they reside on the network, appear as extensions to user PCs, thanks to a networkwide naming and addressing system.

"Banyan's literature read just like our wish list. We were skeptical at first; they looked too good to be true," says Donna Staats, president of the Banyan Users Group and manager of office systems planning for Minneapolis-based World Bank, Banyan's largest installation. "But they were in fact able to do what we wanted."

Banyan has also won its share of kudos from industry analysts. "They are one of the few companies that can talk a good story about wide-area and local-area networks," says Robert Clarke, a consultant with the Seybold Group, a market research firm in Torrance, Calif.

'Very focused'

The privately held company was founded in September 1983 by David C. Mahoney, Anand Jagannathan and Lawrence Floryan. "Banyan has good, in-depth management. They are very focused," says Claire Fleig, director of research for International Technology Group in Los Altos, Calif.

Analysts estimate the venture capital-funded company is worth between $20 million and $25 million, predicting the company may jump as high as $40 million this year. Mahoney hints at the possibility of going public late this year or early in 1988.

Banyan approaches networking with a focus befitting the background of its founders — minicomputer and office systems concepts. President and Chief Executive Officer Mahoney spent 10 years with Data General Corp., managing DG's communications/networking hardware and software products, before forming Banyan. Also, Banyan engineers can lay claim to having helped design Digital Equipment Corp.'s PDP-11 minis and the DEC Rainbow.

This systems orientation is crucial in that it allows Banyan to anticipate the moves of systems integrators — minicomputer vendors — on the high end and gives it a leg up on its competitors at the low end, particularlly Novell, Inc. in Orem, Utah, and 3Com Corp. in Santa Clara, Calif. Although they dwarf Banyan in size, these two are just beginning to stretch beyond the work group clusters to provide links to host systems and remote locations.

Banyan concentrated mostly on building sales last year, and the response has been good, analysts say. "[Part of] Banyan's problem is that it is trying to make money at this point, while Novell and 3Com are going businesses," says George Colony, president of Forrester Research, Inc. in Cambridge, Mass.

'Risk-taking' clientele

While Banyan can not yet touch Novell or 3Com's market share, it has built a loyal and enthusiastic, if still small, following. Launched last year, the Banyan Users Group today numbers about 100 member companies, with a heavy regional emphasis in the Northeast and Southwest. "We were all risk-takers at the time, as [Banayan's] technology was not yet blessed," Staats says.

Despite what analysts call a good, solid strategy, Banyan today finds itself at a crossroads, caught in a Catch-22 of sorts.

Chief among the company's goals for this year is to increase market share in order to produce the revenue it needs to grow the operation and its product lines.

But Banyan lacks name recognition and is handicapped by its limited ability to provide support services, supporters say. Without either, it will be hard to penetrate the networking market at the speed with which Banyan wants to grow.

Support is another pebble in Banyan's shoe. Banyan contests complaints about its ability to support customers, although a user questioned Mahoney at a recent conference, complaining about problems with equipment she had purchased from a dealer.

Banyan's approach to support relies heavily on third parties. Analysts question whether dealers in particular are capable of properly installing and supporting the sophisticated Vines network.

Direct sales are much less troublesome. Banyan has concentrated its efforts on large corporate customers, such as World Bank, Bank of Boston Corp., Bank of New England Corp. and Citibank N.A. The MIS departments at these sites all capably take on the bulk of support requirements for the Banyan network.

"Networking is highly support service-intensive, and Banyan's limited resources have it at somewhat of a disadvantage here," Forrester Research's Colony says.

Despite criticism, analysts are willing to paint Banyan a bright future. Many consider Banyan an even more likely candidate than 3Com to catch, and even surpass, Novell. "Banyan could be an excellent alternative to Novell," Clarke of the Seybold Group predicts.

The support and visibility issues are easily solved by money. Short of generating the necessary revenue on its own, Banyan has the option of providing those funds through continued venture capital investment, a public offering or an equity investment or buyout by a larger firm. All are viable options. "I think Banyan has to look for a partner in this market," says International Technology Group's Fleig, pointing to the success Banyan has had with TRW, Inc.

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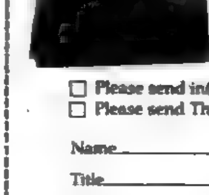

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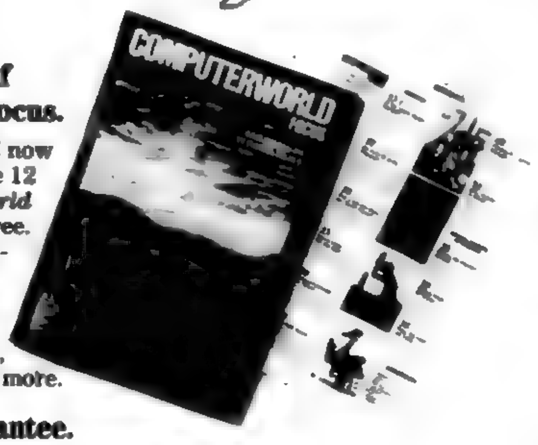

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ACTIVE ISSUES

Kathy Porteus

Investors: 'This LAN is my LAN'

Several weeks ago, investors hopped on the local-area network (LAN) bandwagon, and they have no doubt enjoyed the ride so far. Since Jan. 2, stocks of LAN companies have gained between 19% and 43% in price per share. Such movement reflects not only the robust stock market but also growing investor belief in a rosy year for the LAN market.

"This certainly seems to finally be the 'year of the LAN,' " says George Kelley of Morgan Stanley Group, Inc. . "The overhang from IBM is now gone, and users are becoming more comfortable with the fact that networking represents the next round of improvements for white collar workers who already are benefiting from the use of personal computers."

According to Paul Sherer of Robertson, Colman & Stephens, investors now realize that LAN companies provide real value to personal computer users. Such a perception about LANs, and the fact that a major portion of the installed base of personal computers has yet to be connected, strengthen the argument for investing in this area, Sherer says.

Sherer recommends purchase of 3Com Corp. (COMS — 19½), Bridge Communications, Inc. (BLAN — 19¼) and Novell, Inc. (NOVL — 35¾). Sherer says he likes 3Com for its retail distribution leverage in taking advantage of increased demand for PC networks. He favors Bridge for its "excellent new product flow" and Novell for its dominance in value-added resale channels.

Investors are bullish on LAN vendors

Closing price per share in national over-the-counter trading

	Dec. 31	*Feb. 2*	*% Change*
Bridge Communications	15½	19¼	24%
DCA	27	33¾	25%
Novell	25¾	36	40%
3Com	16¼	20½	27%
Ungermann-Bass	9¼	12¾	39%

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Sherer estimates calendar-year earnings for 3Com, Bridge and Novell will be 92 cents, 86 cents and $1.70 per share, respectively.

On the other hand, Laura Peck, communications analyst with L. F. Rothschild, Unterberg Towbin, has become less aggressive in her recommendation of 3Com and Digital Communications Associates, Inc. (DCAI — 32¼), owing to recent strong performances by those stocks. Instead, she emphasizes her recommendation of Ungermann-Bass, Inc. (UNGR — 13¼).

Peck expects Ungermann-Bass to show an earnings turnaround this year, a story the stock does not yet fully reflect. Based on her estimate for this year of 70 cents per share, Peck says Ungermann-Bass still sells below the price/earnings multiple of other LAN firms.

While investment activity in LAN companies currently focuses on personal computer networking, Mark Stahlman of Sanford C. Bernstein & Co. says he believes networks based on IBM's Token-Ring and General Motors Corp.'s Manufacturing Automation Protocol (MAP) are two businesses "that can really boom in 1987." Stahlman recommends purchase of Ungermann-Bass because it is the company best positioned in both of these markets.

Ungermann-Bass is among the most active companies in factory networking through Industrial Networking, Inc. (INI), its joint venture with General Electric Co. Although Stahlman recognizes that reductions in capital spending at GM will slow progress of INI's much-publicized network contract with GM, he maintains that INI "has successfully expanded its customer base now that product is available and GM has proven that the MAP concept works."

Perot puts $20M in Jobs' start-up

They say politics makes strange bedfellows, but so does the computer business.

Two of the industry's most controversial figures — Apple Computer, Inc. cofounder Steven Jobs and Electronic Data Systems Corp. founder H. Ross Perot — have joined forces. Perot recently paid $20 million of his $750 million General Motors Corp. stock sale proceeds for a 16% stake in Next, Inc. — Jobs' start-up company that is developing a "scholar's workstation" for the higher education market. Perot will also hold a seat on the Next board of directors.

Next also said that Carnegie-Mellon University and Stanford University have jointly invested $1.32 million for a 1% ownership in the company.

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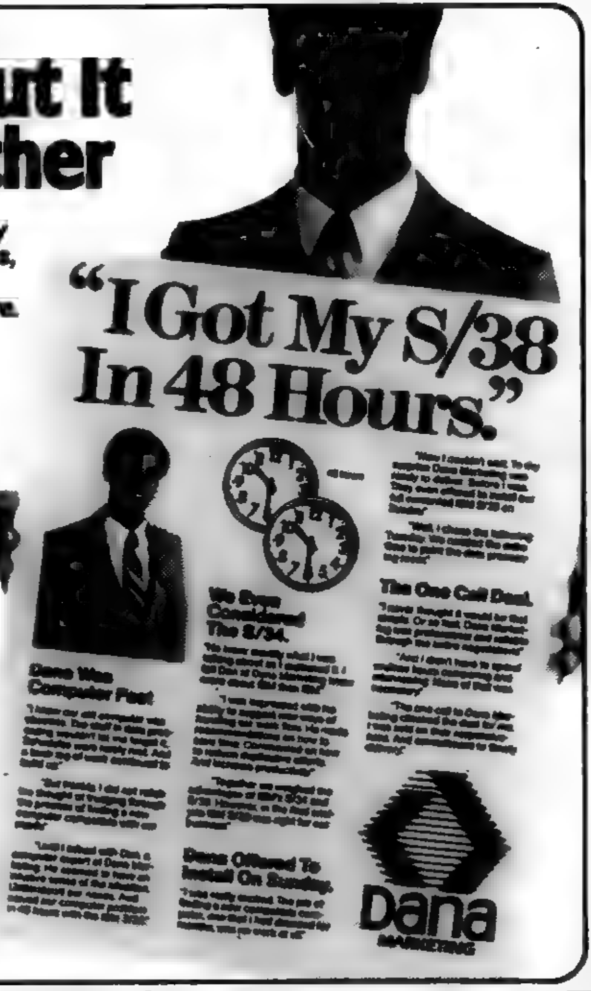
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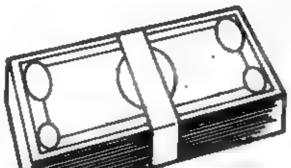

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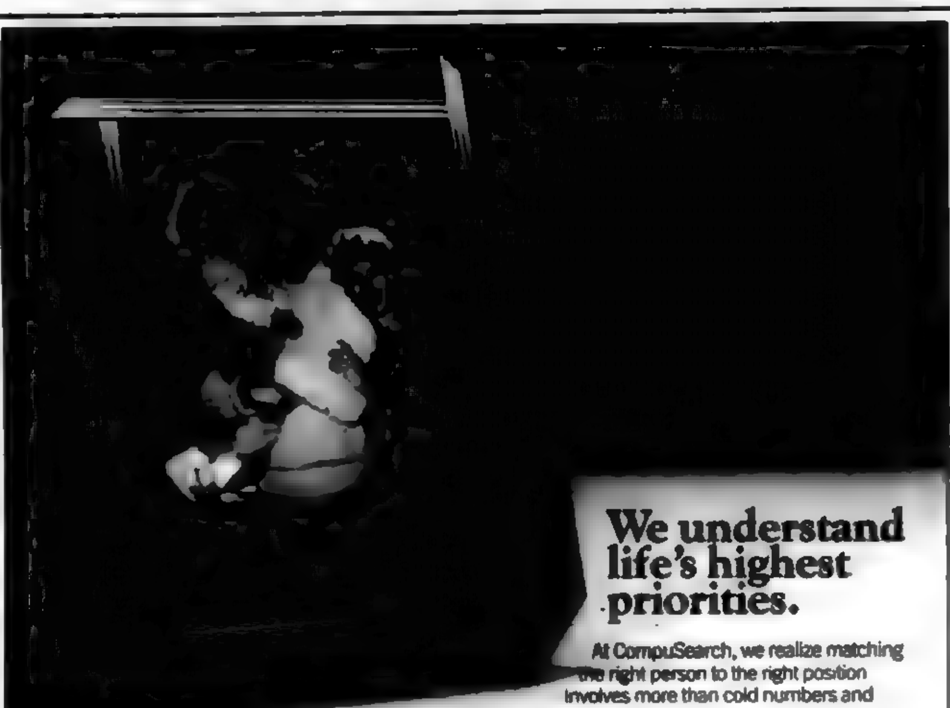

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November 1986

Computer & Electronics Marketing

Page 21

Digital Equipment Corp. Named Marketer of the Year

Despite Most High-Tech Profits Slowing, DEC Keeps Its Business Growing

By Nat Sakowski

MAYNARD, MASS.—To analysts' astonishment, in an atmosphere of doom and gloom, layoffs, cost cutting, lackluster profits, and worst-case scenario projections for the future, Digital Equipment Corp. keeps racking up impressive earnings, quarter after quarter. Third-quarter earnings, for example, were up 85.7% on a 14.2 gain in revenues. Those results contrast with industry leader IBM's 27% decline.

Nor do analysts think Digital's recent per- analysts

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sure all its computers communicate with each other. That investment is now paying off. In the last 20 months, DEC has introduced seven high-performance systems, including the $1-million VAX 8800, which comes close to matching some of IBM's mainframes in performance; the MicroVax II, a powerful desktop mini that begins at $20,000; and the VAXmate, the IBM PC compatible with built-in local area networking capability selling for a little more than $40,000.

Each of these computers can run the same software programs and share data wi

Olsen's philosophy is t

clearly aimed at general commercial users. It lets a user easily access a word processing, spreadsheet, or appointment calendar, do electronic mail, or printing, by stepping down through a menu. It even features Windows, the latest razzle-dazzle software from Microsoft.

DEC has been furiously beefing up its marketing and sales staffs. Many already have technical sophistication and have been laid-off by other companies doing less well than DEC. In-house training has become more sophisticated, too. Once sales and marketing were taken for granted. DEC was to-

duct oriented

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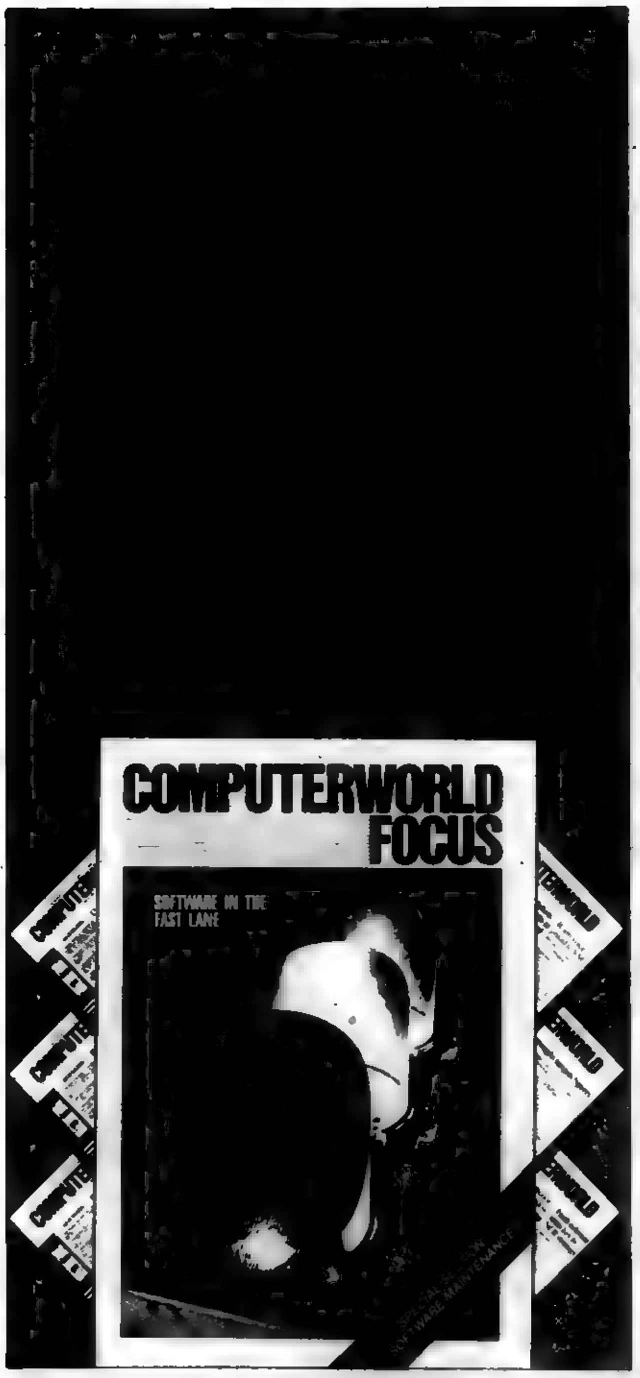
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Candidate should have a bachelor's degree or equivalent combination of education/experience as well as two years of technical writing experience. Candidate should have a strong technical background including knowledge of at least one programming language, experience in an applications area such as graphics or statistics, and computer science coursework. UNIX strongly desired. Writing sample required. (Job # A87-877)

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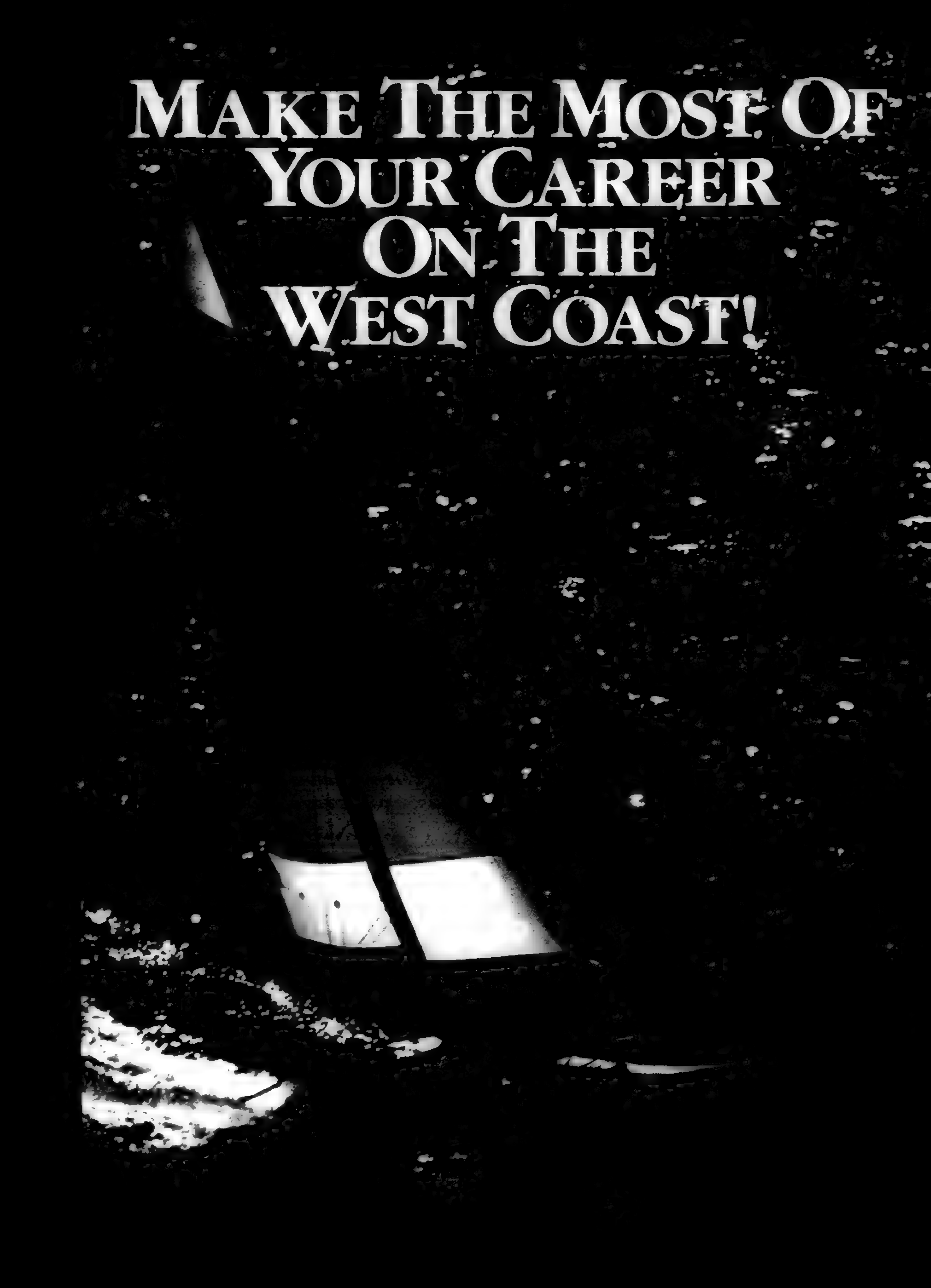
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SOUTHERN CALIFORNIA

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DEC VAX System Programmer *(371-11)* Northern San Diego software company. Manage and tune their VMS system. Will interface with Applications Programmer and assist in training. To $45,000.

Software Engineer — Vision Systems *(371-12)* Rapidly expanding San Diego firm is adding to their vision systems group. Person will develop machine vision inspection systems on microprocessors. To $40,000.

IBM Programmer/Analyst — IDMS Training *(361-02)* Leading Orange County Fortune 500 company offers excellent training and a pleasant, modern working environment. Two years of OS COBOL experience desired with exposure to on-line/database applications. To $40,000.

Senior Business Systems Analyst *(361-03)* International corporation with headquarters in Orange County seeks a Project Leader with IBM 30XX OS/MVS experience. Will select and install a major personnel and payroll system. IMS DB/DC preferred. To $47,000.

FOCUS Programmer/Analyst *(361-04)* Southern California Fortune 500 company offers a highly visible position for a FOCUS Programmer/Analyst to work in an information center environment. You will support various user groups and develop applications to meet their needs. To $38,000.

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CICS DL/1 Programmer/Analysts *(361-06)* Join a progressive Orange County firm with new development opportunities for solid CICS DL/1 Programmers. To $37,000.

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UNIX Systems Programmer *(351-04)* Santa Monica-based employer engaged in development of hardware/software products, seeks experienced UNIX Internals Systems Programmer to support and enhance software. To $50,000.

MSA/McCormack and Dodge P/A and S/A *(351-05)* Suburban Fortune 500 firm seeks an experienced Programmer/Analyst or Systems Analyst to support major financial packages. Growth potential. To $45,000.

Database Architects and Software Engineers *(351-06)* Progressive West Los Angeles-based firm seeks technical professionals for an exciting research and development project involving a relational database spanning mainframes and micros. Strong background in database software development or complex real-time systems development and experience with PASCAL, C or Assembly sought. To $60,000.

NORTHERN CALIFORNIA

UNIX Systems Programmer *(341-01)* Major San Francisco Bay Area vendor is seeking UNIX Development Engineers. Requires kernal knowledge in Berkeley and AT&T UNIX for this highly visible position. To $55,000.

DoD Contracts Awarded — Silicon Valley *(341-02)* Positions available in Program Management. Satellite control, mission planning configuration management, digital signal processing and test and integration. Skills needed are ADA, JOVIAL/73, PASCAL, or FORTRAN to be used in a state-of-the-art development environment. To $70,000.

Software Engineers — Project Leaders *(341-03)* Utilize your experience in digital signal processing or high speed image processing to grow with this rapidly expanding supplier of satellite systems. Prefer VAX, UNIX, PASCAL and C. Any EW experience is a plus. San Francisco Bay Area location. To $50,000.

Product Marketing Manager — Mini/Microcomputers *(341-05)* Prestigious nationwide computer vendor in San Jose is looking for an experienced professional to manage the integration of a product from engineering definition through product life cycle and marketing distribution. Experience in marketing a computer product is desired. To $60,000.

Customer Support Systems Engineer *(341-06)* Dynamic young company located in the San Francisco Bay Area is looking for Systems Engineers to support their banking and insurance clients. Three to five years experience in CICS, IMS-DC in an IBM MVS environment. To $48,000.

Software Engineer — AI Start-Up Opportunities *(341-07)* Many positions open for experienced Software Engineers with backgrounds in customer support, knowledge engineering, UNIX internals, LISP or PROLOG, compiler development. Silicon Valley location. To $100,000.

Programmer/Analyst — Management and CICS Training *(331-01)* Rapidly expanding San Francisco data processing organization seeks a professional with at least two years of IBM OS/COBOL and VSAM experience to work on information systems. Endless opportunities for advancement. To $40,000.

Programmer/Analyst — Long-Term Growth Position *(331-02)* Major San Francisco manufacturer seeks aggressive, results-oriented individual with two years System 34 or 36, RPG II experience. New system development project offers skill enhancement and promotion potential. To $42,000.

Programmer/Analyst — IMS DB/DC *(331-03)* Major California department store chain offers highly visible and challenging opportunities to professionals with four years structured COBOL and some IMS experience in an IBM/OS environment. Excellent training program. Beautiful suburban San Francisco location. To $50,000.

Systems Programmer — Communications, MVS, IMS *(331-04)* Leading San Francisco computer manufacturer seeks Systems Programmers with a minimum of two years in installation, troubleshooting, and product support of network systems, VTAM, SNA, MVS, IMS, and VM/CMS. Must have experience in multiple major system products support. To $48,000.

OREGON

Software Engineers — High-Tech Start-Up *(311-01)* Portland-based software firm which develops application specific software for image processing has multiple opportunities in signal/image/seismic processing, cat/medical imaging, CAD/CAE simulation, and ASW. Requires solid mathematical backgound with C, Fortran or Assembler experience. To $45,000.

Database Administrator — IDMS *(311-03)* Rapidly expanding software house located in Portland seeks an IDMS Data Base Administrator. Will be involved in all technical aspects of database administration, extensive interface with applications development, consulting with outside clients and project management. Strong technical background with IDMS and any database experience, ADS/O and COBOL, are highly desired. To $50,000.

Programmer/Analysts — Minicomputers *(311-04)* Expanding software house has recently created multiple opportunities for Programmer/Analysts with solid backgrounds in Basic language and the PICK operating system. Develop new on-line applications for order entry, manufacturing, inventory and financial applications. Excellent career growth potential to lead positions, management or technical areas. Very progressive and creative environment. Portland. To $35,000.

Applications Engineer — UNIX O/S *(311-05)* Well-established high-tech company for the OEM market, manufacturing a 32-bit multi-board computer, seeks experienced and innovative individuals to develop operating system, drivers, utilities, etc. Campus atmosphere in a high-tech park allows individuals to work in a creative atmosphere. Knowledge of C and UNIX internals desired. Portland. To $50,000.

Consultants — Big 8 Image *(311-06)* Use your five or more years of large system experience, project management skills and profit orientation to develop information system plans and use clients' staff to achieve results in a true consulting role. Strong communication skills and a background in financial, manufacturing, insurance or banking and an MBA is highly desired. To $45,000.

Systems Analysts — Growth to Management *(311-07)* Utilize your strong verbal and written skills as well as structured design techniques to lead special projects in a pure Analyst role for this well-established Portland company. Initially you will be involved in the conversion of manufacturing systems from DEC 20's to IBM 30XX under MVS. Requires four to six years of solid background as P/A and S/A in COBOL with one year experience in CICS. Database experience is very helpful. To $36,000.

Software Engineers — Graphics *(311-08)* Four year old rapidly growing high-tech firm specializing in software and firmware for graphics applications has recently created new, exciting career positions for Software Engineers. Positions exist in graphics applications, database applications, firmware development and quality assurance. Experience with C, UNIX Graphics Applications or Graphic Kernal desired. Portland. To $40,000 plus stock.

Senior Programmer/Analyst — CICS *(311-09)* Rapidly expanding, well established firm headquartered in Portland seeks professionals for the design and development of applications to support a variety of applications including distribution, inventory and financial in an on-line, large-scale IBM environment. Requires minimum two years of structured COBOL and one year of CICS experience. Prior experience with DB2 would be a real plus. Firm offers exciting career potential. To $38,000.

Programmer/Analysts — HP3000 *(311-10)* Growing software house located in a low cost of living area, has multiple openings for professionals with hospital laboratory or business experience. Minimum three years experience on HP3000 with Pascal or Fortran, structured methodologies and customer interface skills desired. Progressive environment with career path to Project Leader. To $40,000.

WASHINGTON

Database/Analyst *(301-01)* Seattle office of well-established manufacturing firm is expanding its staff to add to the company's database administration. Successful candidate will possess expertise in a major database management system such as IMS TOTAL or IDMS. To $45,000.

Tandem Programmer/Analyst *(301-02)* Major Seattle firm is seeking a professional with two or more years experience in TAL, Pathway and COBOL. Banking, financial or data communications experience preferred. Company is situated in a beautiful country setting outside of Seattle. To $45,000.

Project Leader *(301-03)* Seattle-based organization is seeking a proven leader to implement a major on-line *(CICS/DL/I)* project. Position is in the retail industry and offers an opportunity for advancement. Must have major project responsibility experience and excellent interpersonal skills. To $45,000.

Systems Programmer *(301-04)* Expanding Northwest firm offers state-of-the art exposure to an experienced IBM OS Systems Programmer. The successful candidate will join the state industry leader while enjoying the unique advantages of the Pacific Northwest. CICS MVS/JES systems, internals desirable. To $45,000.

Telecommunications Systems Programmers *(301-06)* Large manufacturing firm located in the Pacific Northwest has multiple opportunities in IBM communications systems. Develop, implement, and design networks. IBM ACF/NCP, VTAM/NCP, BTAM, SNA experience helpful. To $50,000.

Software Engineers — CAD/CAM/CAE *(301-07)* Highly successful suburban Seattle-based company which develops manufacturing/engineering software products, has multiple openings. Background in CAD/CAM/CAE, CADAM, CATIA, or CAEDS desired with FORTRAN, C or PASCAL IBM mainframes. To $45,000.

Programmer/Analyst *(301-08)* Wholesale distributor seeks a Senior and Junior Programmer/Analyst using RPG III on IBM System 38. Will develop major new systems in all areas of the company. Excellent opportunity to work in a small environment with room for promotion in the suburbs of Seattle. To $35,000.

COBOL Programmers — IMS DB/DC Training *(301-10)* One of the largest employers of data processing professionals in the Seattle area has multiple openings for DOS or MVS COBOL Programmers with a minimum of one year experience. This firm offers extensive in-house training in IMS DB/DC skills. To $30,000.

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ADVERTISERS INDEX

ADR	.3
Alex Brown & Company	.99
Applied Management	.51
Artificial Intelligence	.23
AT&T	94-95
Ausdata	58
Bell Atlantic	.66
BMC Software	71
Cambex	13
Canaan Computer	83
CGI	115
Cincom	.86-87
Codex	104
Communication Networks '87	109
Compaq	96-97
Corp. for Open Systems	66
Cullinet	.68-69
CW April Focus	21
CW Circulation	113
Data Design Associates	64
Data General	34
Data Retrieval	20
Data Switch	48
DCA Networking	40-41
DCA	106-107
Digital Consulting (insert)	18/21
Duquesne	15
Electrohome	70
EMC Corp	62
Emergency Power Enineering	.80-81
Fischer Innis	.19
Flagstaff Engineering	41
Four G	102
Fujitsu	22
Genicom	54
GTE	75
Hewlett-Packard	46-47
H&M Systems Software	135
Honeywell	52-53
Informix	.67
Innovation Data Processing	7
Integrated Networks	.103
Intelogic Trace	14
ITT Courier	.28-29
James River Corp.	30-31
KMW	105
Landmark Systems	112
Lawson Associates	92-93
Leasametric	114
Local Data	100
Michaels, Ross & Cole Ltd	30
Micom	108
Micro Data	82
MicroData	82
Morino Associates	24-25
National Advanced Systems	45
Novell	60
Nynex	111
On-Line Software International	56-57
Oracle	11 27
PC Discount	36
Printronix	37
Racal Vadic	76
Radio Shack	38
Relational Technology	18
Realia	72
SAS Institute	32-33,39
Seiko Instruments	84-85
Soft Switch	26
Software Engineering of America	9
Software Quality	58
Software Technology & Research (STAR)	13
[illegible] Software	55
SQ Software	31
Stratus	44
Syncsort	5
Tandon Computer	63
Technology Transfer	79
Televideo	110
Times	59
3M Files	42-43
Transform Logic	88-89
Uccel Corp	8 55,90
UDS	98
Unicom Systems	26
Unilease	10
Ven-Tel	136
Walker Interactive	12
Westinghouse	35
Wyse	74
Xerox	50-51

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UPCOMING COMPUTERWORLD SPOTLIGHT SECTIONS

Issue Date	Topic	Ad Closing Date
March 2	PC Storage Devices	February 13
March 16	Business Graphics Software	February 27
March 30	Modems	March 13
April 6	Desktop Publishing Systems	March 20
April 13	T1 Equipment/ Multiplexers	March 27
April 20	Workstations	April 3
April 27	DEC-Compatible Equipment	April 10
May 4	Printers	April 17
May 11	Manufacturing Software	April 24
May 18	UPS	May 1
May 25	PCs — IBM & Compatibles	May 8
June 1	Field Service	May 15
June 8	LANs	May 22
June 15	DBMS	May 29
June 22	Add-in Boards	June 5
June 29	Accounting Software	June 12

Centram accepts buyout deal

President says Sun offer is 'significantly' better than 3Com's

BY JAMES A. MARTIN
CW STAFF

MOUNTAIN VIEW, Calif. — 3Com Corp.'s intended acquisition of Centram Systems West, Inc., a small Berkeley, Calif., microcomputer network vendor, had been progressing as planned until Sun Microsystems, Inc. stepped in last week with a deal Centram could not resist.

In an agreement Centram President Nat Goldhaber described as "the closest thing to having our cake and eating it too," Sun Microsystems signed a letter of intent to acquire Centram for some 685,000 shares of Sun common stock, valued at $20 million.

3Com did not reveal the amount of its offer to Centram, but 3Com Vice-President of Software Robert Bressler said Sun's offer was "significantly more than ours."

3Com had been negotiating to acquire Centram since November, according to Bressler, until Sun stepped in last week. Meanwhile, Sun had been considering Centram as an acquisition since before 3Com's announcement, according to Scott McNealy, president and chairman of Sun.

The move was seen as an important strategic step for Sun, a rapidly growing company anxious to offer its Unix-based workstation users a networking interface to Apple Computer, Inc.'s Macintosh and IBM Personal Computers. In addition, privately held Centram, as an independent Sun subsidiary, will benefit from Sun's research and development efforts and distribution network.

"It's a smart move for both Sun and Centram," said Mark Stahlman, research analyst for Sanford C. Bernstein & Co., a New York-based investment research firm. "Centram gets to remain independent, they're being paid more money, and they're working with the leader in Unix system software. For Sun, the advantage is it now has a lock on the product which ties PCs into Unix, which is a very important additional capability."

Since July, Centram has sold some 21,000 copies of Tops, a micro networking product that links Macintoshes and IBM PCs and compatibles to Unix-based systems. Tops is said to be an important technological fit with Sun's Network File System network, according to company officials and analysts.

"Every one of our customers has PCs and Macintoshes in volume, so it makes sense for us to tie those into our network," Sun's McNealy said. "The one piece missing in our network was the connection to the Macintosh and PC world, and Tops gives us that."

While many expressed surprise at the 3Com-Centram partnership's abrupt end, the news of Sun's interest was equally unexpected. "I would never have thought of Sun as a suitor for Centram," said Richard Shaffer, editor and publisher of "Computer Letter," a New York-based micro industry newsletter. "Sun has been repositioning itself toward the higher end Unix market as the price/performance leader with the ability to network systems.

"Centram is associated with much lower performance equipment, such as the Macintosh," he said. "But Sun is a strong company, and this acquisition will make it even stronger."

Although there have been recent rumors that Apple is readying a Macintosh offering similar features to Sun workstations at lower prices, Sun is not in essence providing a network link to its competitors, analysts said.

It is unlikely that Apple will introduce its rumored "Sun-killer" this year, if at all, Sanford C. Bernstein's Stahlman said. "Their product will be a single-user, high-end Mac based on the Motorola Corp. 68020 microprocessor," he said.

3Com to accelerate product releases after fourth acquisition attempt fails

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — After last week's botching of its fourth merger attempt in as many years, 3Com Corp. expects to bounce back with surprising quickness and a slew of product announcements.

A week after 3Com revealed its intention to purchase Centram Systems West, Inc. in Berkeley, Calif. — maker of the Tops network interface — it was jilted for another Berkeley resident, Sun Microsystems, Inc., a maker of Unix-based scientific/engineering workstations (see story above).

3Com failed in three previous bids to merge with Sytek, Inc., Bridge Communications, Inc. and, more recently, Convergent Technologies, Inc.

Last year, after an intense six-month courtship with OEM manufacturer Convergent, 3Com's financial advisors canceled the nuptials on the wedding eve. The aborted merger cost 3Com a half year of misdirected focus, allowing rival Novell, Inc. of Orem, Utah, to race to a substantial lead in the local-area network market.

The reverse situation is possible for 3Com following this year's disappointment, particularly in the Apple Computer, Inc. Macintosh market.

First, 3Com will probably push up the release of its promised Macintosh port of the 3+ network software, according to Robert Bressler, vice-president and general manager of 3Com's Software Division.

The 3+ for the Mac has been in beta-testing, awaiting the final specifications for the Apple File Protocols (AFP). Plans to purchase Centram and then port certain features of Tops into 3+ led to a third-quarter release date.

But 3Com lost Centram to Sun and now only has to update the beta version of 3+Mac to the AFP, which includes a new Finder from Apple, enhanced for networking. It will provide 3Com with the same user interface running over Tops. With minimal changes, Mac users could see 3+ very soon, according to 3Com.

An earlier release date not only positions 3Com as one of the leaders in Apple networking, but it means 3Com will likely beat Novell's frustrated efforts to port its network operating system, Netware, to the Mac [CW, Jan. 19].

Bressler said users can expect a show of solidarity from Apple and 3Com, which are considering a campaign to position Apple's Appleshare file server at the networking low end, with a migration path to 3Com's 3+ family at the high end.

The point is to increase sales of both servers, and it is clear that 3Com will pursue this tack whether Apple gets involved or not.

A spokesman for Apple said the company generally tries not to get into a position of supporting one product over another. However, Apple does comarket 3Com's file server.

Mid-Atlantic bureau correspondent Alan Alper contributed to this report.

Screws

FROM PAGE 1

MIS at Storer Communications, Inc. in Miami Beach, Fla., says he would like to see the high end of the line increase one more level and then gently overlap the 9370 line.

"Then we could use VM as a common operating system, like Digital Equipment Corp. has, and then we'll be all right," he says.

Murphy now has a 4381 Q-3 model and says that in the future he will likely upgrade it to a Model 14, a move that IBM tells him will make the machine 23% more powerful.

But ideally, he says, he would like to upgrade even beyond that.

Exploring the options

John Bjork, operations manager for Pic'N Pay Stores, Inc. in Matthews, N.C., says he is exploring several options: purchasing another 4381, using 9370s for distributed processing, going to a 3090 or combining all three options.

However, having just upgraded to a Model 14, Bjork says he does not need to upgrade further immediately.

Bjork says he talked to IBM last week and was told his representatives "haven't seen anything" in the way of a new 4381.

While consultants disagree as to what course IBM will take, most of them concur that an announcement within the next 12 months is inevitable.

Next logical step

Frank Dzubeck of Communications Network Architects, Inc. in Washington, D.C., says that eliminating the 4381 would be a logical step in thinning out the industry giant's product inventory in a time of architectural consolidation.

"If I were IBM, I would want to rid myself of a given product stream," he says, adding, "They need to build a bigger mousetrap, whatever it is," indicating that a more powerful system of some kind is needed in the 4381 niche.

Thomas Henkel, an industry analyst with Boston-based The Yankee Group, says that he believes the machine's days are numbered.

"The 4381 has 12 months left, then a new 9370 will blow it out of the water," Henkel predicts.

"There is no point to a product line of [only] 8 to 15 million instructions per second," (MIPS) Henkel stresses.

One point in favor of the continued survival of the 4381 is that it runs MVS/XA and VM/XA, and the 9370 does not run either version.

"Given the price difference between the 9370 and the 4381, they need a mid-level machine that can run MVS/XA," says Dale Kutnick, a consultant at the Stamford, Conn.- based Gartner Group, Inc.

However, only 13% of 4381 users are running an extended architecture operating system, according to Computer Intelligence, a La Jolla, Calif.-based market research firm.

Kutnick says he expects a new 4381 in mid- to late 1988. Kutnick says a new machine, "will be geared to run in a copier room, not a computer room, and will be air-cooled. You will get twice the performance at a lower price," he says.

Kutnick also predicts a figure of $75,000 per MIPS, a price/performance ratio that is comparable to the 9370.

Norman Weizer, an analyst with Arthur D. Little, Inc. in Cambridge, Mass., agrees, stating that a 4381 with a vector processing feature will be an important weapon aimed at the scientific and engineering markets.

> "IT WILL be geared to run in a copier room, not a computer room, and will be air-cooled. You will get twice the performance at a lower price."
>
> DALE KUTNICK
> GARTNER GROUP, INC.

"The 4381 is absolutely not going to be abandoned," Weizer says. Although the 9370 high end overlaps the 4381, he says, it does not overlap enough to displace it.

In addition, the 9370, even in clusters, will not replace the 4381. "In some jobs, you need single-string performance," Weizer says.

In addition, Weizer says that the way the 3090 Model 150 is put together is too expensive to be priced to appeal to buyers who are in search of less power for fewer dollars.

The 4381 replacement, which will come in 1988 or late this year, will upgrade the 4300 Models 11, 12, 13, 14, the machines that were delivered in spring 1986, Weizer says.

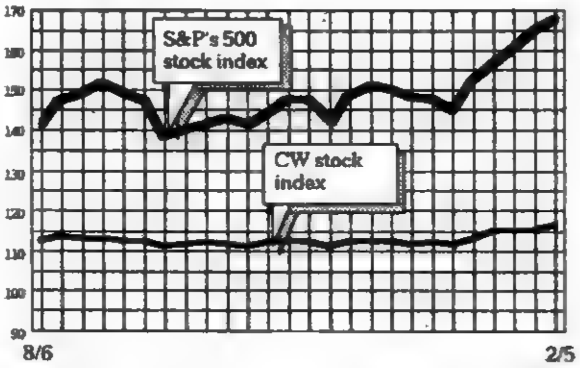
A new 4381 will be more office compatible and will not need to operate in a computer room, he says.

Rudolf Strobl, an Arthur D. Little analyst, says that he does not think the VM operating system is well suited to a high-end 9370, because it is necessary to run VSE as a guest under VM in order to use the X.25 protocol.

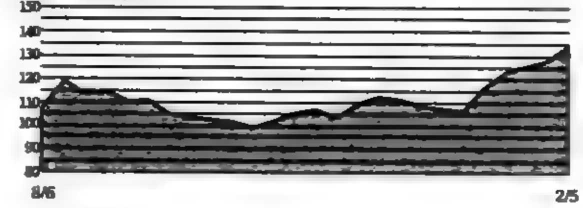
"It's really a kludge," he says.

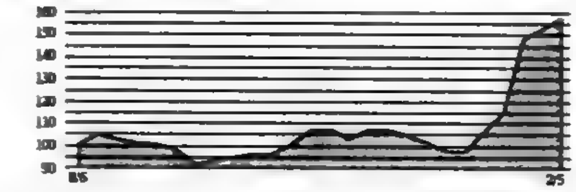
"I always believed there would be a new 4300, and the 9370 announcement did not change my opinion," Strobl says.

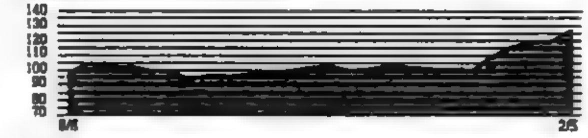
STOCK TRADING INDEX

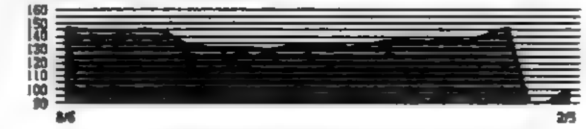


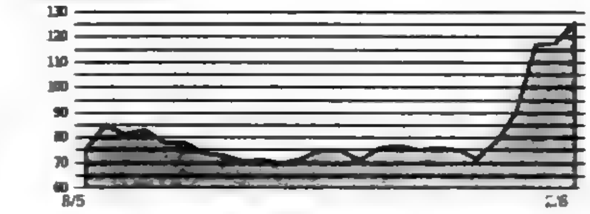
Indexes	*Last Week*	*This Week*
Computer Systems	130.5	**136.1**
Supplies & Accessories	152.7	**157.8**
Software & DP Services	118.8	**126.6**
Semiconductors	90.2	**100.1**
Peripherals & Subsystems	117.3	**125.9**
Leasing Companies	107.3	**113.3**
Composite Index	115.1	**116.3**
S&P 500 Index	164.7	**167.2**

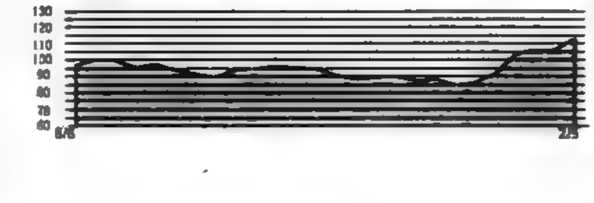

Computer Systems


Software and DP Services


Peripherals and Subsystems


Supplies and Accessories


Semiconductors


Leasing Companies

Stock trading summary

CLOSING PRICES WEDNESDAY, FEBRUARY 4 1987

Computer Systems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4 13	0 4	8 3
O	ALTOS COMPUTER SYS	19	10	14 88	+1 1	+8 2
A	AMDAHL CORP	35	14	34 50	+4 8	+16 0
O	APOLLO COMPUTER INC	22	9	21 63	-0 8	-3 6
O	APPLE COMPUTER INC	57	23	55 00	0 4	0 7
N	AT&T	28	21	23 63	2 6	10 0
O	C P T CORP	7	3	3 50	-0 0	-0 0
N	COMPAQ COMPUTER CORP	28	12	27 75	-2 9	-11 6
A	COMPUTER CONSOLES INC	12	6	10 13	0 1	1 2
O	CONCURRENT COMP CORP	25	11	15 00	+0 5	+3 4
N	CONTROL DATA CORP	30	19	28 88	-0 3	-0 9
O	CONVERGENT TECH	13	4	10 25	-1 4	-15 5
N	CRAY RESH INC	116	62	113 25	1 0	0 9
O	DAISY SYS CORP	20	8	11 25	-1 4	-13 9
N	DATA GEN CORP	48	25	36 00	-2 4	-7 1
N	DATAPOINT CORP	9	4	5 88	+0 8	+14 6
N	DIGITAL EQUIP CORP	150	75	146 63	-0 3	-0 2
N	FLOATING POINT SYS INC	46	11	14 25	-2 3	-18 8
N	GOULD INC	31	15	19 00	0 1	0 7
N	HARRIS CORP	40	27	38 75	+1 0	+2 6
N	HEWLETT PACKARD CO	54	36	53 25	+2 4	+4 7
N	HONEYWELL INC	84	58	65 88	+2 3	+3 5
N	IBM	162	116	135 13	+5 1	+3 9
O	IPL SYS INC	4	1	2 25	-0 0	-0 0
N	ITT CORP	61	39	59 50	1 3	2 1
N	M A COM INC	19	12	14 50	+1 0	+7 4
N	MATSUSHITA ELEC INDL LTD	136	64	125 00	+4 8	+4 0
O	MENTOR GRAPHICS CORP	27	11	25 88	-0 9	-3 5
N	NBI INC	14	8	10 75	+0 5	+4 9
N	NCR CORP	60	40	58 75	+1 1	+2 0
N	PRIME COMPUTER INC	28	16	22 25	-0 4	-1 7
O	STRATUS COMPUTER	34	17	32 00	+2 8	+9 4
O	SYMBOLICS INC	15	4	4 50	+0 4	+10 8
O	TANDEM COMPUTERS INC	59	22	57 13	+1 6	+2 9
N	TANDY CORP	50	31	48 13	-0 1	-0 3
N	TEXAS INSTRS INC	156	103	155 50	+12 4	+8 6
A	ULTIMATE CORP	35	13	23 88	1 5	5 9
N	UNISYS	101	58	96 13	0 9	0 9
A	WANG LABS INC B	22	11	15 13	-1 1	-8 0
A	WANG LABS INC C	22	11	15 38	+1 6	+11 3
N	XEROX CORP	72	49	68 00	+0 6	+0 9

Supplies & Accessories

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	29 50	-1 5	-5 4
N	BARRY WRIGHT CORP	25	14	17 88	-1 6	-10 0
A	DUPLEX PRODS INC	23	18	21 13	+1 3	+6 3
N	ENNIS BUSINESS FORMS INC	32	22	31 75	+1 9	+6 3
N	3M CO	140	92	129 13	2 6	2 0
N	MOORE LTD	28	20	23 50	+0 4	-1 6
O	STANDARD REGISTER CO	50	32	44 00	+1 0	+2 3
N	WALLACE COMPUTER SVCS	50	37	45 63	1 5	3 2

Software & DP Services

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	4 25	0 3	5 6
N	ADVANCED SYS INC	20	12	19 50	+0 4	+2 0
N	AGS COMPUTERS INC	37	17	36 00	+3 1	+9 5
O	AMERICAN MGMT SYS INC	31	12	28 50	+1 5	+5 6
O	AMERICAN SOFTWARE INC	23	9	21 00	-0 3	-1 2
N	ANACOMP INC	7	3	6 00	+1 6	+37 1
O	ANALYSTS INTL CORP	10	4	9 25	0 6	6 3
O	ASHTON TATE	30	10	27 75	+2 0	+7 8
O	ASK COMPUTER SYS INC	15	9	13 25	-0 4	-2 9
O	ASTRADYNE COMP IND	3	1	1 81	+0 1	+3 6
N	AUTOMATIC DATA PROC	47	29	44 63	-0 4	-0 8
O	BOOLE & BABBAGE INC	9	4	8 00	-0 0	-0 0
N	COMPUTER ASSOC INTL INC	44	17	42 88	+2 9	+7 2
O	COMPUTER HORIZONS CORP	14	10	12 63	0 4	2 9
O	COMPUTER NETWORK TECH	10	4	5 31	+1 0	+23 2
N	COMPUTER SCIENCES CORP	53	30	51 25	-1 3	-2 5
O	COMPUTER TASK GROUP INC	19	11	14 38	-1 1	-8 5
O	COMPUTONE SYS INC	6	0	0 19	+0 0	+0 0
O	COMSHARE INC	16	10	13 25	-0 0	-0 0
N	CULLINET SOFTWARE INC	17	6	10 00	+1 8	+21 2
O	CYCARE SYS INC	17	7	9 00	0 4	4 0
O	DUQUESNE SYS INC	33	18	47 50	+6 8	+16 6
N	GENERAL ELEC CO	104	71	100 25	1 3	1 2
N	GENERAL MTRS CORP	50	24	36 00	-4 3	-13 4
O	HOGAN SYS INC	15	7	13 88	+0 3	-1 8
O	INFORMATION SCIENCES INC	4	1	0 88	0 1	12 5
O	INFOTRON SYS CORP	19	7	9 50	+2 0	+26 7
O	KEANE INC	16	5	8 00	+1 8	+28 0
N	LOGICON INC	38	22	27 00	0 3	0 9
O	LOTUS DEV CORP	69	20	68 75	+3 3	+5 0
O	MANAGEMENT SCI AMER	21	11	20 75	+2 8	+15 7
O	MCI COMM CORP	13	5	5 25	0 6	12 5
O	MICOM SYS INC	22	10	16 50	+0 3	+1 5
O	MICRO PRO INTL CORP	5	2	4 31	+1 2	+38 0
O	MICROSOFT CORP	78	26	72 00	+0 3	+0 3
O	NATIONAL DATA CORP	26	16	24 38	-1 0	-4 3
O	ONLINE SOFTWARE INT	19	10	18 63	+0 4	+2 1
O	ORACLE SYS CORP	31	13	29 00	+2 8	+10 5
N	PANSOPHIC SYS INC	41	25	40 50	+3 0	+8 0
O	POLICY MGMT SYS CORP	30	15	28 00	0 5	1 8
O	PROGRAMMING & SYS INC	11	8	9 00	-0 0	-0 0
O	REYNOLDS & REYNOLDS CO	42	27	34 25	+3 3	+10 5
O	SCIENTIFIC COMPUTERS INC	8	4	7 50	+0 4	+5 3
O	SEI CORP	28	15	24 75	-1 3	-5 3
O	SHARED MED SYS CORP	51	30	50 50	+5 6	+12 5
O	SOFTWARE AG SYSTEMS INC	22	10	15 13	+2 3	+17 5
O	SOFTWARE PUBG CORP	11	5	11 13	+1 5	+15 6
A	STERLING SOFTWARE INC	21	10	13 25	+1 4	+11 6
N	SUNGUARD DATA SYSTEMS	17	10	16 50	0 3	1 5
N	UCCEL CORP	33	15	30 38	-0 1	-0 4
N	URS CORP	20	11	18 88	0 4	1 9
O	VM SOFTWARE INC	36	12	36 00	-3 1	-9 5

Semiconductors

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	34	13	21 00	+3 5	+20 0
N	ANALOG DEVICES INC	25	14	21 38	+1 8	+8 9
O	ANALOGIC CORP	15	10	12 50	+2 6	+26 6
N	APPLIED MAGNETICS CORP	23	13	22 38	+2 1	+10 5
O	AVANTEK INC	23	14	16 38	+0 9	+5 6
O	HADCO CORP	6	3	3 75	0 3	6 3
O	INTEL CORP	36	16	34 63	+4 9	+16 4
O	MICRO MASK INC	7	2	4 75	-0 0	-0 0
N	MOTOROLA INC	50	34	48 25	+3 0	+6 6
N	NATIONAL SEMICONDUCTOR	16	8	14 75	+0 9	+6 3
N	TERADYNE INC	30	16	24 00	+5 0	+26 3

EXCH N – NEW YORK A – AMERICAN P – PACIFIC B – BOSTON
L – NATIONAL M – MIDWEST O – OVER THE COUNTER S – SPLIT

O T C PRICES ARE BID PRICES AS OF 3 P M OR LAST BID
(1) TO NEAREST DOLLAR

Peripherals & Subsystems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	[illegible]	-0 6	-8 8
A	ANDERSON JACOBSON INC	3	1	2 00	-0 5	-18 5
O	AST RESH INC	27	11	17 75	+1 9	11 8
O	AUTOTROL CORP	10	5	8 50	-0 4	-4 6
O	AVANT GARDE COMPUTING	7	3	4 38	0 3	5 4
O	BANCTEC INC	13	6	12 38	-0 3	-2 1
N	BOLT BERANEK & NEWMAN	51	35	50 00	-1 9	-3 9
A	CETEC CORP	9	5	5 00	-0 1	-2 6
A	COGNITRONICS CORP	6	2	3 13	0 1	3 8
N	COMPUGRAPHIC CORP	27	16	22 25	-0 9	-4 1
N	COMPUTERVISION CORP	23	10	22 50	+2 3	+11 1
N	CONRAC CORP	18	12	15 88	-1 6	-11 4
A	DATAPRODUCTS CORP	18	11	14 63	-0 4	-2 6
A	DATARAM CORP	18	7	8 63	0 1	1 4
O	DATA SWITCH CORP	9	5	7 63	+1 1	+17 3
O	DATUM INC	7	4	6 13	-0 3	-4 3
N	DECISION INDS CORP	15	8	11 63	+1 0	+9 4
O	ENDATA INC	9	4	8 63	-0 6	-7 8
O	EMC CORP	25	11	25 00	-2 3	-9 9
O	EVANS & SUTHERLAND	33	20	32 00	0 5	1 5
N	FLOATING POINT SYS INC	46	11	14 25	-2 3	-18 8
O	GANDALF TECHNOLOGIES	9	5	8 75	-0 1	-1 4
N	GENERAL DATACOMM IND	15	8	12 50	+1 6	+14 9
N	HAZELTINE CORP	30	16	29 75	-0 0	-0 0
O	ICOT CORP	13	8	10 50	-0 5	-5 0
O	INFORMATION INTL INC	16	13	14 25	-0 3	-1 8
O	INTECOM INC	7	3	3 00	+0 0	-0 0
O	INTERLEAF INC	15	6	10 25	-0 0	+0 0
O	MEGADATA CORP	5	2	5 13	+2 3	+82 2
A	MSI DATA CORP	14	10	13 88	-0 1	-0 9
N	NASHUA CORP	28	17	26 75	0 6	2 3
O	NETWORK SYS CORP	19	10	18 38	-1 0	-5 0
N	NORTH AMER PHILIPS CORP	48	35	42 25	-0 0	-0 0
N	NORTHERN TELECOM LTD	43	25	42 38	+3 9	+10 1
O	NOVELL INC	40	14	39 75	+4 8	[illegible]
N	PARADYNE CORP	11	4	5 38	-0 4	[illegible]
A	PENRIL CORP	4	4	5 38	0 6	[illegible]
N	PLESSEY PLC	38	24	31 75	0 1	0 8
O	PRINTRONIX INC	15	10	12 13	1 5	4 1
O	QMS INC	16	10	10 13	-0 0	-0 0
O	RAMTEK CORP	7	3	5 50	-0 4	[illegible]
N	RECOGNITION EQUIP INC	27	10	18 88	-1 0	-5 6
O	SCAN TRON CORP	19	11	12 50	-0 3	-2 0
N	SCIENTIFIC ATLANTA INC	15	9	15 00	+1 6	+11 1
O	SEAGATE TECHNOLOGY	33	8	32 50	+4 8	17 1
N	STORAGE TECHNOLOGY	7	2	4 00	0 0	0 0
O	SUN MICROSYSTEM INC	32	11	29 88	-1 4	-4 8
A	T BAR INC	8	5	8 00	-0 0	-0 0
A	TAB PRODS CO	17	12	16 63	-0 6	-1 9
O	TANDON CORP	8	2	3 63	1 1	[illegible]
A	TEC INC	7	3	3 88	[illegible]	3 3
N	TEKTRONIX INC	42	27	41 00	-1 3	-3 1
O	TELEVIDEO SYS INC	4	2	2 63	-0 0	-0 0
N	TELEX CORP	85	52	82 38	-0 0	-0 0
N	TIMEPLEX INC	36	14	35 00	-4 3	[illegible]
N	TITAN CORP	12	6	7 75	-0 1	-1 6
O	VISUAL TECHNOLOGY INC	1	0	0 44	-0 0	-0 0
O	WYSE TECH	25	11	24 75	+0 8	+3 1

Leasing Companies

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	25	15	23 88	+3 5	[illegible]
N	CONTINENTAL INFO SYS	12	7	10 50	+0 6	+6 3
O	FINALCO GROUP INC	5	2	3 00	-0 4	[illegible]
O	PHOENIX AMER INC	6	3	6 25	+0 6	+11 1
O	SELECTERM INC	12	5	5 61	+0 4	+8 1
N	U S LEASING	49	38	48 50	+0 8	+1 6

Intel's stock surges

IBM, DEC also see rise, while Cullinet has roller-coaster week

A surge in semiconductor stocks began when Intel Corp. Chairman Gordon Moore told securities analysts Jan. 30 that Intel's revenue could rise as much as 42% in 1987. Intel's stock jumped on that day and again last Monday, when it gained 3½ in heavy trading to close at 34¾. Although Intel remained among the most active over-the-counter issues throughout the week, the buying surge moderated, and Intel remained at 34¾ after last Thursday's session.

IBM's stock has rebounded well from last month's 1986 earnings announcement. In the first four days last week, IBM jumped from 128¾ to 136⅛. Digital Equipment Corp. kept right on rolling, gaining 5¼ in the same period to close Thursday at 150⅛, another new 52-week high.

It was a roller-coaster week for Cullinet Software, Inc. Cullinet was the New York Stock Exchange's leading percentage gainer Tuesday when it jumped 1½ to 10½, prompting a Wednesday morning press release stating that the company had no explanation for the rise. Cullinet stock fell back to 10 Wednesday but climbed back Thursday to 10⅜.

CLINTON WILDER

Users turn to leasing for protection

BY JEAN S. BOZMAN
CW STAFF

Large users who lease IBM mainframes say they gain protection from rapid technical changes, such as IBM's recent decision to create a two-tier 3090 line.

Purchasers of IBM 3090 equipment complained last week that IBM's latest series of price/performance enhancements are available only through an upgrade in processor — from a Model 200 to a Model 400E, for example.

"The risk of technical obsolescence goes down dramatically with leasing," claimed James Benton, executive director of the Computer Dealers and Lessors Association, which is based in Washington, D.C."

Some large users have already benefited from adopting a leasing policy. "We lease everything and we have plenty of capacity right now," said Ed Earles, director of information services for American Express Co.'s Fort Lauderdale, Fla., data processing center. The Fort Lauderdale center has two Model 200s, two Model 400s and an IBM 3084 QX.

"In the future when we make a decision to buy more 3090s," Earles said, "it will not be a capacity issue. It will be looked at in terms of the financials of the situation."

In most cases, computer executives indicate, they would be willing to go along with a leasing contract for the upgraded machine — although it would probably have a longer term before payoff. "When an upgrade takes place sometime before a customer's lease is up, the leasing company is generally willing to handle the upgrade," said Svend Hartman, president of Computer Merchants, Inc. in Chappaqua, N.Y., a broker of IBM mainframes. "It represents new business for them."

Another user concern in favor of leasing, according to Benton is the fear that the IBM 3090's product life is nearly over. If that is the case, users said, they would rather save their purchasing dollars for the next IBM mainframe, Summit, expected to be announced before 1990.

DEC fills VAX

FROM PAGE 1

ration isexpected to be priced at about $10,000.

DEC user Don Awalt, corporate information systems manager for Rexnord Automation of Hunt Valley, Md., said he will look to Vaxstar as a cost-effective way to add users to his firm's sizable, existing DEC network. "We have some interest in it, if only for the fact that Vaxstar gives Microvax power in a much cheaper box," Awalt said.

"My feeling is they are getting very aggressive at the low end of the workstation market," commented analyst George Colony of Forrester Research, Inc., a Cambridge, Mass., market research firm, as he was speaking along with other analysts prior to DEC's confidential briefing last week. Vaxstar would make a strong Ultrix platform, he stressed. The product is directed more at workstation vendors such as Apollo Computer, Inc. than at IBM, Colony added.

Both 2000 series systems, using a single-board version of the Microvax II CPU, will include a Vaxmate-type Ethernet adapter, 2M bytes of standard memory with expansion capability to 6M bytes and 5¼-in. disk drives that support up to 159M bytes of on-line storage. The Microvax 2000 is expected to support up to four users and is aimed at the small business and department markets.

Although DEC is also expected to enhance its Vaxcluster offerings at the low end, some observers say the company is unlikely to offer a mix of large and small systems on the local-area Vaxcluster.

"Digital, right now, is in the position that IBM was in 1967, when it was able to deliver a unified product line with a single operating system to all of its customers. During that period, IBM achieved its most significant growth in recent decades," observed Charles T. Casale, consultant with The Yankee Group in Boston.

In response to competitive pressures in the 1970s, IBM began offering incompatible computer lines, claiming that different types of functions demanded different computers. "I think that's proven to be a wrong assumption," said Steven Smith, industry analyst for New York-based Paine Webber Group, Inc. "It created an opportunity for DEC to offer a more aggressively priced product."

DEC's goal is to deliver a single product line spanning a 1,000-to-1 price range, Casale said. "With the high-end VAX 8974 and 8978 [announced in mid-January] priced at $4.5 million and Vaxstar expected to be priced around $10,000, Digital will have achieved a 500-to-1 price range," he observed.

Analyst Richard Mikita of Framingham, Mass.-based International Data Corp., said the Microvax 2000 is positioned to fill the price gap that Microvax II, with a base price of more than $18,800, cannot address.

The firm still must address shortcomings in its mid-range offerings. While the VAX 8300 is strong in technical computing, it is weak in commercial processing, Mikita explained. At the high end, DEC lacks its own array processor or near-supercomputer, he added.

Both users and analysts pointed to connectivity as DEC's major strength. The local-area Vaxcluster announcement last fall reinforced the firm's ability to link its computing power not only across networks but also within smaller work groups. Clustering allows users to share resources and provides redundancy of data and programs should one or more clustered machines fail, according to DEC.

Senior Editor James Connolly contributed to this report.

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INSIDE LINES

Can the egos . . . ? An alliance between micro data base vendor Ashton-Tate and a relational DBMS vendor such as Oracle or Relational Technology makes a lot of sense, Ashton-Tate boss Edward Esber says. But, he added, egos are standing in the way. "Right now we're all out there pounding our chests individually," he said last week in New York.

Those characters from Seattle! Microsoft is working on a character-based version of its Windows operating environment that would be targeted toward low-power PCs and compatibles, according to Microsoft officials. The product is not a full implementation of Windows but consumes a lot less memory and will run on off-the-shelf PCs without special graphics hardware. Although Microsoft won't say, chances are that character-based Windows is a revamped version of Mondrian, the IBM Topview work-alike that Microsoft picked up when it acquired Dynamical Systems last year.

Deja vu. West Coast sources claim Apple Computer's Open Mac has slipped off schedule. "It's just not testing well in Alpha," an informed source reports. The recently unveiled Appleshare file sharer, you might recall, was vaporware for two years after it was announced.

They've got the data. Reports have surfaced that IBM, Novell and Microsoft are jointly developing an interface to a data base file server, which should be unveiled before the year is out. The interface would run on Novell's Netware network operating shell and IBM's PC Program network software. It's unclear what Microsoft stands to gain, but high priests of Windows have been advertising heavily, on rock radio no less, for data base server engineers.

One for the surgeon general. William G. McGowan, chairman and CEO of MCI Communications, is said to have stopped smoking and dropped 12 pounds to recover from a heart attack he suffered on Dec. 22. Planning to return to work in a couple of months, the 59-year-old nemesis of the Bell System is already preparing to attack the Justice Department's proposal to allow the regional Bell holding companies to enter the long-distance market.

Lug on this one. Compaq has set Feb. 17 to introduce its lightest transportable system yet. The Intel 80286-based, 19-lb machine will come with a flip-up gas plasma display, two full-height expansion slots, a 20M-byte hard-disk drive and a 5¼-in. floppy drive. The machine is expected to compete in price with Toshiba's popular T3100 transportable.

Wish I may, wish I might . . . AT&T is said to be in the process of merging three of its data networking products into one integrated system, which will be called Starseeker. The three products are Starlan, AT&T's low-cost 1M bit/sec. Ethernet; Information Systems Network, an intelligent backbone network that links a variety of asynchronous devices; and Datakit, a data switch similar to ISN.

Open the floodgates . . . Gateways between the two leading communications environments — Open Systems Interconnect and IBM's Systems Network Architecture — are the goal of a joint marketing and development deal to be announced this week by Orion Group and Retix. Orion sells software to implement SNA-based protocols; Retix has a series of programs incorporating the OSI model.

. . . and build some bridges. Two industry sources say IBM is working with network vendor Ungermann-Bass on a late-1987 or early-1988 IBM PC AT-based bridge between IBM's Token-Ring network and the IBM 3725 communications processor. It is likely to provide a faster, more efficient connection than IBM's current 3725 Token-Ring connection, "which is slow," says Kenneth Thurber, president of Minneapolis consulting firm Architecture Technology.

When in doubt, wait awhile. One MIS manager looked closely at the new models for the IBM 3090 line and IBM's offer of discounts for customers installing systems before May. He views that as a good reason to wait until June to purchase a 3090. "I might wait to see what they have planned for June. . . . I've been burned before," he says.

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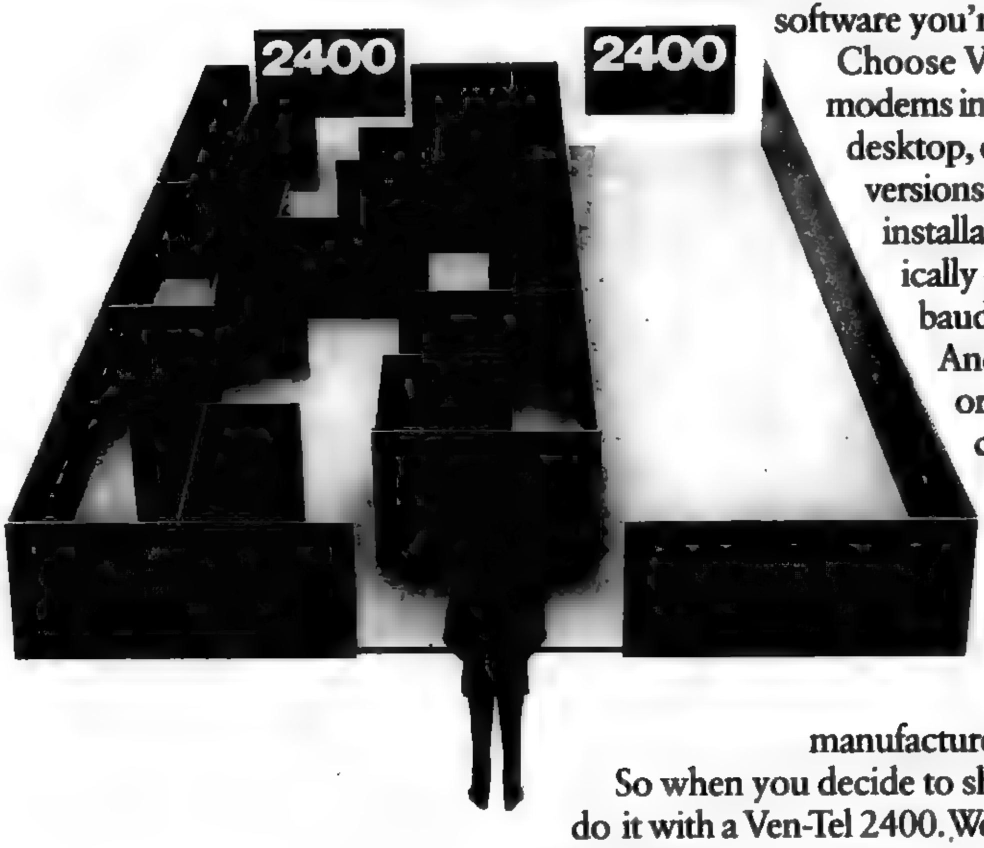

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COMPUTERWORLD

INSIDE

Spotlight — Micro to mainframe: The market is redefining the meaning of 'link.' Center pullout section.

In Depth — Expert system development: Learning by mistake. **Page 57**

Speedier 9370 deliveries and a new low-end model are anticipated from IBM tomorrow. Inside Lines, page 110.

Lotus expected to premiere enhanced Jazz with introduction of Apple's new Macintosh next month. Page 12.

Eyeing commercial users, Cray rolls out its lowest priced supercomputer. Page 8.

System/36 users face tough migration path and have few tools to ease the way. Page 108.

Wang has worked the bugs out of its VS operating system, users say. Page 49.

Arizona colleges save $1 million with 'build-your-own' PC clones. Page 31.

Telecommunications managers' salaries growing at twice the rate of MIS's. Page 69.

Comnet attendees skeptical about the promises of ISDN. Page 4.

Honeywell's first annual deficit marks a tumultuous year. Page 14.

Five-model 'E' series powers Amdahl retort

BY JEFFRY BEELER
CW STAFF

SUNNYVALE, Calif. — Amdahl Corp. last week countered IBM's latest 3090 mainframe family enhancements with the introduction of a three-way processor that reportedly delivers approximately 8% higher price/performance than its Big Blue counterpart.

The company also replaced its four existing Series 5890 mainframes with enhanced 3090-class alternatives that cost the same as their predecessors but offer 4% to 13% more throughput. With the announcement, Amdahl renamed all four of the previous 5890s — the 5890-190, 5890-200, 5890-300 and 5890-600 — by adding the designation "E" at the end of each enhanced model number, just as IBM did [CW, Feb. 2].

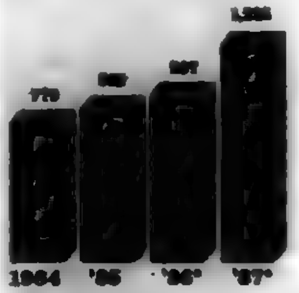
The three-processor 5890-400E and the rest of what the vendor called the E-series models reportedly owe their increased performance to random-access memory chip and logic refinements that can be retrofitted to Amdahl 5890s already in use.

Customers who want to upgrade installed 5890s to the E-series equivalents can do so by swapping boards, according to Dennis Stein, Amdahl's manager of processor systems marketing.

The field upgradability of Am-

Continued on page 110

Amdahl Corp.
Total sales in millions of dollars



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CW CHART

Reluctant support for Netview PC

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — The same vendors and users that are publicly supporting IBM's Netview PC scheme privately harbor grave misgivings about the consequences of adopting it as a network management standard.

About 15 vendors are currently writing hooks to Netview PC, which will enable their network diagnostic and monitoring systems to feed data to IBM's Netview family of host-based network management systems.

But at the Communication Networks Conference and Exposition last week, vendors, users and analysts pointed out gaps in the Netview umbrella, particularly in the data manipulation and presentation areas. In addition, several exhibitors said they were unwilling or unable to integrate their proprietary network statistics analysis and reporting systems with IBM programs that are currently designed to manage only IBM/Rolm Corp. network equipment.

One attendee, a communications manager from a major investment company that is currently evaluating network and network management systems, complained that Netview PC "gathers information from different vendors' systems but lacks an application to put that data into usable form." Since each vendor already has a different application for doing this, "How am I going to get a common syntax so I can use it?" the manager asked.

Continued on page 4

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Apollo disperses power

Net scheme offers distributed applications processing

BY ROSEMARY HAMILTON
CW STAFF

CHELMSFORD, Mass. — Apollo Computer, Inc. laid the groundwork last week for an ambitious network computing strategy that could radically change the way engineers and software developers process applications.

The Network Computing System is intended to provide users with the ability to split applications into portions that would be farmed out to various computing resources on a heterogeneous network for simultaneous computation. While other vendors have provided tools to share files or access data among heterogeneous systems, there are no commercially available products comparable to the Apollo system, according to analysts.

However, Apollo's system will not be available until the third quarter. Company officials said that some of the tools are at a few user sites but declined to name them. One vendor, Alliant Computer Systems Corp., announced its support of NCS last week. Apollo currently resells Alliant's minisupercomputers as Apollo Domain network compute servers, which process large jobs that smaller workstations cannot handle.

The Space and Technology Division of TRW, Inc. has been approached by Apollo to act as a beta site, but it has not yet made a decision, according to Thomas Heim, manager of engineering computation at the division. "We're thinking about it, and if they can do it, then they have a hell of a leg up on everyone else," Heim said. "It sounds like a significant milestone."

According to Edward Zander, Apollo's vice-president of marketing, the company plans to proceed slowly with the new technology. "We have some

Continued on page 6

Criminal past of IEEE officer went undisclosed

Few members knew of computer-aided heist

BY JEFFRY BEELER
CW STAFF

WASHINGTON, D.C. — When Stan Rifkin announced his candidacy last spring for local office in the Institute of Electrical and Electronics Engineers, leaders of the association's section here published a professional biography.

But what the local leadership of the world's largest professional society neglected to tell most of its members — less than 1% of whom attended the subsequent election meeting — is that Stanley Mark Rifkin is a convicted felon who, in 1978, masterminded one of the most sensational computer crimes ever. In 1982, he ended a three-year sentence at California's Terminal Island Prison for electronically diverting $10.2 million from Los Angeles-based Security Pacific National Bank to his personal account at a New York bank.

Rifkin in 1978

The omission of Rifkin's criminal history did not result from ignorance among the local IEEE officers who authorized his run for a directorship in the association's Washington, D.C., section. On the contrary, "his past was well known both to me and to most members of the section's Ex-

Continued on page 108

IN THIS ISSUE

SQL Mania. The widespread acceptance of relational technology fuels industry's fire as corporations rush to standardize SQL all the way down to PCs and vendors publish a 'least common denominator' standard that has some users burning up. **Pages 23,31,101**

Breaking away from large scale. Downsized version of Cray X-MP series aims to attract Fortune 500 commercial enterprises with lower entry price into supercomputing; Teradata's LAN tie-in skirts previously required mainframe pass through. **Pages 8,12**

NEWS

4 Users skeptical about ISDN technology.

4 Long-distance firms blast Justice Department's Bell proposal.

5 Users await missing Token-Ring pieces.

6 DEC positions itself in workstation market with low-cost entry.

8 SAS takes aim at corporate world.

8 Financial statements detail IBM's 1986 27% profit loss.

10 Distribution policy changes at Novell influence prices, support.

10 Word processing product emulates other programs' commands.

10 Unlimited site license lures J. C. Penney to Supercalc4.

12 Lotus re-enters Mac market.

13 Unisys claims 40% power gain from software disk-caching module.

13 Intel soups up 80386 family.

13 Digital Research aims MS-DOS-compatible operating system at PCs.

14 Honeywell posts largest deficit in 60 years.

14 IBM/Honeywell price wars rage in mainframe market.

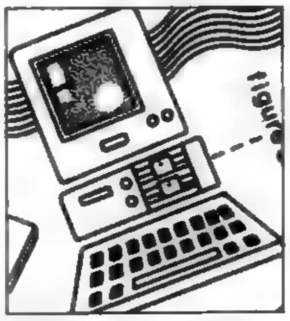
108 Conversion woes cause mid-range crisis for System/36 users.

SOFTWARE & SERVICES

23 Users applaud SAS portability move.

23 DB2 Users Group recommends using system to aid productivity, offset costs.

23 Unify architecture splits application three ways.



Diplomacy in writing: *People write documents, and where there are people, there are politics. By Paula Bell. Page 63.*

MICROCOMPUTING

31 SQL meets the personal computer.

31 College consortium chooses low-cost PC clones.

31 Software package taps extra memory.

NETWORKING

43 LAN industry growing strong.

43 Infotron boosts T1 product line.

43 Comten enhances network-addressing support.

SYSTEMS & PERIPHERALS

49 Users pleased with Wang VS Operating System release.

49 Flexos 386 takes advantage of Intel industrial microprocessor.

49 McDonnell Douglas upgrades small business systems.

MANAGEMENT

69 Photocopy shop offers desktop publishing services.

69 Salaries up for telecommunications managers.

COMPUTER INDUSTRY

81 IBM fortifies software emphasis with Policy Management deal.

81 Merger costs force Unisys to trim its sails.

81 MSA high on mainframe sales potential.

81 EDS says British immigration case closed.

SPOTLIGHT

Work-oriented connections: The next step in micro-to-mainframe linkage is getting information directly to users in the form they need. By Merv Adrian.

Follows page 56

IN DEPTH

57 Let the developer beware: When building an expert system, make sure the shell you choose doesn't doom your project from the start. By Henry Eric Firdman.

OPINION & ANALYSIS

17 Grosch says the sky is not falling.

23 Babcock wants user SQL input.

31 Zachmann takes a shine to Star Micronics' Gemini printer.

43 Gianone and da Cruz review Kermit's leap to popularity.

49 Connolly enters DEC/IBM territory.

69 Duncan gives maintenance a face-lift.

81 Wilder looks into Sun.

DEPARTMENTS

16 Editorial

70 Calendar

The Solution unravels at Hartford Insurance

BY DAVID A. LUDLUM
CW STAFF

HARTFORD, Conn. — The Hartford Insurance Group has withdrawn from the market its programmer productivity software, The Solution, and all but closed Hartford Integrated Technologies, Inc. (Hitech), the subsidiary it set up 19 months ago to market the product.

Almost a year to the day after announcing licensing agreements with third-party vendors and a joint marketing agreement with Wang Laboratories, Inc. — the maker of the hardware that Hitech's product runs on — Hitech is dissolving these pacts.

Wang, which hoped The Solution would bolster its effort to become a major supplier of data processing equipment, is evaluating whether it will continue to market the software, a Wang spokesman said.

Thus far, The Solution, which The Hartford Insurance Group developed in-house for automating its software development and maintenance, has been acquired only in limited test versions, according to the Wang spokesman, Edward Clough.

The sales involve "smaller versions in-house to basically kick the tires," said Clough, who declined to disclose how many companies are testing the product.

In announcing The Solution a year ago, The Hartford and Wang said they were targeting a modest goal of 10 full-blown installations for 1986.

The Solution has failed to sell primarily because potential customers are not willing to provide the support the system requires in areas such as training and development of methodologies, according to John T. Crawford, director of information management for the Hartford and former president of Hitech.

"We didn't find many ready to make that kind of commitment," Crawford said. "We have mutually come to the conclusion that we couldn't afford to continue this in the full-scale basis, primarily because the market wasn't ready to do what we wanted it to do."

Clough said Wang anticipated that The Solution would have a long selling cycle because the concept behind it must be sold before the product.

He estimated the cost of The Solution in a model configuration for 40 software professionals to be $27,000 per user, or $1.08 million. The software runs on Wang VS hub computers and Wang Professional Computer workstations.

The Hartford will try to keep Hitech running as a shell, with one executive, and to sell pieces of The Solution, Crawford said. The first piece will be Scoreboard, which is for quality control in Cobol development and maintenance.

The company formed Hitech in July 1985 to sell The Solution. At its peak in the middle of last year, the subsidiary employed 26 people, Crawford said. He confirmed that it lost money but declined to say how much.

IBM silent on Fujitsu case

BY ALAN ALPER
CW STAFF

NEW YORK — IBM last week declined to discuss a report that it has reached a partial settlement of a dispute with Fujitsu Ltd. in Tokyo that involved the Japanese company's alleged continued infringement of a mainframe operating system.

According to a report in a Japanese newspaper, Fujitsu has agreed to pay IBM $65 million a year to use its version of the MVS/XA operating system.

An IBM spokesman declined comment on the matter.

Sources knowledgeable of the situation said the $65 million annual payment made sense in light of Fujitsu's current mainframe sales. They questioned, however, why IBM did not press for back damages. "Perhaps [IBM] did not want to ask for too much and put Fujitsu out of business," a source in the plug-compatible mainframe business said. "It would have looked too hostile if they had put the company into bankruptcy."

The two companies have been engaged in a year-long battle before the American Arbitration Association regarding charges that Fujitsu violated a 1983 agreement under which it was supposed to pay IBM an unspecified sum and allow periodic inspection of its systems software. IBM charged that Fujitsu copied IBM's MVS/XA operating system in creating an operating system for its own line of plug-compatible mainframes.

Under terms of its 1983 settlement, Hitachi was to pay IBM on a sliding scale, sources said. The initial figure was reportedly $400 million, sources said last week. Certain requirements were eased by IBM late last year.

Fujitsu could not be reached for comment by press time.

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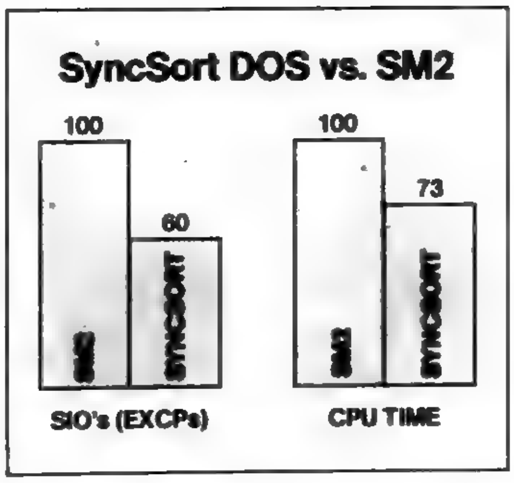

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Users skeptical about ISDN benefits, support

BY DONNA RAIMONDI
CW STAFF

WASHINGTON, D.C. — Despite the rush by telecommunications suppliers to develop integrated services digital network (ISDN) products and services, users remain skeptical about immediate benefits of the technology and the likelihood of adequate service support.

Potential ISDN users who were interviewed at the Communication Networks Conference and Exposition (Comnet) last week pointed to the 1990s as a likely time frame for widely available services.

ISDN promises simultaneous high-speed data and voice transmission, interactive voice mail, call management and messaging and switched-host access. While it enhances or replaces Centrex services and adds value to the plain facilities telephone companies offer, only the pioneer customers are likely to fare well in implementing such services, observers said.

The second tier of users will get stuck with problems because they will get less attention from the vendors, according to T. Doane Perry, senior telecommunications consultant at International Data Corp. (IDC).

'Little recourse'

"If the customer is not in the limelight, there is little recourse for solving problems," said Michael J. Vonder Heide, voice network manager at Ace Hardware Corp. in Oak Brook, Ill. Ace, a cooperative of 5,000 hardware stores and 13 distribution centers, is in the process of cutting over to AT&T's 5ESS ISDN-compatible digital switch.

Ace is in the early stages of planning for ISDN. "We're watching the McDonald's Corp. [fast-food restaurants] trial carefully. We want to be on the cutting edge, but we will wait and see because its still in its infancy," Vonder Heide said.

"ISDN is coming because the vendors need it to sell equipment with," IDC's Perry told about 200 attendees at an ISDN session Tuesday morning.

While he said he does not expect to see ISDN become fully available until the 1990s, Joseph Monks, a manager of marketing at General Electric Co. in Bridgeport, Conn., said ISDN service will become vital. "The best part of it is that we will have one common access point to the network that gives all the services we need," he said.

'Pricing vague'

But vendors will not sell the ISDN services to customers until they can show a cost/benefit relationship. "The pricing is very vague now," Monk said.

This thought was echoed by Richard Kuehn, president of RAK Associations in Cleveland, who spoke at the ISDN session. "I worry that it will wind up like Videotex. Everybody loved it but wouldn't pay for it," he commented.

Loren Henry, director of ISDN planning at regional holding company U.S. West, a firm that is holding several ISDN trials, intimated that cost savings would accrue to customers because there are several pieces of equipment they would not need to buy, such as cluster controllers, integrated voice/digital hardware, analog-to-digital networks and modems.

Netview PC

FROM PAGE 1

Users are interested in Netview and Netview PC's potential for providing a centralized multivendor network management system with a consistent user interface but "aren't rushing into things," according to Thomas McDonald, a partner at consulting and software company MGT Technology Group. "Applications have to be written before Netview PC is usable, and most users feel that while they'll need a central management facility someday, it isn't critical today," McDonald said.

Sometime in the second half of this year, when Netview PC becomes commercially available, IBM will offer network management applications that will accept data through the Netview PC interface — but only data that is generated by IBM and IBM/Rolm products, IBM senior marketing support representative David Thoenen said.

The vendor has announced general-purpose service routines that use Netview PC as an interface between other vendors' network management systems and collection areas in the IBM host. One such program is a VTAM-based interface that enables Netview PC to send alarm data to a Netview program. A second program transfers batches of network statistics, such as call-detail records, from Netview PC to an IBM CICS-based file-catcher program residing on the host, according to Thoenen.

A number of vendors are developing programs that will allow their systems to send alarm statistics to Netview PC and on to the Netview program for alarm collection and filtering. But while IBM/Rolm offers a CICS-based program to collect call-detail record statistics from a Rolm CBX private branch exchange, there is no CICS application for analyzing statistics from other vendors' systems, according to McDonald.

"Everyone agrees on what kinds of network alarms you need, but there are far more possibilities with usage accounting or traffic analysis — so they are far harder to standardize," McDonald pointed out.

And IBM is leaving it up to users and vendors to resolve this issue. "We don't know whether vendors will write CICS programs from scratch or write the code to merge their products with ours," Thoenen said.

IBM sponsorship

IBM's sponsorship of a Netview-based industry standard could hinder rather than help its acceptance, the investment firm manager suggested at Comnet.

"Every vendor I've talked to is loathe to give over control of its networking products to IBM. This is a great opportunity [to come up with a standard] for a third-party vendor that people aren't afraid of," the manager said.

Several network equipment vendors said they are unwilling to make their own network management systems subordinate to IBM's, claiming that their own systems offer features that Netview lacks.

"We think IBM's network management system should feed data to our system — not vice versa — because we have the strong operator interface, but we're not sure the Netview PC hooks work both ways," said Case Communications, Inc. Senior Director of Product Marketing Art Alberding. Case is one of several vendors evaluating the IEEE 802.3 networking protocols as a way for network products to pass management data across networks, he said.

IBM's Thoenen admitted that Netview's operator interface lacks graphics, adding that up until recently at least, IBM has "concentrated on quality in its network management products. . . . Now it's time to concentrate on presentation."

Despite their criticisms of the protocol, a number of vendors at Comnet have announced intentions to support Netview PC.

Netview PC's only apparent rival in the standards sweepstakes is a set of network management administration protocols that AT&T is working on with "several other companies — principally customer-premise equipment makers," according to Richard Snowden, director of AT&T's Concepts Development Center.

FCC under fire from carriers

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — AT&T, MCI Communications Corp. and U.S. Sprint Communications Co., all hit by recent financial losses and layoffs, last week blasted the U.S. Department of Justice proposal to allow the regional Bell holding companies to offer limited long-distance service.

The remarks, made here at the Communication Networks Conference and Exposition, suggested that the three major long-distance companies are worried the financially healthy Bell spinoffs will capture significant amounts of long-distance business. The International Communications Association, a major business users group, has warned that the Bell holding companies could eventually put MCI and U.S. Sprint out of business [CW, Feb. 9].

In the most strident criticism, MCI President Bert C. Roberts Jr. said the department "completely ignores the fact that allowing the [divested] Bell operating companies to offer any long-distance service puts them, once again, in direct competition with companies such as MCI."

Roberts said the department wrongly views the three long-distance companies as healthy giants. He said they have been battered by multimillion-dollar financial losses and employee layoffs, while the regional Bell holding companies each had profits of about $1 billion last year and have gone on a buying spree.

Unsympathetic officials

Officials from the Justice Department and the Federal Communications Commission were not sympathetic. Charles F. Rule, acting head of the Justice Department's antitrust division, said he recognizes that the Bell companies could put more pressure on the profit margins of MCI and U.S. Sprint but said the department's mission is to "protect competition, not competitors."

Likewise, Albert Halprin, chief of the FCC's common carrier bureau, said it is impossible for MCI and U.S. Sprint to turn a profit so soon after building their expensive nationwide networks, just as it is impossible for a hotel owner to make a profit in the first two years after a new hotel is built.

But MCI President Roberts charged that the Justice Department proposal abandons the

Continued on page 5

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Token-Ring keys missing

BY PATRICIA KEEFE
CW STAFF

WASHINGTON, D.C. — Users attending last week's Communication Networks Conference and Exposition (Comnet) here indicated they are more than willing to wait for IBM to release the various pieces of its Token-Ring network but that for planning purposes, they want to know exactly what it is they are waiting for.

Yet many reported they did not get the information they were hoping to find.

"I'm not sure if we can wait for IBM to answer our questions about the Token-Ring," said Craig Cushman, a telecommunications analyst for Steelcase, Inc. in Grand Rapids, Mich. Steelcase is researching network technologies, including Systems Network Architecture, Manufacturing Automation Protocol (MAP) and IBM's Token-Ring. "We've set up MAP pilots on a limited basis," he said.

Not getting answers

Cushman, who described himself as a data communications manager, said he was not getting the answers he needed from IBM. "You can decide on the technology when looking at the theory to see if it makes sense," he commented. "But that doesn't mean you want to throw out all you know and install something you know little about."

"If we wait for IBM, we'll be left waiting at the train station," complained an attendee from GTE Corp. at a session covering IBM's Token-Ring and AT&T's Starlan. The GTE executive was very critical of the speed with which IBM has been delivering the pieces of its Token-Ring and its responsiveness to GTE's inquiries on the subject. He also complained about the inability to link the IBM System/36 to the Token-Ring today.

"We all have that frustration," said Thomas M. Hadley, a consulting support representative with IBM in Research Triangle Park, N.C., responding to complaints that IBM is just not moving fast enough with its network plans. "But it takes time to develop hardware and software, and we're really trying."

"We can only produce so many lines of code a day," added David Leo, a Telecommunications Marketing Center consulting marketing support representative with IBM's Information Systems Group in Research Triangle Park. One user noted GTE is on the "bleeding edge" of technology. Under pressure from its own customers to install the Token-Ring, GTE is naturally eager for IBM to reveal and release the missing pieces of its communications strategy, he said.

Not everyone is quite so concerned with the pace of IBM's Token-Ring announcement, however.

"Look, people don't expect IBM to be leading-edge. Maybe IBM is a little behind, but eventually they'll get their act together, and it will work," said Thomas McDonald, a consultant with the Waltham, Mass.-based MGT Technology Group.

"Every one of my large [Fortune 1,000] IBM users is asking me about Token-Ring, but they don't understand what it's for or where it fits," McDonald commented.

Many companies are still evaluating networks because up until very recently, network use has been driven by end users sneaking departmental networks past MIS. Steelcase is one example in which personal computer networks have been installed through user departments, but that is changing, Cushman said.

FCC under fire

CONTINUED FROM PAGE 4

business restrictions that were considered essential to the AT&T divestiture accord and opens the door to "the same kinds of anticompetitive abuses that were so common during the Bell system years." He urged the U.S. Congress to investigate the proposal.

The Justice Department on Feb. 2 urged U.S. District Court Judge Harold H. Greene, who administers the AT&T divestiture decree, to remove the ban on Bell company participation in information processing services and equipment manufacturing and to allow them to offer long-distance services outside their regions.

The department argued that the divested Bell operating companies should not be allowed to offer long-distance service that originates or terminates inside their territories, because there they have monopoly power over access to the local exchange.

AT&T President Robert E. Allen said he was puzzled by the Justice Department's deregulation proposal because the local exchange monopoly identified in the 1982 divestiture decree still exists.

"If there was merit to the concern about mixing local monopoly service with long-distance competitive services or to the concern about a monopoly provider also manufacturing its own equipment . . . they still have merit," Allen said. "On the other hand, if these were trivial concerns, a very cruel joke has been played on the nation."

John R. Hoffman, senior vice-president for regulatory and legal affairs at U.S. Sprint in Kansas City, Mo., warned, "If you let the regional Bell holding companies in [long distance] now, you would destroy competition, not enhance it."

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DEC adds low-cost entry to VAX

Ties systems in clusters but withholds Q-bus expansion

BY NINAMARY BUBA MAGINNIS
CW STAFF

BOSTON — Digital Equipment Corp. is aggressively positioning itself in the workstation market, in which it enjoyed considerable success last year, with its low-cost Vaxstation 2000 and Microvax 2000, according to industry watchers and DEC competitors.

The machines were unveiled last week along with provisions for tying DEC's smallest VAXs together in clusters.

The single-user Vaxstation 2000 and multiuser Microvax 2000 are based on the 0.9 million instructions per second Microvax II chip. An optional expansion box can add up to 166M bytes of external storage. "The black-and-white Vaxstation II is replaced by this [Vaxstation 2000], except if you need expansion capabilities provided by the Q-bus," said Jeffrey C. Kalb, DEC's vice-president for low-end systems and technologies. DEC will announce its 2000-series color version within months, he added.

Entry, not replacement

However, DEC gravely limited the expansion capabilities of the new systems by not including a Q-bus backplane. Officials said the 2000 series is intended to be an inexpensive way to get into the VAX architecture, not a replacement for existing machines.

"They're trying to leverage the fact that this is low-end, and you've got all this VAX architecture behind you if you need to grow," agreed John McCarthy, research manager at Cambridge, Mass.-based Forrester Research, Inc.

Although the 2000-series systems can run as stand-alones, they are designed for local-area Vaxclusters, a technology announced last November.

To assist customers in installing low-end Vaxclusters, DEC includes a one-year, on-site warranty in the purchase price, according to DEC's Kalb.

Low-end Vaxclusters use a Microvax II or larger VAX machine as a central controlling boot node and can link up to 13 Vaxstation 2000, Microvax 2000, Vaxstation II, Vaxstation II/GPX or Microvax II machines. "It all looks and acts as one big system. Everyone works from the same data," noted Neil Baldridge, vice-president of Compushare, a Lubbock, Texas-based beta-test user and DEC value-added reseller.

"If you need more than 140M bytes of disk space, the logical move is to go into a cluster environment," Baldridge said. Peripherals installed on the boot node are accessed by all cluster users, he said.

'Not the way people work'

Low-end clustering is DEC's answer to off-loading processing power when the Microvax II becomes overtaxed, according to Forrester Research's McCarthy. Other workstation vendors include Microsoft Corp. MS-DOS operating system functionality for users who want to run such business applications as Lotus Development Corp.'s 1-2-3, he said. With DEC, "if you want personal computer functionality, you've got to have a Vaxmate and Vaxstation on your desk, and that's not the way people work," McCarthy said.

DEC officials claimed their low-end workstation is not pitted against other workstation vendors such as Chelsmford, Mass.-based Apollo Computer, Inc. and Mountain View, Calif.-based Sun Microsystems, Inc. But Edward J. Zander, Apollo's vice-president of marketing, said, "DEC has been chasing us for the last four years trying to get into this market."

DEC's 2000-series workstations, which share the VAX architecture and DEC's VMS operating system and Ethernet networking scheme, will head off the migration of DEC users who are opting for Sun equipment, predicted Sonny Monosson, publisher of "Monosson on DEC."

Because the Vaxstation 2000 also runs Ultrix, a Unix operating system based on the University of California at Berkeley Unix 4.2, the workstation can run as an open system using Sun's Network File System gateway. Sun's converged Unix operating system includes Versions 4.2, 4.3 and System V, said John A. Hime, Sun's marketing director. "If you start talking to the U.S. government and large corporations, the strong message is to operate System V," he said.

Frustrates programmers

The Microvax 2000 works well as a computer server but does not allow programmers to work on driver development because the system lacks a Q-bus, according to beta-test user Wendy Koenig, systems development manager for the Burlington, Mass.-based Ziff-Davis Technical Information Co. If the boot node fails, the entire system is inaccessible, Koenig said. While boot-node failure can hamper operations, it has not caused problems at Ziff-Davis, Koenig said.

Edward D. Jones & Co., a St. Louis-based brokerage firm, has been evaluating the Microvax 2000 since September, according to Rich Malone, general partner responsible for data processing. The firm operates an IBM 3090 Model 200 and a 3083 and said it plans to replace its dumb Unisys Corp. terminals, located at 1,100 branch offices across the country, with intelligent systems. After evaluating both DEC and the IBM Personal Computer line, Jones ranked the Microvax 2000 as superior, Malone said.

Although no orders have been placed yet, each branch office will probably run a Microvax 2000 with two terminals and a printer, Malone reported.

DEC low end

New 2000 models

	Diskless monochrome Vaxstation 2000	*Disk-based monochrome Vaxstation 2000*	*Fully configured disk-based monochrome Vaxstation 2000*	*Entry-level Microvax 2000*	*Diskless Microvax 2000*	*Fully configured Microvax 2000*
Users	1	1	1	1-4	1-4	1-4
Memory (bytes)	4M or 6M	4M or 6M	6M	4M or 6M	6M	4M or 6M
Expanded Storage (bytes)	—	42M disk drive 1.2M floppy drive	71M disk drive 95M streaming tape drive	42M disk drive 1.2M floppy drive	—	71M disk drive 95M streaming tape drive
Price	$10,500	$13,150	$22,245	$11,100	$12,900	$18,195
Price with additional memory	$12,500	$15,150	—	$13,100	—	$20,195

CW CHART

Apollo

FROM PAGE 1

tools, and that's a start. We have a ways to go here, but we've hit a nerve with our customers. So we'll take it real easy. We're still shaking it out and learning about it," Zander commented.

The NCS, designed for a heterogeneous environment, will be initially available for Apollo systems, other Unix-based systems and Digital Equipment Corp. VMS-based systems, according to the vendor. Apollo will also provide source code for other vendors to create the necessary software and compiler to run NCS in their environment. It can support common industry standard networking protocols, including the Transmission Control Protocol/Internet Protocol and IBM's Systems Network Architecture, Apollo said.

With the intent of promoting NCS as an industry standard, the vendor will make public the specifications for its Network Computing Architecture, on which NCS is based.

The new system is targeted at both software developers and large user sites, where in-house programs are used along with off-the-shelf applications. Users will also be able to port existing applications to the NCS environment if those programs are based on a structured language such as C, Apollo spokesmen said.

> WITH the Apollo system, users can optimize the computing resources on a network — a key productivity issue at large engineering installations.

If vendors and users support the Apollo system, users will eventually be able to write and buy software that can take advantage of the shared-computing environment. This would enable users to optimize the various computing resources on a network, a key productivity issue at large engineering installations, industry analysts said.

A user at a workstation could bring up an application, and subroutines of that application could be remotely processed at a number of nodes. Without NCS, a user would run the entire application at his desk, while other systems on the network could be idle.

Assigning subroutines

Furthermore, the Apollo system will be able to assign subroutines to systems that are more suited to processing these subroutines than the workstation itself, the vendor said.

NCS is made up of a series of components that perform two basic functions. One provides an environment that will allow applications to be dispersed and processed across the network, and the other provides tools that will allow users to create such applications.

The first major component of the Apollo system is the Remote Procedure Call Runtime Environment (RPCRE), which is responsible for packaging, sending and receiving, as well as error correction of the subroutines that will be processed across the network. This software, part of the source code that Apollo will offer, must reside on each network node that is participating in NCS.

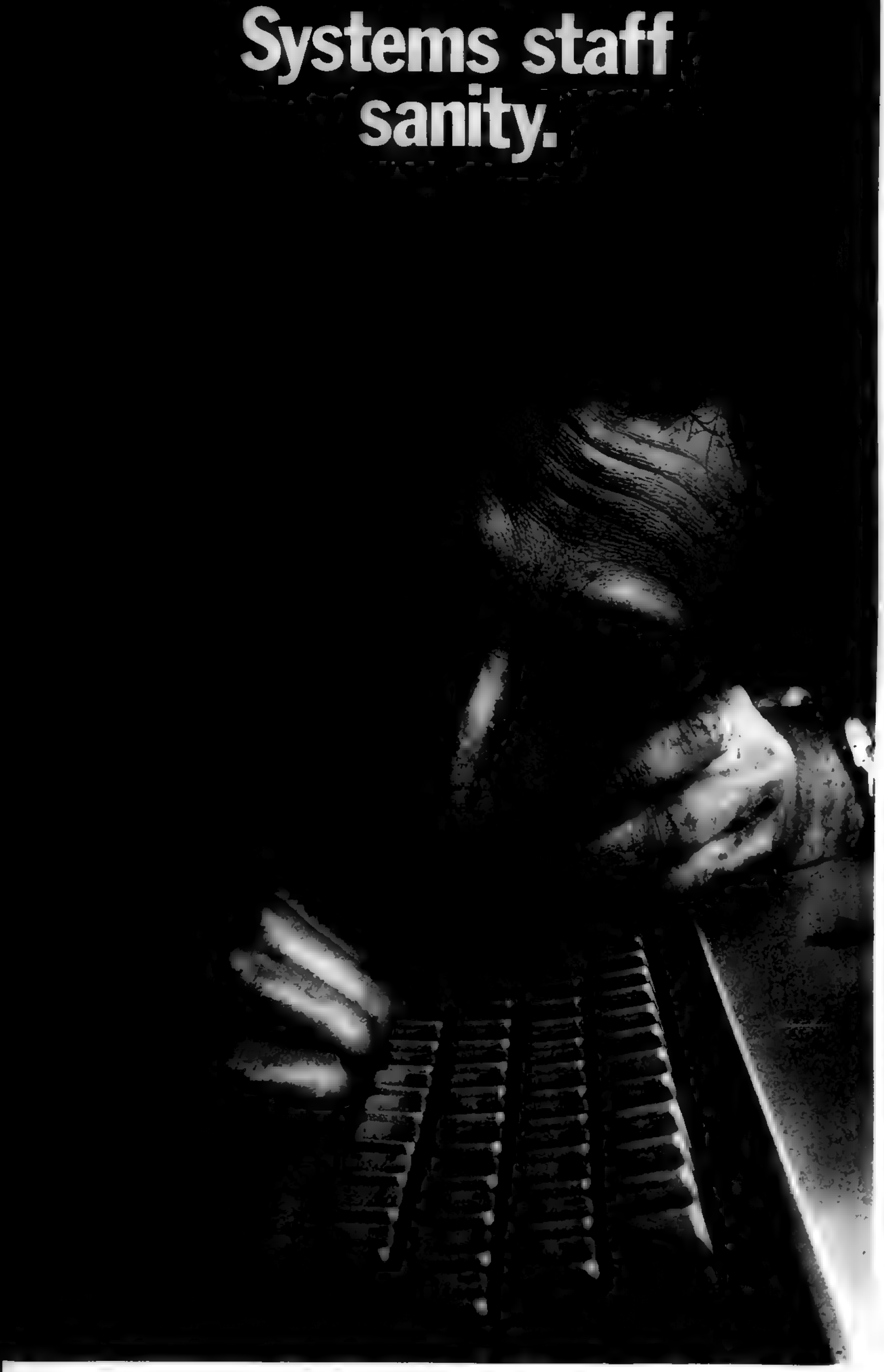
Location Broker

The second component is called the Location Broker, which is actually part of the RPCRE. It can be thought of as a data base portion of the runtime environment in which information on the system's nodes is stored. The Location Broker is responsible for coordinating the remote processing. By monitoring the network activity, it can assign a processing task to the most suitable system while an application is running.

For example, there may be two large DEC VAX systems on a network, both of which are capable of processing a subroutine of a simulation application. However, at the time the user is running his application, one of those VAXs is being used by other engineers. The Location Broker will alert the second VAX for the subroutine processing.

The third major component consists of the tools a user will need to write applications for the system. The first tool is a high-level language introduced by Apollo last week called the Network Interface Definition Language, which the vendor said supports either C- or Pascal-like syntax. Secondly, there is a new compiler, called the Network Interface Definition Compiler, which will compile the new language into C source code that can run on the NCS nodes.

Apollo's scheduled third-quarter product release will including the following: the Network Interface Definition Compiler priced at $1,000 per node or $8,500 per site; the Network Interface Definition Language Source Code at $25,000 for non-Unix and non-VMS systems; the Network Computing System Unix Runtime Source Code at $1,000; the Network Computing System VAX/VMS Source Code at $1,000; the Network Computing Architecture Public Specification priced at $80; and the Apollo-specific Network Computing System Documentation and Runtime Source Code at $250.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IBM bears brunt of drop in its mid-range sales

BY CLINTON WILDER
CW STAFF

ARMONK, N.Y. — IBM's 27% profit decline in 1986 was mainly attributable to sharply lower U.S. sales of microcomputers, mid-range systems and peripherals, according to detailed year-end financial statements obtained by *Computerworld* last week.

The statements, which will be included in IBM's forthcoming annual report, showed that U.S. revenue in both the peripherals and office systems and workstations segments plummeted by 24% in 1986. Domestic sales of office systems and workstations fell to $4.66 billion from $6.14 billion in 1985, while U.S. peripherals sales declined from $7.31 billion to $5.57 billion.

Despite what IBM called "substantial growth" in large-processor revenue as it ramped up shipments of the 3090 series, revenue from the segment labeled processors decreased 5% in the U.S. to $5.5 billion. The segment had declined by 9% in the U.S. for 1985, because the 3090 product cycle did not begin until the fourth quarter of that year.

In 1986, IBM indicated, it took the brunt of lower sales in the beleaguered mid-range. Lower mid-range revenue brought the entire category into negative growth in the U.S. and reduced worldwide processor growth to 9%.

The office systems segment includes all IBM Personal Computers, intelligent workstations and typewriters. The 24% drop provided dramatic evidence of the pricing pressure, increased competition and slower demand besieging IBM in the U.S. micro industry.

The office systems segment's revenue declined by 10% worldwide, as international sales in all segments benefited from the decline of the U.S. dollar.

IBM estimated that its corporate net income of $4.79 billion would have been lessened by 13% without the favorable currency changes.

Peripherals include terminals, printers, copiers, storage devices and telecommunications products. The segment's 24% drop in the U.S. followed a 6% rise in 1985. Peripherals sales were down 11% worldwide, to $11.26 billion.

IBM's revenue from the software and maintenance services segments were both up 9% in the U.S. in 1986.

SAS aiming at business world

Seeks to tie SAS System to mainframe DBMS, low-end VAXs

BY CHARLES BABCOCK
CW STAFF

DALLAS — The SAS Institute is making a concerted effort to tie its well-known statistical, graphics and reporting SAS System to mainframe data bases and the low end of the Digital Equipment Corp. VAX line.

Recent moves by the company indicate it is seeking to move beyond its reputation as a supplier of graphics and statistical analysis software — the name SAS stems from statistical analysis software derived from research at the University of North Carolina — and working to tie into key products serving the corporate business world.

On the same day as DEC's announcement of its low-end Vaxstation 2000 last week, SAS officials told attendees at its users group conference in Dallas (see story page 23) that a version of the SAS System will be available to run on the DEC workstation by this year's second quarter.

The Cary, N.C., software company is also producing an interface to IBM's DB2 that is expected to be introduced sometime in May or June. The menu-driven interface will generate SQL statements that query DB2 and provide data for use in SAS applications. SAS users will also be able to update DB2 through the interface. No price has been set, spokesmen said.

Late in 1987, SAS will announce an interface to Cullinet Software, Inc.'s IDMS/R data base management system, spokesmen said. No pricing has been announced.

In addition, SAS Institute President Jim Goodnight said his company wants to be a competitor in the data base management field with the relational product it acquired from Intel Corp. two years ago, the System 2000.

The data base product retails for $10,000 to $12,000, officials said. Goodnight acknowledged, however, that the installed base of the product remains small, at about 500 units.

Conversion on target

In addition, Goodnight reported that the process of redesigning the SAS System and converting it into the C programming language is proceeding on schedule. The conversion and product testing is not expected to be completed before early 1989.

Goodnight said SAS Institute engineers and beta-test sites "will probably test Version 6 more than any product we have shipped. We will have to have complete upward compatibility" for existing applications written in SAS's proprietary fourth-generation language.

The SAS System currently runs on IBM mainframes, DEC VAXs and 11/70s and IBM Personal Computers. The conversion to C will mean SAS "will have a single system we can move forward very rapidly," Goodnight said.

The SAS System ran exclusively on IBM mainframes until the fall of 1984, when the first VAX software was announced. Personal computer products soon followed, and Goodnight said SAS is seeking to round out its PC product line.

"Every capability on the mainframe will exist on the PC," he claimed.

The base SAS System is licensed for $5,000 to $12,000, with the low range reserved for minicomputers and the high range for the IBM 3090 mainframe, Goodnight said.

In addition, SAS officials announced SAS/Share, which provides users with simultaneous access to information stored in SAS System data libraries. License fees range from $2,000 to $3,000 the first year, with a two-thirds fee collected each succeeding year.

Cray courts Fortune 500 with downsized $2.5 million X-MP

BY JEAN S. BOZMAN
CW STAFF

MINNEAPOLIS — Cray Research, Inc. opened the door last week to a new class of users for its supercomputing systems — commercial enterprises in the Fortune 500. A downsized version of the X-MP series has lowered the price of entry to Cray supercomputing to $2.5 million.

The X-MP/14SE is the slowest X-MP model available, performing 275 million floating-point operations per second (MFLOPS) — about one quarter the power of an X-MP/4 — for a fraction of the X-MP's average $14 million price.

The announcement of the entry-level X-MP was accompanied by the introduction of three other models — the $8.5 million X-MP/116, the $14.5 million Cray-2/4 and the $12.5 million Cray-2/2. However, the X-MP/14SE units will be the only Cray machines that cannot be upgraded to higher models.

Cray's X-MP product line now ranges from the $2.5 million X-MP/14SE, a single processor with 32M bytes of memory, to the high-end X-MP/416, a 128M-byte, four-processor unit priced at $16 million. The Cray-2 line now has three models, including the 1G-byte, two-processor 2/2, the 1G-byte 2/4-128 and the older 2G-byte 2/4-256.

There are now 11 X-MP models, excluding two older one-processor models that were withdrawn from the market this week, the X-MP 11 and the X-MP 12. There were also three price reductions in the Cray lineup: the top-of-the-line Cray 2/4-256 was reduced from $17.6 million to $17 million, the X-MP 24 from $8 million to $7.5 million and the X-MP 22 from $7 million to $6 million.

The wider array of products is expected to draw new and repeat business for Cray, which generated $596 million in revenue and $125 million in profits last year. Until now, Cray had only about 100 users around the world and only 150 machines installed. Most customers are U.S. government agencies, oil companies and foreign governments. Production has been steady but limited, with just 35 X-MPs produced last year.

The intent in introducing so many models over a wide range of performance is to widen Cray's user base. "Instead of the supercomputer market maturing, we see that it continues to expand," said Robert Ewald, vice-president of commercial marketing at Cray.

Users eagerly waiting

Users seem to be eagerly awaiting the delivery of the entry-level X-MPs in the third quarter of this year, along with the other new machines. "There was always a large gap between the highest level [Digital Equipment Corp.] VAXs and the smallest Cray," said Peter Patton, director of the University of Minnesota Supercomputer Institute, which operates a Cray 2.

Now, Patton said, users at universities and large commercial companies may find that the low-end X-MP price tags, ranging from $2.5 million to $7 million, are not terribly higher than IBM's.

Industry analysts were also pleased by the move. "This will open up more sales from cost-conscious customers," said Michael Orsak, an analyst with San Francisco investment banking firm Robertson, Colman & Stephens. He projected Cray revenue at $750 million for this year — with even greater revenue possible as time goes on.

The revamped lineup of Cray machines offers a wide range of performance. The low-end X-MP 14SE will run at 275 MFLOPS, Ewald said, while the high-end X-MPs offer slightly more than 1 billion FLOPS, and the Cray 2 offers about 2 billion FLOPS. Those numbers are theoretical maximums, and actual performance will vary by application, Ewald said.

Cycle time for the new machines will not differ from that of previous Cray 2 and X-MP models, with the exception of the X-MP 14SE. That unit will run about 75% slower than the 8.5-nsec cycle time of other X-MPs. Cray 2 models will run at 4.1 nsec, Cray spokesmen said.

Another new feature, called the HSX high-speed external channel, will now be available for all Cray systems. This external channel will link Cray supercomputers with other Cray computers, peripheral devices or computers made by other vendors. Running at 100M byte/sec., the HSX channel will operate at distances up to 50 feet.

Latest Cray Research supercomputers

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2/4-128	4	1G byte	2GFLOPS*	4.1 nsec	$14.5
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
X-MP/116	1	128M bytes	1GFLOPS	8.5 nsec	$8.5
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* Floating-point operations per second
** Estimate

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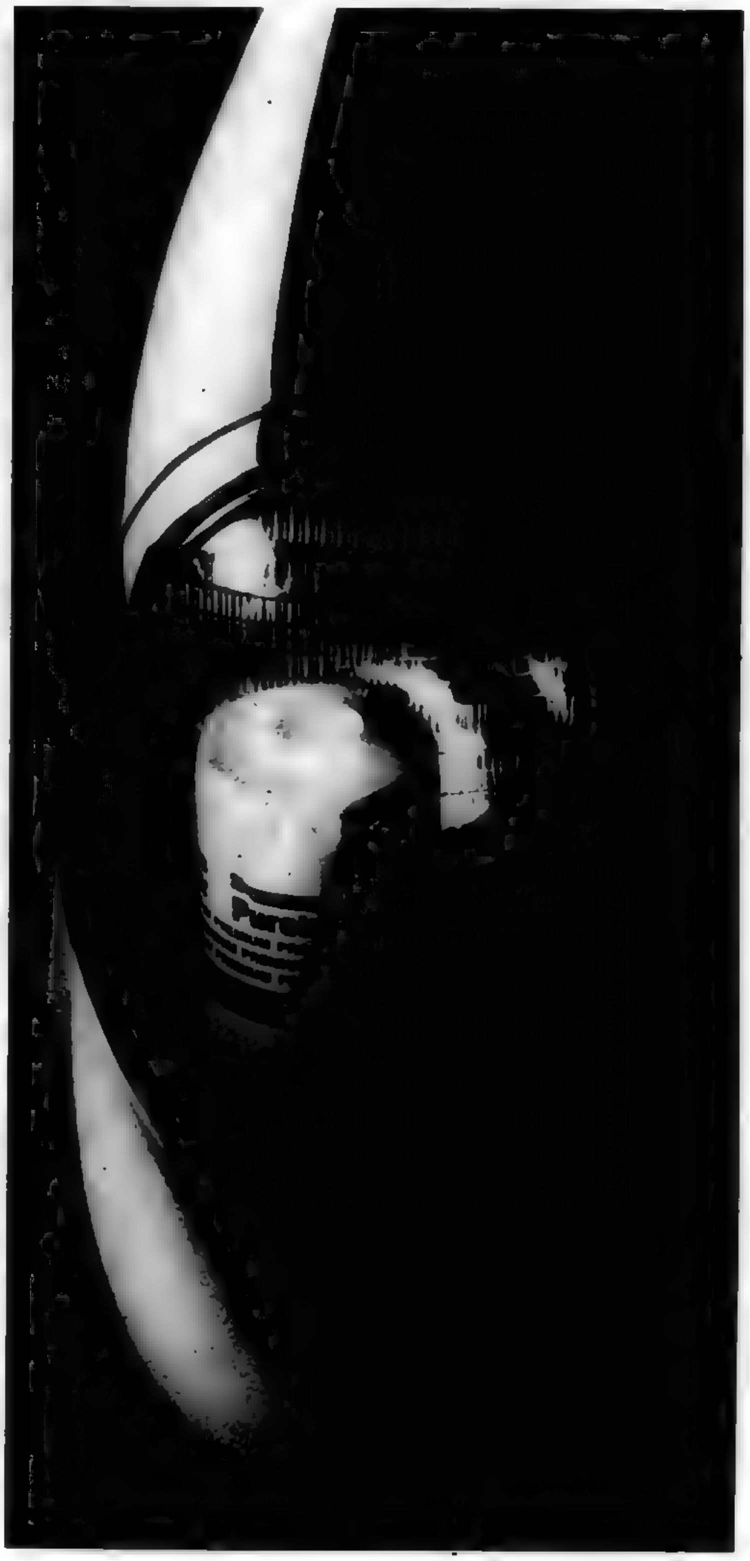

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Novell policy shift seen paring dealers in favor of direct sales

BY PATRICIA KEEFE
CW STAFF

OREM, Utah — Dramatic changes in Novell, Inc.'s distribution policies could result in lower prices and an initial drop in support for users of the company's networks, distributors predict.

Novell has asked its distributors to sign contracts stipulating software quotas between $1 million and $3 million. Distributors also are required to purchase 10%, or $100,000 to $300,000, of the agreed-upon volume up front.

"They want to sell a lot of their software," observed one distributor, who added, "The more software you take up front, the higher the discount, the heavier the carrying cost."

The up-front purchases could lead to a shakeout among Novell distributors, forcing as many as half to drop the product, several distributors predicted.

Distributors said they believe the strategy will require some users to obtain support-only contracts with the remaining Novell partners, while others will buy products directly from the company.

"I absolutely think Novell will start selling direct [to users] in a major way," said Ian Ebel, president of Microserv Technologies Corp. a Novell distributor based in Boston. He said some of his dealers told him they have already seen moves and orders in that direction.

Repeated efforts to obtain comment from Novell were unsuccessful.

In addition, distributors claimed the requirement to purchase large amounts of software up front is sure to incite a price war, if not lead to the availability of Novell's Netware network software through mail order.

"Distributors are sure to find a home for that software. It's too much software [to take on at one time] to be nice guys about it," said Terry Green, president of CPU Corp., a Novell distributor in Houston, and president of the LAN Group, a consortium of five Novell distributors.

The excess software could resurface in the gray market, which is typically fed by distributors and dealers who have more products than they can sell or afford to carry in inventory.

Novell's products require a lot of support, according to Ebel.

"I'm not sure that Novell has the support network in place to support all these customers. There's a chance that the whole thing could backfire in a very bad way for Novell," Ebel said. "We have tried to convince Novell that they need the whole support organization out there."

Sprint word processor adopts others

SCOTTS VALLEY, Calif. — Borland International, Inc. last week announced a word processing program that allows the user to configure almost all operating commands and can emulate those of other vendors' word processors.

A user could create a document under one word processing program's commands and read it under another using an automatic file-conversion command, according to Borland.

The product, Sprint: The Word Processor, reportedly will be able to emulate file structures and respond to commands from word processing products by Micropro International Corp., Word Perfect Corp., XYQuest, Inc. and Ashton-Tate, according to Borland.

Business-user appeal

Borland aims to appeal to business users who may have several word processing programs in use in a single office.

The writers may sometimes need to share documents but resist switching from the word processing programs with which they are familiar.

Sprint: The Word Processor costs $195 and is scheduled for release in the second half of this year.

J. C. Penney lured to Supercalc4

BY DOUGLAS BARNEY
CW STAFF

NEW YORK — The appeal of an unlimited site license was enough to lure J. C. Penney Co. from Lotus Development Corp.'s 1-2-3 to Computer Associates International, Inc.'s Supercalc4.

"The key reason was the price and the fact that we are used to centralized control," said Hal Menzel, senior technical specialist for J. C. Penney in Dallas. The agreement allows J. C. Penney to centrally acquire and distribute Supercalc4. There are also some nice features in the product, according to Menzel.

The licensing agreement allows for an unlimited number of copies to be used by J. C. Penney, and the bulk of new spreadsheet users are expected to use Supercalc4. J. C. Penney's DP department paid for the license and maintenance agreement and will charge users $39 for a complete package. "I suspect most people are going to be ordering [Supercalc4] rather than getting Lotus," Menzel said.

J. C. Penney had nearly standardized on 1-2-3 and had developed a set of 18 standard macro files to improve productivity and control costs. Those macros are now being converted to run on Supercalc4. Supercalc4 also reads and writes Lotus 1-2-3 files.

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AZ	Phoenix	Dec 2, Jan 28
	Tucson	Jan 29, Mar 25
CA	Concord	Feb 11
	Los Angeles	Dec 16, Jan 15, Feb 10, Mar 11
	Newport Beach	Jan 20, Mar 17
	Sacramento	Jan 13, Mar 10
	San Diego	Jan 8, Mar 3
	San Francisco	Dec 9, Jan 8, Feb 4, Mar 12
	San Jose	Jan 22, Feb 12, Mar 26
CO	Colorado Springs	Jan 15
	Denver	Dec 10, Jan 13, Feb 13, Mar 17
CT	Hartford (Farm.)	Feb 4
	New Haven	Dec 4, Mar 25
DE	Wilmington	Feb 3, Mar 31
FL	Ft. Lauderdale	Mar 5
	Jacksonville	Jan 28
	Orlando	Mar 11
	Tampa	Jan 20
GA	Atlanta	Jan 28, Mar 18
	Macon	Feb 19
	Savannah	Mar 19
HI	Honolulu	Jan 29
IA	Des Moines	Feb 18
ID	Boise	Feb 12
IL	Chicago	Dec 18, Jan 22, Feb 19, Mar 11
	Springfield	Feb 28
IN	Indianapolis	Dec 9, Jan 14, Feb 11, Mar 18
KS	Wichita	Jan 8
LA	Baton Rouge	Feb 19
	New Orleans	Dec 9, Feb 20
MA	Boston	Dec 10, Jan 14, Feb 10, Mar 18
	Burlington	Jan 27
	Worcester	Feb 25
MD	Bethesda	Dec 10, Jan 13, Jan 20, Feb 5, Feb 12, Feb 17, Mar 4, Mar 12, Mar 18
MI	Detroit	Jan 13, Feb 10, Mar 10
	Lansing	Jan 15
MN	Minneapolis	Dec 18, Jan 20, Feb 3, Mar 12
MO	Kansas City	Jan 22
	St. Louis	Jan 6, Feb 17, Mar 12
NC	Charlotte	Mar 16
	Raleigh	Mar 17
	Winston-Salem	Jan 28
NE	Omaha	Jan 6, Mar 3
NH	Manchester	Mar 5
NJ	Iselin	Jan 7, 15, 21, Feb 4, 12, 18, Mar 10, 26
NM	Albuquerque	Dec 10, Feb 4
NV	Las Vegas	Jan 13
NY	Buffalo	Feb 18
	New York City	Dec 9, Jan 14, Jan 22, Jan 28, Feb 11, Feb 17, Mar 11, Mar 19, Mar 25
	Rochester	Dec 10, Jan 15, Feb 11, Mar 19
	Syracuse	Dec 16, Mar 10
OH	Cincinnati	Jan 8, Feb 18, Mar 19
	Cleveland	Feb 3, Mar 3
	Columbus	Feb 4, Mar 4
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Teradata ties LANs into machine

BY CHARLES BABCOCK
CW STAFF

LOS ANGELES — Teradata Corp. is offering the Communication Processor, said to tie Ethernet or other local-area networks (LAN) into its data base machine, the DBC/1012.

The LAN tie-in is both a hardware and software addition to the data base machine that allows end users direct access to the large corporate data bases typically stored on it. The Communication Processor will work with any LAN that conforms to the IEEE 802.3 standard and utilizes either Transmission Control Protocol/Internet Protocol (TCP/IP) or International Standards Organization/Open Systems Interconnect (ISO/OSI) network protocols. Teradata officials said they plan to add support for the Xerox Network Systems protocol and the Manufacturing Automation Protocol by the end of this year.

The LAN tie-in is a departure for the 8-year-old company, which has previously limited access to its data base machines to users able to pass through an IBM host. "In the past, we were owned by the mainframe," commented Jon H. Gausman, Teradata sales director.

Software that manages a workstation session on the DBC/1012 is available for the IBM Personal Computer or compatibles or an AT&T 3B2 minicomputer running Unix System V. Support for Digital Equipment Corp.'s VMS operating system is planned by the end of this year, Teradata officials said.

By using an SQL-based PC interface such as the Portable PC/SQL-Link from Micro Decisionware, Inc. in Boulder, Colo., an end user may formulate SQL queries transmitted over an Ethernet LAN, according to Gausman.

S. Boyd Pearce Jr., Teradata vice-president of marketing, said the Communication Processor on the data base machine has a maximum of 64 concurrent users.

The Communication Processor and software is available immediately at a price of $39,000, with an additional $4,000 price on TCP/IP or ISO/OSI adapter. A PC interface license for 10 PCs is $5,000, with a 3B2 interface priced at $2,000, the spokesmen said.

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Lotus to jazz up Mac debut

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Despite disappointing sales of Jazz, an integrated package for Apple Computer, Inc.'s Macintosh, Lotus Development Corp. is set to re-enter the Macintosh market with an announcement March 3.

The release, expected to coincide with Apple's announcement of two new Macintoshes, is essentially a new version of Jazz containing five enhanced modules: data base, spreadsheet, word processing, graphics and communications, sources say. It is unclear whether the product will be named Jazz.

In one of the most important enhancements, the spreadsheet module will be more closely aligned with Lotus's 1-2-3, a source close to the company said. One of the shortcomings of Jazz has been the lack of macros, and Lotus lost market share to Microsoft Corp.'s Excel.

The new Jazz is expected to include the 1-2-3 macro language and will read and write 1-2-3 .WKS files. The package is expected to be marketed along with the existing Jazz, not be a replacement for it.

Lotus's success against Excel with the new strategy depends upon the offering's quality, one user says. "There would have to be sufficient improvement to cause us to displace Excel," says Dick Webb, an audit partner with New York's Peat, Marwick, Mitchell & Co.

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VAX boom triggers hiring war

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3317-8767

Module sets aside memory

Unisys claims 40% power gain for A 12s, A 15s using cache

BY JAMES CONNOLLY
CW STAFF

DETROIT — Promising performance gains averaging 40%, Unisys Corp. last week announced a software disk-caching product for users of the company's largest mainframes.

The Software Disk Cache Module sets aside portions of main memory in Unisys A 12 and A 15 mainframes as dynamically allocable cache. The approach by Unisys differs from how some other vendors manage cache, which is on disk controllers. The advantage to the Unisys approach is that the Software Disk Cache Module allows users to move data from various disk strings into a single cache, according to William Maclean, Unisys program manager for system software.

Maclean said the greatest performance gains, were achieved by using the Software Disk Cache Module in I/O intensive applications, particularly applications in which data bases are not managed by Unisys's Data Management System 2 (DMS2). He said DMS2's buffers provide some of the same advantages.

The module, which requires Unisys MCP/AS Release 3.6.4, uses a minimum of 24M bytes of memory on the A 12 and 48M bytes of memory on the A 15. Maclean said approximately 170M bytes of the 192M bytes of maximum memory in the A 15 can be set aside for cache.

Available now, the module on an A 12 costs $5,280 per month on a monthly license or $258,720 for a five-year, extended-term purchase. The cost for an A 15 is $6,360 per month or $311,640 for a five-year purchase.

Intel soups up 80386 family

BY DAVID BRIGHT
CW STAFF

SANTA CLARA, Calif. — Intel Corp. will this week introduce a series of 80386-related chips it says will lead to faster, smaller and more efficient systems. The chips include a 20-MHz version of the 80386 microprocessor [CW, Feb. 2], two peripheral chips and a numerics coprocessor that was originally announced in October 1985.

According to Intel, the new microprocessor operates at between 4 and 5 million instructions per second, which is 25% faster than the 16-MHz version. This rating also puts the new 80386 ahead of Digital Equipment Corp.'s VAX 8600 and IBM's 4381 in terms of raw CPU performance.

Dave House, Intel Microcomputer Group vice-president and general manager, said that the immediate impact of the new chips will be seen in performance-critical areas such as computer-aided design, manufacturing and engineering and departmental-level computing.

The peripheral chips include an integrated-system peripheral that includes direct-memory access as well as major processor support functions and the 82385 cache memory controller.

The 80387 will perform floating-point operations for math-intensive applications. With the new 80386, 80387 and peripheral chips working together, the "full potential of 80386-based systems can now be realized," House claimed.

Because the 82380 Integrated System Peripheral eliminates the need for as many as 30 large-scale integration and very large-scale integration components in most applications, the chip reportedly will help systems manufacturers reduce design time and board space.

The 20-MHz 80386, the 82380 and the 80387 are available now. Intel said it will ship the 82385 in the second half of this year.

Operating system for 80386 lets users access existing applications, MS-DOS

BY DAVID BRIGHT
CW STAFF

MONTEREY, Calif. — Digital Research, Inc. announced last week that it had tailored its IBM Personal Computer AT-based Concurrent DOS Expanded Memory operating system to systems based on the Intel Corp. 80386.

Called Concurrent DOS 386, the new operating system is aimed primarily at multiuser environments that need to simultaneously run existing Microsoft Corp. MS-DOS applications packages. The operating system also runs Digital Research's CP/M-86 operating system.

Digital Research will initially sell Concurrent DOS 386 to OEMs and then move it into retail channels around May, according to Frank Iveson, sales director. Digital Research has already signed up two OEMs in the UK — Jarogate Ltd. and Comart Ltd. — he added.

The operating system uses the chip's Virtual 86 mode to run multiple 16-bit programs in separate 1M-byte sections of memory. While Concurrent DOS 386 supports the chip's 32-bit native mode and its 4G-byte address space, Digital Research will instead emphasize the operating system's multitasking capability for current applications, Iveson said.

That way, users can take advantage of the huge base of MS-DOS packages as well as the 1,400 vertical-market and general applications already available worldwide under previous versions of Concurrent DOS, Iveson added.

The operating system is expected to be available in early March.

Digital Research recently introduced the Flexos 386 operating system for industrial real-time environments using 80386- and Intel Multibus II-based systems (see story page 49).

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Honeywell reports first deficit ever — $492M

BY CLINTON WILDER
CW STAFF

MINNEAPOLIS — Honeywell, Inc.'s final year in the computer business was a disastrous one, as the company last week reported a net loss of $492.8 million, or $10.94 per share, attributable to one-time charges and write-downs.

In addition, Honeywell noted that its only remaining computer operation, the Federal Systems Division, will turn over 50% of its profits to the new joint venture formed by Honeywell's Information Systems Division, Japan's NEC Corp. and France's Compagnie des Machines Bull.

The profit sharing plan has been negotiated among the three companies since the Dec. 2 announcement of the joint venture.

"I'm not sure why they decided to do it that way for accounting purposes," said Gary Blauer, analyst with Minneapolis-based Dain Bosworth, Inc. "Federal Systems will be buying a lot of product from the new venture, so it could just as easily have been put into prices. The new venture sees the division as a customer, and they are going to need customers."

When the new computer venture was announced, Honeywell said it was retaining U.S. ownership of the Federal Systems unit because most federal computer contracts are closed to non-U.S. vendors. The final structure of the yet-unnamed venture is expected to be announced next month.

Among largest losses ever

Honeywell's loss, its first in 60 years as a public company, ranks among the largest deficits ever reported by major computer vendors. Control Data Corp., in the midst of its fiscal crisis, reported a 1985 loss of $567.5 million, or $14.56 per share.

Honeywell took most of its major charges in the fourth quarter, including the $408 million, $9.04 per-share loss from the sale of 57.5% of Information Systems to the new venture. Honeywell sold the operation for $250 million below book value.

The company did not break out 1986 results for the information systems unit, since it is now accounted for as a discontinued operation. A spokeswoman said the computer division was profitable, excluding one-time charges, but the unit's profit was expected to fall significantly from its 1985 level of $200 million.

Dain Bosworth had estimated the division would earn just $90 million in 1986 [CW, Dec. 8].

In overall corporate results, income from continuing operations, excluding charges, fell 14% from $220 million, or $4.80 per share, in 1985 to $189 million. Charges of $134 million for consolidations and job reductions and $42 million for inventory write-down reduced Honeywell's actual 1986 operating income to $13 million, or 28 cents per share.

Honeywell Chairman Edson Spencer said the company's first-quarter 1987 profits would be flat compared with those of the year-earlier quarter but that net income would improve substantially during the rest of the year.

"It is now a whole different company with a new industry mix," Blauer said. "I think they will meet their targets, although their results are now more tied to capital spending growth than before."

For the year, Honeywell's overall corporate revenue grew 8%, to $5.37 billion, from $4.99 billion in 1985. Fourth-quarter revenue was also up 8%, from $1.50 billion a year earlier to $1.62 billion.

DPS 90 line gets 10% price slash

BY JAMES CONNOLLY
CW STAFF

PHOENIX — Honeywell, Inc. has cut prices on its DPS 90 mainframes by an average of 10%, a move the company said is intended to make Honeywell's largest systems more competitive with the IBM 3090 mainframe family.

The announcement came after IBM restructured and enhanced the 3090 line to improve price/performance ratios and after Honeywell officials reported that they expect to use recently introduced NEC Corp. processors in the DPS 90's successors.

The DPS 90 itself uses technology developed by NEC, which this month announced systems providing twice the performance of existing NEC systems.

All five models of the DPS 90 family are affected by the cuts.

The price of the uniprocessor DPS 90/91 was cut from $3.95 million to $3.55 million. The dual-processor DPS 90/92 was reduced from $5 million to $4.5 million, and the redundant dual-processor DPS 90/92T was cut from $6.25 million to $5.625 million. The three-CPU DPS 90/93 was reduced from $7.3 million to $6.5 million, and the four-CPU DPS 90/94 was cut from $8.35 million to $7.6 million.

Monthly maintenance prices were also reduced. For example, the maintenance charge for the DPS 90/91 was cut from $6,250 to $5,625.

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PC Magazine, *Oct.28,1986*

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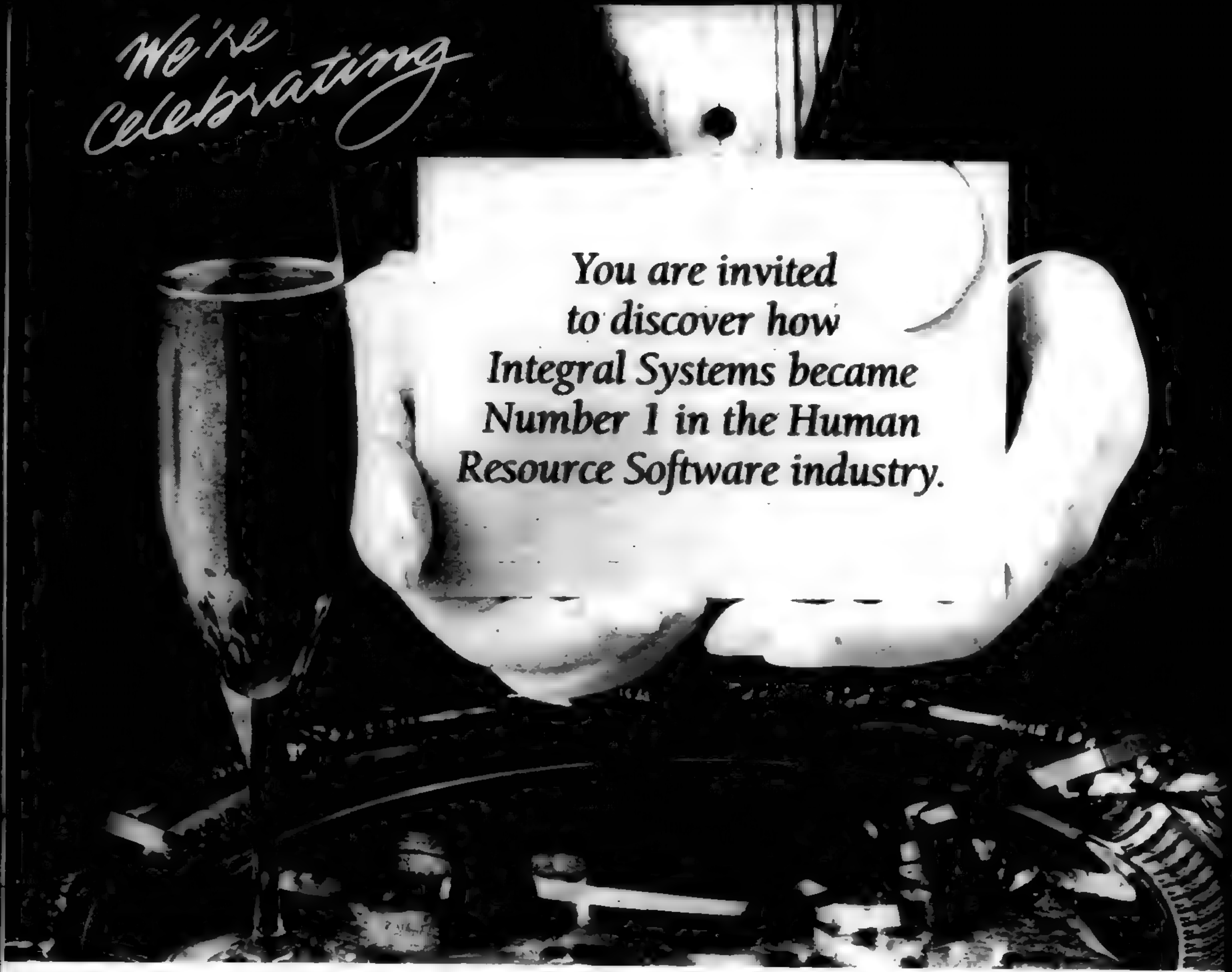
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EDITORIAL

Cloudy Blue skies

IBM HAS CHOSEN an unusual time to declare 1987 "The Year of the Customer."

At an Orlando, Fla., gala for 150 of its biggest users two weeks ago, IBM brought out its top executives to kick off the new campaign with three days of back-slapping, cheerleading and whispering about future product plans. The message was simple: IBM cares about its customers and wants to listen.

Yet only a week before the Florida confab, a very different IBM gave its valued mainframe users a message that was shrouded in vagaries and thin on detail. The occasion was the announcement of the 3090E series, IBM's most powerful mainframes and a needed kick for the 3090 line, which has been suffering from slow sales of late. Three weeks after the announcement, many customers are still asking just what the E series means to them, what upgrade options they have and why IBM chose to spring the machines with so little advance notice.

The confusion is IBM's doing. When it unveiled the E series, the company told its current 3090 customers that in order to enjoy the 10% to 15% performance advantages of the new line they must, in fact, make two upgrades: one from their existing 3090 to a 3090E and the other from their current model to the next highest model in the series. Horizontal upgrades — for example, from a Model 150 to a Model 150E — are not allowed.

IBM was also evasive about what is really new in the E machines. Customers were told they will get a 3090E immediately if they have a 3090 on order. But users who have already taken delivery of a 3090 — even if it was only last week — must pay the full upgrade price.

IBM STATEMENTS SINCE the announcement have only further clouded the picture. The E models that will ship this month aren't full-function versions of the new machines, IBM said. Those will be upgraded in May. And an IBM spokesman admitted to a *Computerworld* reporter a week after the 3090E's debut that an upgrade within the same model is "technically possible," but that IBM won't help the customer do it.

IBM has long labored under the image that it exists only to sell more "iron." But in a market that is being driven by an increasingly shrewd breed of user and squeezed by some hungry competitors, it is in IBM's interest to shed that stigma as soon as possible. The more cynical IBM critics have already written off the 3090E as an IBM ploy to boost its bottom line at the expense of its customers. What's troubling is that some of those critics are customers themselves.

IBM owes its customers a clear and continuous statement of product direction, the kind that won't let them make expensive and embarrassing buying decisions. Users owe IBM an equally open response when the vendor's activities don't agree with them. The Year of the Customer is dawning, and it promises to be a pivotal one for both.

LETTERS TO THE EDITOR

Lucid documentation

Something important is missing in your article, "Intrapreneurship: Turning in-house projects to profit" [CW, Jan. 19]. Customers need and expect better documentation than in-house users do.

In-house users have probably seen the package develop. They also have easier access to technical support than do commercial users. So commercial documentation needs to be simpler and more thorough than documentation for in-house users. In addition, commercial users expect more graphics and better packaging.

Good documentation helps sell software by convincing potential commercial customers that their people can use the product. But good documentation requires careful planning and development — and that means time and money.

Last-minute documentation is often inaccurate, incomplete and poorly written; it may even make the package more difficult to sell.

Norman Boyer, Ph.D.
Consultant
Sandra Pakin & Associates
Chicago

PCTs and VDTs

Your article on display terminals, "VDTs: Doing more for less" [CW, Jan. 19], did your readers a disservice by not covering personal computer terminals.

Don't just take my word for it, because I'm sure market researchers at Dataquest, Inc. and International Data Corp. would both agree.

The PC terminal market grew at a faster rate than any other ASCII terminal segment. So much so that companies like ADDS, Ampex Corp., C. Itoh Electronics, Inc., Falco Data Products, Inc., Liberty Electronics Co., Televideo Systems, Inc., Visual Technology, Inc. and Wyse Technology, Inc. have chosen to enter it.

Yet your story did not contain a single syllable about what a personal computer is, what makes a terminal a PC terminal or what the PC terminals market is all about.

Robert A. David
Director of Marketing
Kimtron Corp.
San Jose, Calif.

This week in history

Feb. 21, 1977
A U.S. District Court judge decides to abort the California Computer Products, Inc. vs. IBM antitrust trial after three months of evidence against IBM.

The move leaves members of the dismissed jury frustrated and disappointed at not being able to see the case to completion since, before hearing IBM's defense, the majority of jurors leaned toward Calcomp.

Feb. 22, 1982
A Hollywood movie producer looks for used computers for "War Games," scheduled for release in 1983.

The United Artists' feature film's associate producer explains that banks of the hardware are needed in order to make the computer-room set look authentic.

Addressing Sec. 1706

Thank you for your editorial, "Declaration of independents" [CW, Jan. 19], on the impact of Section 1706 of the tax reform package on independent contractors.

I would offer that any reader who wishes to contact members of Congress regarding Section 1706 to please write Dean Gallo (R-N.J.) of the Small Business Committee, Minority Enterprise Subcommittee, and Robert A. Roe (D-N.J.), of the Science and Technology Subcommittee, in care of:

Congress of the United States
House of Representatives
Washington, D.C. 20515

George Moran
Kinnelon, N.J.

One hundred flowers

I enjoyed the Executive Report, "Parallel Processing" [CW, Dec. 22], very much. It was gratifying to see there is support for the coexistence of a great many approaches to super computing.

The old proverb, "Let a hundred flowers bloom," should not be attributed to Mao Tse-Tung. He appropriated it, adding the words, ". . . then pick them all at once." He was referring to his policy of encouraging dissent and pluralism for a few years, in order to bring those so inclined into the open; this was always followed by a ruthless purge.

I hope of the "hundred flowers" of superspeed computer architecture many bear fruit. Problems exist at many levels of granularity, and some primarily recursive algorithms cannot be parallelized at all.

Larry Van Stone
Conoco Inc.
Ponca City, Okla.

PC or paperweight? The boss goes off-line

GLENN RIFKIN

Johnson was the third guy to return from the executive suite disfigured. He looked at me in embarrassment, his face twisted into that frozen mix of a grimace and a smile of patience. Three hours was the record. Benson and Portnoy had each come back after two hours with that same bizarre contortion on their faces. Frankly, I was angry with the failure of the first two, but when I saw poor Johnson, I knew we were all in for a long siege. I sent him home and looked grimly upward toward the 25th floor.

The moment of truth, in fact, had come when they told me to head up the information center. Great, I thought, terrific. Lines of neophytes looking to me to lead them to the promised land. PC literacy spreads throughout the land on the wings of my every nod and comment. Grateful end users singing hosannas to the department chiefs about that wonderful guy at the IC, the guy who gave them The Power.

But even then I knew the call would come. It might be some executive assistant bucking for a promotion, but more likely the Head Honcho in MIS was looking for a pipeline to the front office. Get The Big Guy on a PC. Teach him Lotus, teach him data base management. Make him an Info Age swami and he'll be eternally grateful when budget time rolls around.

And who would they send to get Mr. Top Gun loaded? You got it. Let the info center do it. Aren't they responsible for end users and PCs? No problem. But why was the MIS guy snickering when he left my office? And why did his whole department look away and shake their heads when I passed through that afternoon? Doom, is why. No win, is why. Mr. Techvoid is on the throne and you get to bring him the news that the 20th century is passing him by.

So I sent Benson, then Portnoy and then Johnson. Three strikes. My turn to bat.

When I peered around the corner of his door, I shuddered a bit and involuntarily sunk backward. "Now, now, Mr. Barnes. He doesn't bite," his executive assistant urged, nudging me toward the office. "What's the matter with you techie types anyway?" she said as her fingers drummed the top of her word processor. I remembered her. She had been in the IC a year ago screaming loudly about how technology stinks and where was her Selectric.

When I entered, she closed

Continued on page 18

Rifkin is a senior editor for *Computerworld*.

Change for change's sake

Balancing centralized vs. distributed processing

EFREM MALLACH

The Flying Wallendas were one of the great trapeze acts of all time. Yet their most dramatic feats pale next to the balancing acts that MIS managers perform every day.

MIS managers spend their working lives balancing needs vs. resources, maintenance vs. development, standardization vs. flexibility, performance vs. software vs. people, overtime vs. schedule. From a strategic point of view, however, the most important balancing act is probably that of centralization vs. distribution of processing.

Most organizations begin in a centralized mode of operation. Anyone who installed their first system more than 10 years ago had little choice. (Remote batch terminals and data entry systems don't count.) Anyone whose first system is more recent must have started small with a single system.

At some point an organization realizes that (a) many of its business functions are inherently distributed; (b) local managers should be allowed to manage; and (c) technology permits computing to follow the business. Everyone starts talking about the dangers of putting all your eggs in one basket. The conclusion is distributed processing. Processors are purchased, lines are leased, programs are converted, files are split. Six months — or three years — later, everything is distributed. Each warehouse has its own supermicro.

Now what? The cry soon goes

Continued on page 18

Mallach is associate professor of computer science at the Boston College School of Management and a consultant to top managers of vendor and user organizations.

Why the sky is not falling

HERB GROSCH

My theses are very different from those of the moaners and groaners in Silicon Valley. I believe:

- The computer business is flourishing worldwide.
- The U.S. is far out in front of its rival, Japan, and will stay in front for at least 20 years.
- Chip-making is in great shape here and in Japan.
- Federal assistance, for instance in the funding of the construction of a chip superfoundry, is not needed.
- Pentagon intervention on the grounds of security is contra-indicated.
- The loudness of the cries for money or protection is in proportion to the greed and/or incompetence of the petitioner.

Growth around the world, in either financial terms or number of users, is between 10% and 15%, the exact figure depending on how you handle the home-computer part of the desktop business and, in the U.S., on how you handle military hardware and software. This figure compares with the historical rate from the mid-1950s to the early 1980s of 15% to 17%. These figures reflect the rate at which novel technology can be absorbed once pent-up initial demand is satisfied.

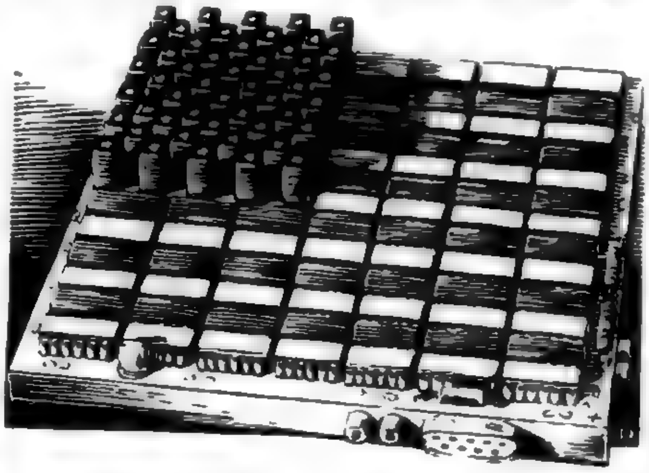
Do you suppose the shipbuilding, steelmaking and auto industries would complain if they had such a growth rate? If it continues, as new applications and wider education in working with information technology guarantee, our industry and its ancillaries will be the largest sector of both the U.S. and the international economies in a decade.

The sky is not falling. Then why does the press tell us it is? Two answers: The nicer one is that journalists are new to the game, having been charged up at the beginning of the personal computer boom. They find growth of less than 40% or 50% a year unexciting. One piece of evidence is the silly disproportion of attention to the smallest machines. To such people, mainframes and minis are complicated, jargon-ridden and boring.

The other answer is that stories that the sky is falling are exciting, are read closely and sell publications.

The key to continuing American dominance is research. Until the Japanese remodel their extremely good but rigid educational system and until family and employer support of that system is changed, there will be a major shortfall in the production of research men (and especially women). It isn't a question of ability. The great outfits like Fujitsu Ltd. and even the universities are vigorously working for change.

Yes, the Japanese beat us to each generation of memory chips. That takes development skills, exquisite manufacturing care and long-term investment of large quantities of money, all of which they have. We produce 80386 chips and such things as new microprocessors, reduced instruction set computing chips and hybrids. Both countries are doing beautiful work.



Do we want to get the lower priced random-access memory (RAM) production back? We could, with superb microrobotics and Class-One clean rooms and lots of money. With the same level of effort, we could get color TV production back. At best both are dog-eat-dog, low-profit scrambles, and both the U.S. and Japan would be well advised to move on to newer markets.

The well-publicized calls for a large federal investment in a superfactory to make superchips in superquantities are not being challenged loudly enough. Congressmen, computer manufacturers and concerned citizens are all saying, 'Well, even if it isn't necessary, it will help the semiconductor companies compete against overseas outfits.' That isn't what the chip makers want the taxpayers' money for. They want a free superfactory with which to compete.

IBM is already building a facility in East Fishkill, N.Y., as advanced and considerably larger than the one proposed by the Sematech consortium. And IBM is doing it without federal support, using its own experts, who are the best in the world.

There was a fine story supporting the idea of federal intervention by Bohdan Szuprowicz in the Dec. 8 issue of *Computerworld*. He emphasized the national security aspects, which are of deep concern to the Pentagon, and deplored the acquisition of Fairchild Semiconductor Corp. by Fujitsu. I wryly noted that he did not mention that the mainframes offered by ICL, PLC, Siemens AG, Honeywell, Inc., BASF Co. and Olivetti Corp. are all of Japanese design and manufacture.

Note that the factories that Fujitsu and NEC Corp. and Hitachi Ltd. and Toshiba Corp. might take over (or build) would be located in the U.S. and staffed almost entirely with Americans, which is much more secure in a national emergency than the chip foundries U.S. firms have built in Europe or the Far East. And note that Toshiba, for instance, is furnishing its advanced dynamic RAM know-how to Motorola, Inc. as Fujitsu doubtless plans to furnish its technology to Fairchild. Our security is increased by interactions with Tokyo.

There is a dark side to Pentagon support, and that is the restriction on exchange of technology across national boundaries, among companies with different levels of military commitment and even between American engineers and scientists. This is the greatest danger to national security and America's worldwide domination of information technology — not Russian spies, not Japanese manufacturing skills, not low Korean wages, but the perennial military desire to build a wall up to the sky and isolate our technical people from the rest of the world and each other.

I will not dwell on my sixth thesis, but simply restate it. Our industry is rife with greed, barred, in most cases by investor demands, from long-term planning and investment and heavily populated with frightened and incompetent executives. Proposals to tap the federal, and especially the military, till should be read with that in mind.

American computers are great. American chips are great. American research and development is great. Ignore the screams from the weaklings and cowards and press on.

Grosch is known for the relationship between computer speed and cost (Grosch's Law), which he discovered in the early 1950s. He has worked for IBM, General Electric Co. and the federal government and currently consults for companies in Europe, North America and Japan.

Paperweight

FROM PAGE 17

the door a bit too loudly behind me. The Big Cheese didn't look up for a long time. The AT, sitting precariously near the edge of his desk, looked like the monolith in *2001*. I half expected him to start banging bones on his desk and screeching.

He finally looked up at me and heaved a sigh of monsoon proportions. "Must we?" said his face. "Sit down," said his mouth.

The Big Guy hadn't arrived at where he was for nothing. The couch in front of his desk was several levels down from his eyes and it was made of a material into which one sank like quicksand.

"You realize, Mr. Barnes, that this machine has been on my desk for six months now and has yet to produce a meaningful blip of information," he said as he gently patted the cleanly dusted top of the AT. "I stare at it each morning and urge it to produce something worthwhile, something to justify its existence. But it simply stares back at me as if it were challenging me to produce something meaningful first."

"Cough, cough," I wriggle. "Hmmm."

"Now really, Mr. Barnes. I have listened patiently to my MIS chief, and I endured the tribulations of your emissaries. And what I sense here is a gap."

"A gap?" I reply.

"A gap, indeed," he bellows. "Do you know what I do virtually all day, Mr. Barnes? I'll tell you what I do. I talk to people. That's right. Talk . . . talk, talk, talk. I talk to them in person, I talk to them on the phone, I talk to them at lunch and dinner. I tell them what I want and they tell me how they will get it for me.

"And then I receive this miracle of technology, this key to competitive advantage and I immediately sense a gap. It won't talk to me. It won't even listen to me, and it doesn't tell me how it will get what I want. You send me people who tell me I must touch it and stroke it and make it feel wanted. And I say, let it make me feel wanted. I'm the Big Cheese, after all."

"But sir," I interrupt with a sense of panic rising in my throat. "It's not that hard. We've customized a program for you that gives you access to mainframe data and lets you do spreadsheets with simple commands. We've given you a hard disk so you needn't fuss with floppies and the communications pack—"

He is holding up his hand, ordering me to cease and desist.

"I've been at this company for 30 years, Mr. Barnes. We are a very big company and we make lots of money. I use some of that money to pay my accounting people to do the spreadsheets and when I want information, I pick up my phone and call someone. You'd be amazed at how quickly I get an answer."

I cleared my throat to respond, but he continued. "Productivity, Mr. Barnes, is in the eyes of the beholder. I like your spunk, but call me when you've got something I can use."

"Shall I take it with me?" I asked, shoulders slumped.

"Actually, no. I don't want to appear to be fighting progress. And it makes a hell of a paperweight."

I slouch toward the door.

"Oh, by the way, would you tell Ms. Lewis to come in . . . to take a letter."

Change

FROM PAGE 17

up for central applications. We want to switch our Pittsburgh customers from the Harrisburg supply depot to the one in Akron. Why did we ever split the distribution division into 16 kingdoms?

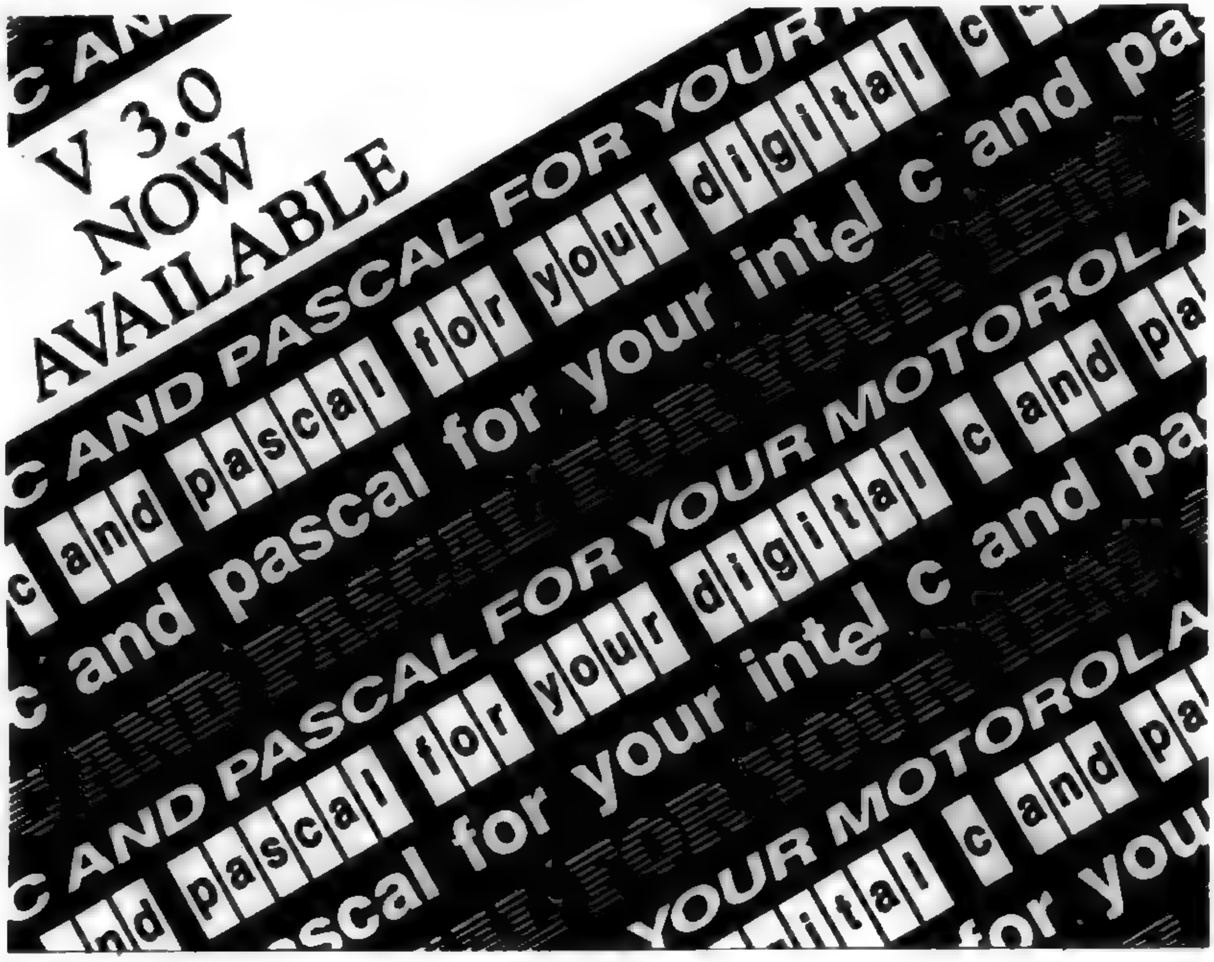
And so the Flying Wallendas' trapeze swings back. We install a central system to pull the supermicros together. We consolidate the data bases. We run more work at the central site. Soon the local micros are reduced to intelligent data entry machines. We're back where we were. Older but probably no wiser.

Does this mean we should never decentralize? That we should always decentralize? Of course not. What this means is that ***we must resist the normal human temptation to deal with problems through change for change's sake.*** If a centralized MIS shop has problems, distributing the processing will put problems in eight more places. If a distributed MIS shop has problems, centralizing will pile them all on top of each other in one room.

The organization's needs should be the determining factor in the issue of centralization vs. distribution. If you're in the gasoline credit card authorization business, 98% of your credit checks are for people within 100 miles of their homes. Use regional processors and set up a network for the other 2%. If you're in the national airline business, you need all your bookings in one place. Use a central system. It's that simple. Don't automatically do the opposite of what isn't working or the opposite of what your disgraced predecessor did. Just do what the business calls for. In short:

- Decide how information can best support the business needs.
- Set up your systems that way.
- Face any problems that come up within your system context, confident that your basic approach is sound.
- Change your approach only if the business needs change or if the technology changes so drastically that earlier tradeoffs no longer apply.

Do this and you still may not live happily ever after. But you will lose that sinking "Isn't this where I came in?" feeling you get each time the Wallendas' trapeze swings back to you.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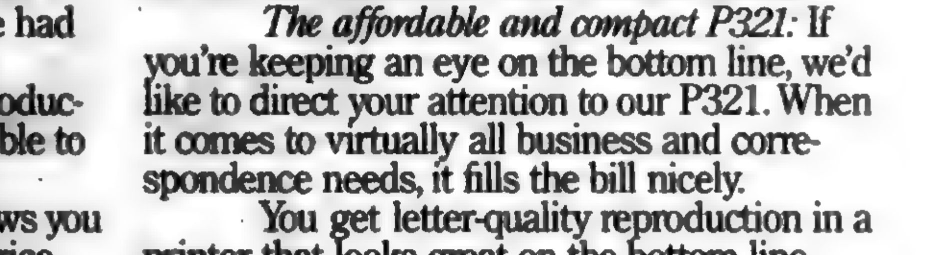

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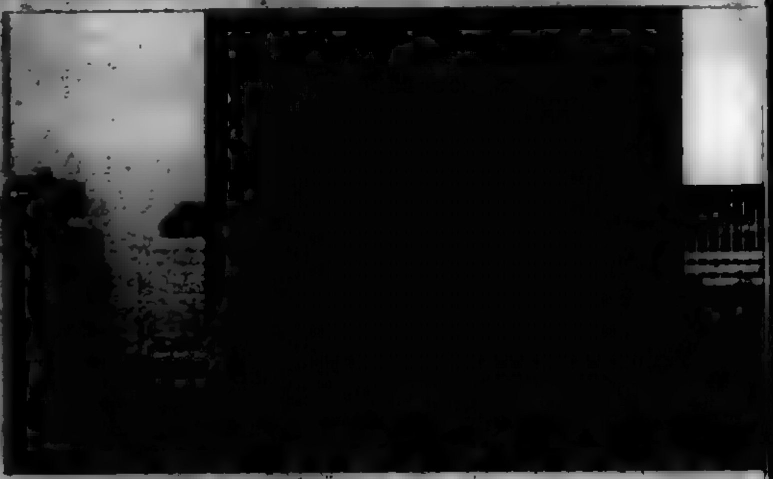

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SOFT TALK

Charles Babcock

Wanted: User SQL input

Some critics are viewing the Structured Query Language standard recently published by the American National Standards Institute (ANSI) as the captive of vendors who supply SQL with their relational data base products.

The fact that ANSI SQL so closely resembles IBM's SQL seems to indicate to vendors that the ANSI X3H2 committee gave away the ballgame before the first inning was over. After all, it is IBM that has failed to support use of foreign keys and other extensions of the basic SELECT, PROJECT and JOIN SQL statements.

To follow IBM's example in creating a standard is to hobble the standard with IBM's expediency in the marketplace, not to accomplish what might be possible technically, critics would say.

That line of thought is not necessarily fair to the X3H2 committee, but Chris Date of the Relational Institute has a point, I think, when he charges that the committee had a richer standard six months ago than the one that emerged from the standard-setting process.

Another critic, Sharon Weinberg, president of Codd & Date Consulting, a sister firm of

Continued on page 24

Users laud SAS portability move

BY CHARLES BABCOCK
CW STAFF

DALLAS — Customers of the SAS Institute, Inc. applauded the company's effort last week to convert its product line into portable C versions and to supply more SAS software to personal computer users.

But they questioned how quickly SAS would be able to improve its mainframe product line, given its concentration on conversion to C-based code, and they urged the company to improve the reporting capabilities of its mainframe base system.

These and other reactions were evident at the 12th annual meeting of the SAS Users Group International held here last week. About 3,000 users attended the conference.

At the opening session, SAS President Jim Goodnight told attendees that SAS development teams are in the process of converting the base SAS System and its add-on statistical analysis, data management, graphics and other applications into the C programming language.

The converted software has been redesigned to separate the user-oriented application and supervisory layers from the operating system layer. The new architecture will allow future releases of the SAS System to be available on PCs, minicomputers and mainframes simultaneously, Goodnight said. SAS software is currently written in assembler and PL/1.

Jim Goodnight

The converted products are expected to enter beta testing early next year but will not be issued as products until early 1989, he said.

David Wilson, a programmer analyst at New Mexico State University in Las Cruces, N.M., said a C-based product line would be a boon to SAS System users. "It's a great way to go. A programmer would be able to go from the mainframe to a PC, and his application would work on either one," he said.

Even though the current SAS product line looks much the same whether it is running on an IBM mainframe, Digital Equipment Corp. VAX or PC, "each environment has its idiosyncracies. There's enough differences to make it annoying moving between operating systems," said Pat Hermes Smith of the corporate management services group at CIBA-GEIGY Corp. in Greensborough, N.C., and president of the SAS Users Group International.

Continued on page 25

Developing on DB2 reaps high returns

BY ALAN ALPER
CW STAFF

NEW YORK — Despite DB2's inability to support referential integrity, data processing shops using the IBM relational data base management system should use it to develop new applications in hopes of achieving productivity gains and cost savings.

That was the recommendation provided during a discussion sponsored by The Greater New York DB2 Users Group at the

Continued on page 25

Data View

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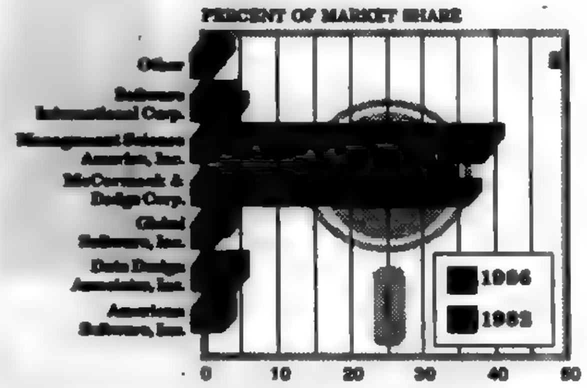

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART: MITCHELL J. HAYES

Unify lifts distributed DP systems

Architecture matches layers to processors

BY MITCH BETTS
CW STAFF

Unify Corp., a Unix software vendor based in Lake Oswego, Ore., recently announced a radically different architecture for its application development and data base management software that splits the application into three layers running on micro, mini and mainframe processors.

Unify's Cooperative Processing Architecture breaks the application into three components — human interface processing, applications processing and data base processing — and matches each layer to the most appropriate processor.

In an order-entry and sales tracking system, the data entry tasks would be handled by users at micros, the application would be driven by the mid-range processor, and the data base would reside on a departmental mainframe such as IBM's 9370, Unify President Nicolas Nierenberg said in an interview. Primarily, the architecture off-loads user-interface functions from Unix minis to increasingly powerful PCs, he added.

The second layer, which re-

Continued on page 24

Inside

- Kolinar updates its SQL/DS tool. Page 26.
- State of the Art adds accounting modules to its MAS 90 series. Page 28.

Spotlight

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SQL input

CONTINUED FROM PAGE 23

the Relational Institute, told DB2 users in New York recently that the standard committee was dominated by SQL vendors who sat around eliminating SQL features that were not in their implementations. After all, the typical vendor might ask, What good is a standard if your product doesn't meet it?

So what happened, in Weinberg's view, is that the vendors flocked to the X3H2 committee and voted down the features that they didn't have, leading to what Weinberg calls "a least common denominator standard."

In talking with Donald R. Deutsch, manager of data systems at the General Electric Information Services Co. and chairman of the X3H2 committee, a picture emerges that isn't totally at odds with Weinberg's view.

"That's true. We have a least common denominator standard" reflecting current SQL implementations, he says. Furthermore, membership on the committee almost doubled during the last year as interested parties, including federal agencies but primarily SQL vendors, sought to participate in the standard-setting process, he says.

SQL, an IBM invention that has been around for a decade, came into its own last year with the widespread acceptance of relational technology. Deutsch correctly points out that the X3H2 committee is attempting to set an SQL standard swiftly on the heels of that phenomenon.

Cobol 85 brouhaha

One need only look at the brouhaha over Cobol 85 to realize the hazards of setting a standard for a widely used product, even one supposedly already adhering to a standard. Deutsch cites the example of the Pascal standard, "which lagged years behind Pascal's acceptance.

"The effort here was to get a standard out in front of the parade. Then we could place in the public domain the debate about SQL's extensions," Deutsch says.

This is an excellent point. By establishing a standard early, vendors will consult the latest round of debate within the X3H2 committee before heading off in their own direction with extensions. Even if multiple extensions do appear, the committee can highlight those that it is inclined to include in the next version of the standard. Deutsch says an addendum process has begun to try to capture the extension process and place it in the public forum.

Nick Rawlings, director of the technology department at Dun & Bradstreet Computing Services, points out another advantage of an early standard. It allows all vendors who wish to market SQL-based products to share a common subset of the language, guaranteeing a kind of minimum transportability of programs.

'IBM not under pressure'

However, Rawlings says, SQL gets hurt if the standard-setting process is allowed to sit for long in its present state, due to missing functions. In addition, "IBM isn't under as much pressure as it would be if we had a standard that incorporated features not in IBM's SQL," he notes.

If the vendors have won the first round by arguing for a least common denominator SQL, the SQL user community also won a round by creating a public process to further develop the language.

Where are the representatives from the growing community of DB2 production users who have the greatest stake in extending the SQL standard? If everyone is too busy implementing SQL applications to join the standard-setting process, users will find themselves stuck with a limited SQL that costs them efficiency for years to come. Some priority must be assigned, making users' needs paramount to the committee.

Or, as Weinberg told the DB2 users in New York, "To make it your standard, you've got to invest some skin in it."

Babcock is *Computerworld's* senior editor, software & services.

DP systems

CONTINUED FROM PAGE 23

sides on Unix supermicros and minis, controls the application's logic, data base requests, user algorithms and security checks. The third layer places the data base on a Unix-based supermini or mainframe computer. IBM VM and Digital Equipment Corp. VMS versions are forthcoming, and access to IBM MVS data bases will be provided via a standard SQL interface, the vendor said.

Initially, Unify is putting its Accell Integrated Development System, an application development product, under the new architecture.

Unify announced two products for the architecture — Accell/CP and Query/CP, which will be available in June. Accell/CP enables an Accell application's user interface to be off-loaded to an IBM PC-DOS micro while the application functions and data base continue to reside on the larger Unix system. Only Accell-developed applications work under the architecture.

Nierenberg said that Accell/CP will cost $100 to $200 and Query/CP will cost $400 to $500.

Nierenberg added that the Cooperative Processing Architecture goes a step beyond distributed data base systems, on which data is shared among various systems and departments. "The combination of data distribution and processing distribution is what we're calling cooperative processing."

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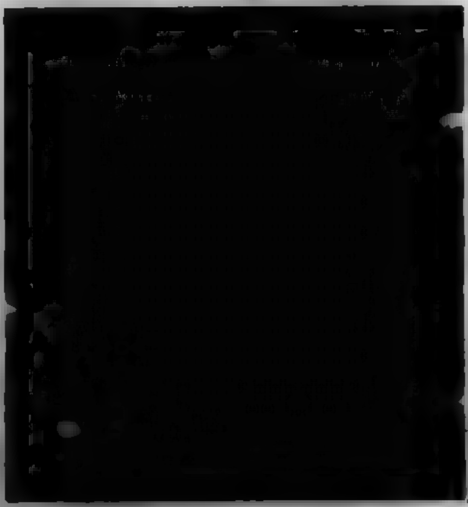

Developing

CONTINUED FROM PAGE 23

World Trade Center recently. Marilyn Bohl, DB2 product manager, and Sharon Weinberg, president of Codd & Date Consulting Group in San Jose, Calif., answered questions from users after addressing the group.

One user, who runs both IMS, IBM's established DBMS, and DB2 in his shop, asked why he should develop a new application using DB2 if he has a simple parent-child relationship that requires referential integrity.

Weinberg responded that users should develop applications using DB2 because the return on investment (ROI) is much greater than with IMS. The ROI using DB2 was 95.3% during a five-year period vs. 53.6% when using nonrelational data bases, she said.

'Relational the key'

The gain is achieved through a shorter development cycle and greater ease of maintenance. "It's been determined that relational is the key to this," she said.

The fact that IBM is using terminology like "secondary keys" — rather than foreign keys — and has yet to implement domains, means the firm is a long way from supplying these features, Weinberg said. She criticized IBM for being slow to provide referential integrity, which allows a DBMS to match changes in a primary key with a foreign key, maintaining the integrity of data.

"If you want to create rot in your data base, like you have in IMS for the last 18 years, that's well and fine," she said. "But I can assure you that the board of directors of your company, CEO and vice-president don't want your companies to rely on junk to make their decisions."

When asked if tables created without referential integrity would be affected once it became available, IBM's Bohl said, "Many of the things needed for referential integrity indeed already exist in the catalog for any new release that may come along. Certainly, it is our intent to minimize the impact."

Some users say they are experiencing productivity gains using DB2 to develop applications. Mark Karpilovsky, a consultant and panel member, said he is currently working on a project in which two production systems supporting more than 100 users are running on a dedicated mainframe.

"The first DB2 application we developed consisted of about 17 or 18 programs, 18,000 lines of code," he said. "I'd say the total gain in development time was about 25%."

One user asked when IBM would provide an on-line performance monitor for DB2. "It's kind of hard for me to accept having a state-of-the-art data base engine and a batch monitor that lets you look at reports a day or two later," he declared.

Bohl said IBM has yet to draw up plans for developing an on-line monitor. "It's a well-understood requirement," she said.

Users laud SAS

CONTINUED FROM PAGE 23

In addition, a C-based product line that was transparent across operating systems could install very quickly, she said.

Redoing the underlying architecture is also a necessary move. "I think SAS Institute found itself building a house one room at a time. At some point they said, 'Maybe we should get some structure in here,' " Hermes Smith said.

Wendell Refior, research analyst with Boston Edison Co. in Boston, recommended that SAS Institute produce "more complex report writing capability with complete customization features.

"You don't have enough flexibility to do the things you want — to do a printout phone book-style or stop halfway down the page with a new heading and indentation," he added.

Report-writing tops wish list

Goodnight said in an interview that the SAS base product allowed a large number of reports to be generated "with one or two statements." He acknowledged that complex report writing procedures remained near the top of the list of SAS users' wishes in an annual ballot of SAS users' needs.

The base SAS System and many add-ons are available under DEC's VMS operating system and PCs as well as IBM mainframes, where the product line was concentrated exclusively until late 1984. Several SAS users urged further expansion of the PC product line.

SAS Institute is working on linking SAS products that run under DEC's VMS operating system to PCs via a link that will move data sets across the link with a single statement, said Greg Steer, a biologist with the Canadian Department of Fisheries in Nanimo, B.C., as he exited an exhibit room that included a demonstration of the link. The VMS-to-PC link will go into beta test this month, he said.

SAS spokesmen said PC versions of SAS Applications Facility, SAS Graph and SAS Full Screen Product will be announced later this year.

Another SAS user on PCs, Kenneth Whitesides, an information center consultant at Duke Power Co. in Charlotte, N.C., said the Institute needs to find ways to work around the 640K-byte memory limit on PCs.

Duke Power attempts to use the SAS PC base product and SAS/Stat on IBM 3270 PCs and finds it can only upload or download limited data sets with the memory that remains.

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NEW PRODUCTS

Systems software

Kolinar Corp. has introduced **Release 1.3** of its **SQL/Exec**, a VM/CMS product for users of IBM's SQL/DS.

SQL/Exec is said to allow users to execute any SQL command from Exec2, Rexx or the IBM CMS command line. It helps users build a custom data base application. Features of Release 1.3 include simplified installation and faster execution speed. Other features include automatic error-message handling, timing and operator commands and substitute symbols for null values.

SQL/Exec is priced at $6,000. Optional maintenance costs $1,000.

Kolinar, 3064 Scott Blvd., Santa Clara, Calif. 95054.

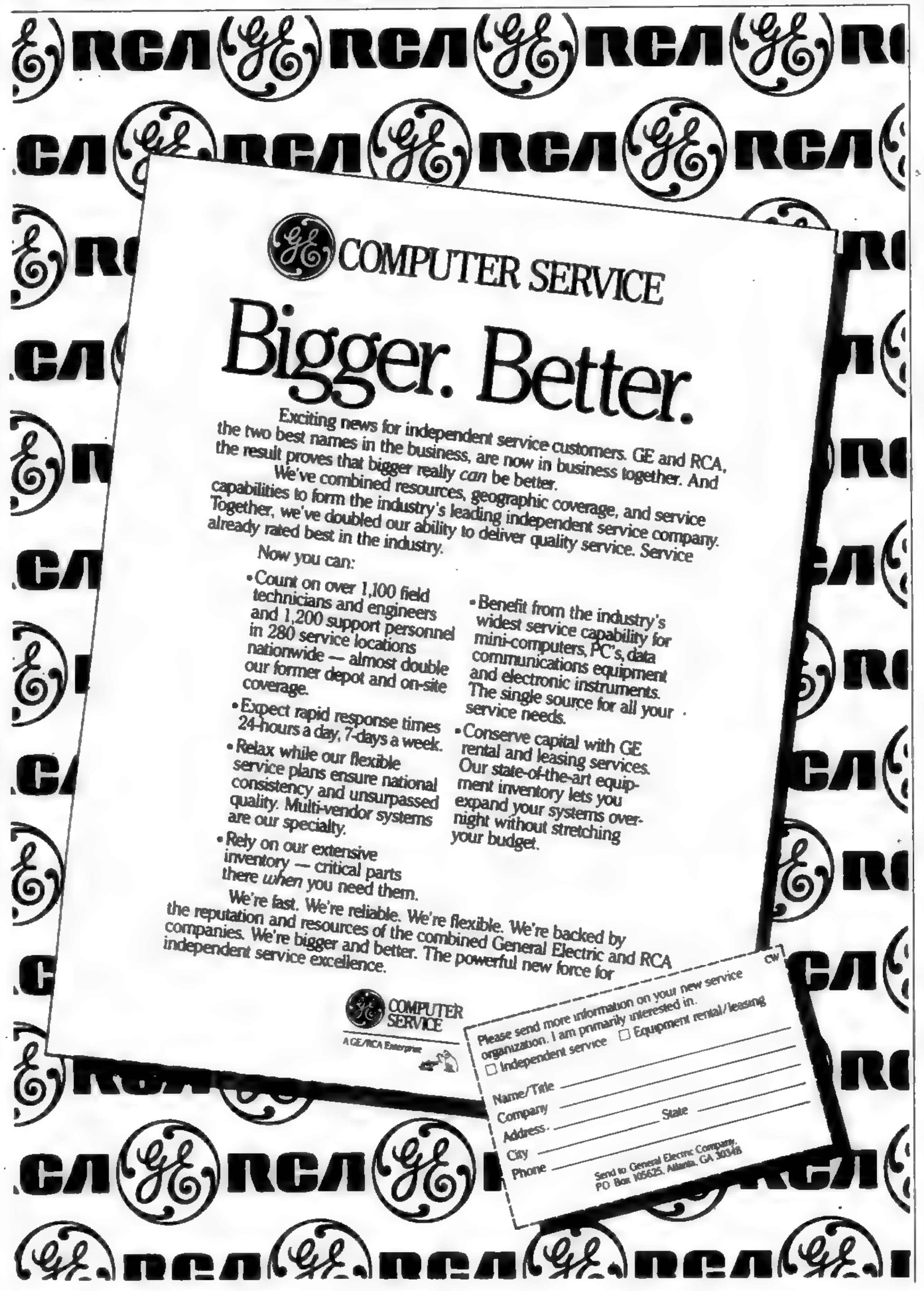
Sterling Software has announced **Release 7.5** of its **DMS/OS** data storage management system.

Major improvements in DMS/OS Release 7.5 include the ability to back up and recover catalogs. Enhancements to program development system handling are said to permit processing of data sets in which logical errors have been detected as well as merging individual members into a library from backup or archive copies.

Improvements in archive and backup management include the ability to merge onto disk any unexpired data sets from the archive or backup medium and to produce duplex copies.

The basic DMS/OS system is priced at $14,000.

Sterling Software, #100, 11050 White Rock Road, Rancho Cordova, Calif. 95670.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Computer Associates International, Inc. has announced **Release 1.0** of its **CA-Optimizer II**, a code optimization, debugging and source analyzation product that supports the capabilities of IBM's Cobol II and MVS/XA operating environments.

CA-Optimizer II is said to provide a split-screen Cobol II language Help facility. Other enhancements include optimization techniques enabling the optimizer component to handle programs up to eight times larger than previously possible.

CA-Optimizer II Release 1.0 is priced at $48,000 for IBM's MVS and MVS/XA operating environments.

Computer Associates, 711 Stewart Ave., Garden City, N.Y. 11530.

RD Labs, Inc. has announced **Release 3.3** of its **RD/Share** library management and control system for IBM's VM/CMS environment.

RD/Share is said to provide for version control of source files, auditing of changes, security over access of files under the system's control, prevention of concurrent updates, data compression and management reports.

Release 3.3 includes a new Rexx-based guard file facility and the ability to pre-emptively trap and disallow transactions without communicating with the service machine.

RD/Share Release 3.3 is priced from $5,675 to $13,675 per CPU.

RD Labs, P.O. Box 255832, Suite A, 1783 Tribute Road, Sacramento, Calif. 95865.

Applications packages

Tigera Corp. has announced **Word Era**, a word processing program for multiuser Unix-based systems.

Word Era includes a Wang Laboratories, Inc.-compatible interface and document conversion capabilities. It supports the windows environment as well as voice recognition and voice annotation. Other features include math function support for screen and keyboard input; block copy, move and delete functions; full-featured footnoting; password protection; index and table of contents generation; and spelling checker.

Word Era is priced from $895.

Tigera, 350 Bridge Pkwy., Redwood City, Calif. 94065.

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Access Technology, Inc. has announced **Release 2** of its **20/20** integrated spreadsheet software for AT&T's 3B2, 3B5, 3B15 and 3B20 computers.

Release 2 features more than 50 enhancements, the vendor said. Specifically, additions include optional letter and number cell notation; advanced macro capabilities, including work sheet-based macros; new range commands, including range name; global and local rounding; work sheet password protection; and an enlarged matrix.

Other features include an expanded data import/export capability and improved ability to move spreadsheet models between computers.

20/20 Release 2 for the AT&T computers is priced from $1,200 to $5,800.

Access Technology, 6 Pleasant St., S. Natick, Mass. 01760.

Data Center Software has announced **Watch**, a calendar and phone book management system for Digital Equipment Corp. VAX and Microvax computers.

Watch is said to maintain personal or project schedules and other timely events. It will print or display any selected entries for any given time period. The phone book feature can support multiple names and telephone numbers for a single entry, and any selected entries can be printed or displayed.

Watch is priced from $450.

Data Center Software, 447 Old Boston Road, Topsfield, Mass. 01983.

State of the Art, Inc. has added three accounting application modules to its **MAS 90 Master Accounting series.**

The three modules include Inventory Management, Sales Order Processing and Purchase Order Processing. They can be integrated with other MAS 90 modules such as General Ledger for comprehensive reporting, the vendor said. Features of the accounting series include the ability to generate numerous management reports.

The modules are priced at $795 each.

State of the Art, 3191-C Airport Loop, Costa Mesa, Calif. 92626.

MCBA, Inc. has announced its **Labor Performance** package for the Wang Laboratories, Inc. VS line of computers.

The package was designed to help businesses track employee production statistics, identify productivity problems and improve labor utilization. It supports clock-card entry and editing and, by integrating with MCBA Payroll, permits the payroll to be calculated automatically from clock-card data.

Other features include the ability to analyze performance productivity, use files created by data terminals, allow centralized labor transaction entry and provide for an incentive system.

Prices for MCBA's accounting, distribution and manufacturing software for the Wang VS family range from $2,000 to $12,000.

MCBA, 425 W. Broadway, Glendale, Calif. 91204.

Utilities

Iris Software has announced **Version 2.0** of its **Dgen/36** software for the IBM System/36.

The product is said to generate on-line Report Program Generator (RPG) program documentation. Version 2.0 offers an enhanced RPG listing procedure featuring action diagrams connecting all DO, IF and CASE statements with their matching END stations. Also, all GOTOs and TAGS are bracketed. Field length and array information can be printed to the far right of each I-, C- and O-spec line and double-defined, and unreferenced fields are flagged.

A single CPU license costs $295.

Iris Software, P.O. Box 4594, Suite 219, 119 Broadway, Chico, Calif. 95927.

J. D. Edwards & Co. has announced **Fastr**, a financial report writer for use with its World Systems for the IBM System/38.

Fastr is said to extract information from World Systems accounting data bases. Any category of data defined in the chart of accounts can be selected, sorted and printed in a specific financial statement.

Design capabilities include exception and variance reporting, multiple levels of subtotaling and control of column and row formatting.

Fastr costs $7,000.

J. D. Edwards, Suite 5500, 4949 S. Syracuse St., Denver, Colo. 80237.

Application Development Systems, Inc. has announced **Xpediter/CICS**, a testing and debugging package for IBM mainframes running under MVS or MVS/XA.

Xpediter/CICS is said to provide source-level testing and debugging for CICS application programs in the CICS region. It features user commands and a scrollable full-screen source code display. It can be used to control the execution of the program, display and change variable values and simulate unwritten code. It can also intercept application abends and prevent application programs from accessing storage associated with other CICS tasks.

Xpediter/CICS is priced from $19,000.

Application Development Systems, 6840 78th Ave. N., Minneapolis, Minn. 55445.

SQ Software has announced **Release 3.1** of its **Structured Query Report Writer** (SQR) for Oracle Corp.'s Oracle relational data base.

SQR is said to combine SQL query definition with print control, formatting and procedural logic into a single, structured paragraph. It also supports full-screen document editing, page headings and footings and input and display commands for interactive query modification.

Features of Release 3.1 include the ability to read and write external files, define multidimensioned arrays, pass report arguments at runtime and include common source modules.

SQR is priced from $295 to $10,500.

SQ Software, 2000 Lee Road, Cleveland, Ohio 44118.

DATASPHERE WAS THE KEY TO SUBARU'S NEW COMPUTER CENTER

Subaru is a *great car*, as continually increasing Subaru sales will attest! And when Carl L. Daddona, Subaru's Director of Operations, needed a *great computer facility* to support this growth, he knew a specialist was required. So Subaru called Datasphere, America's premier designers and builders of Data Processing facilities.

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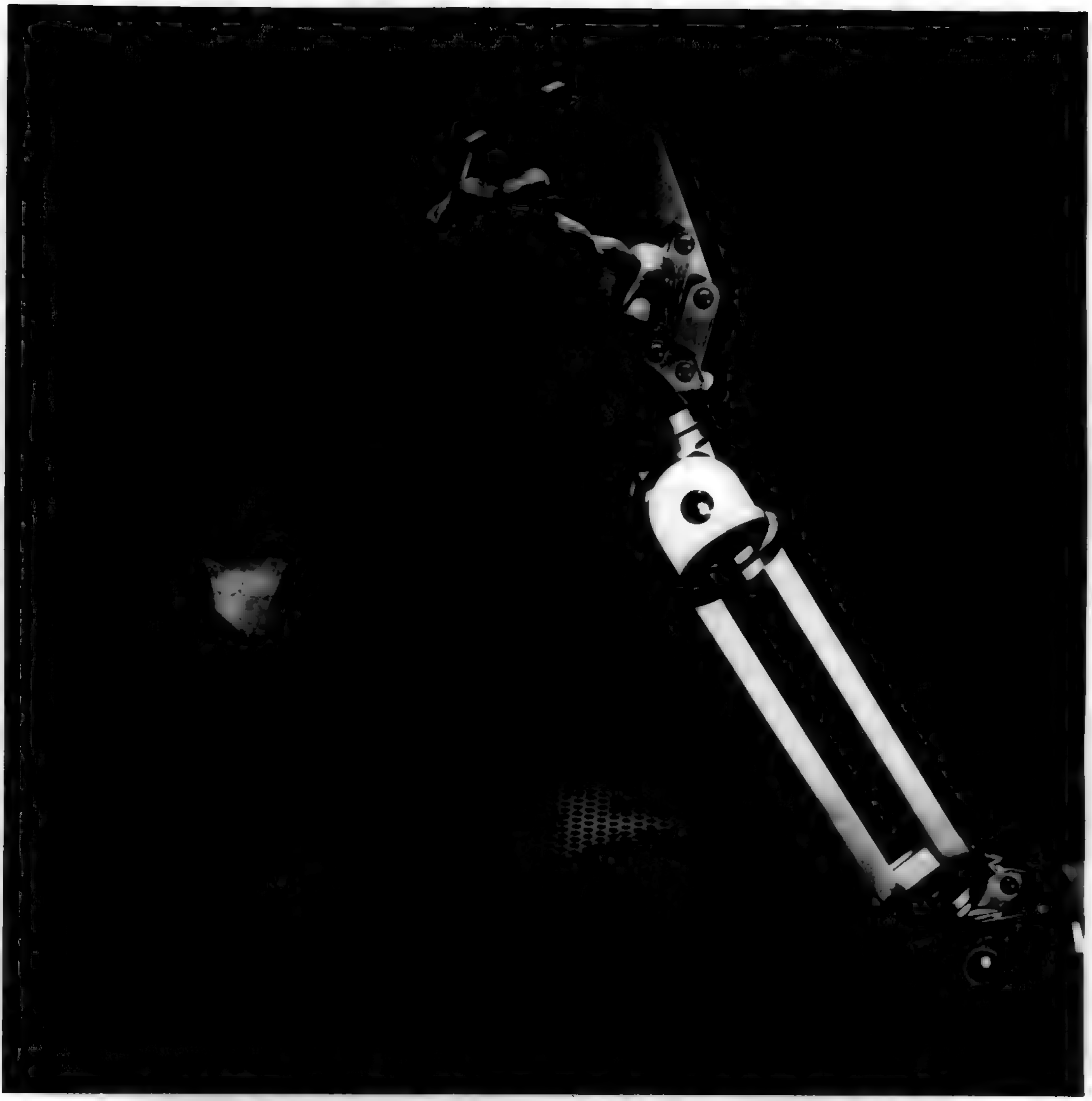

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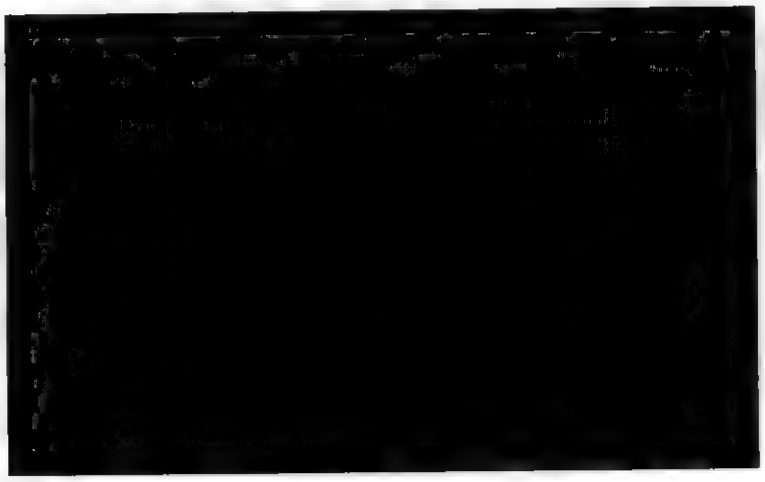

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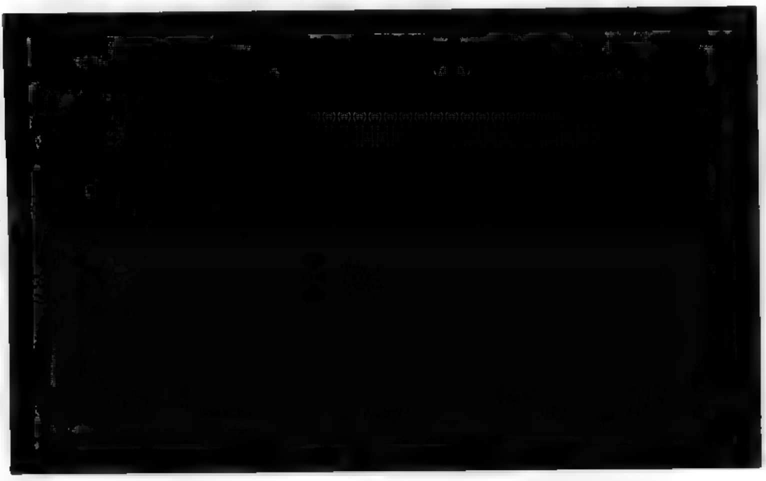

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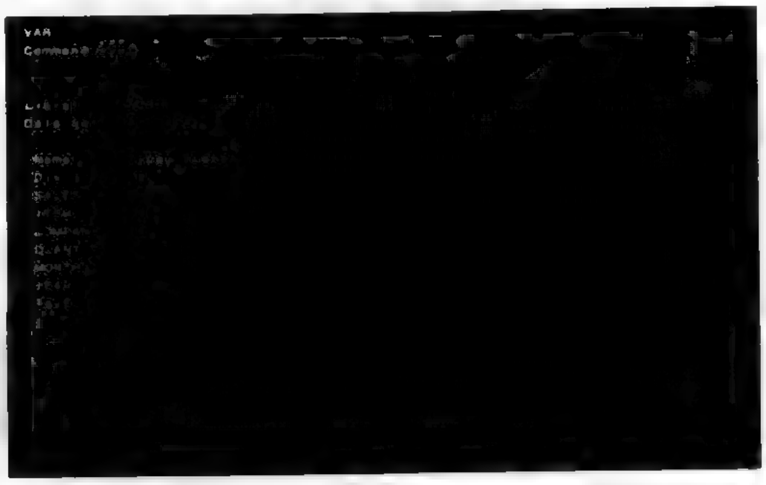

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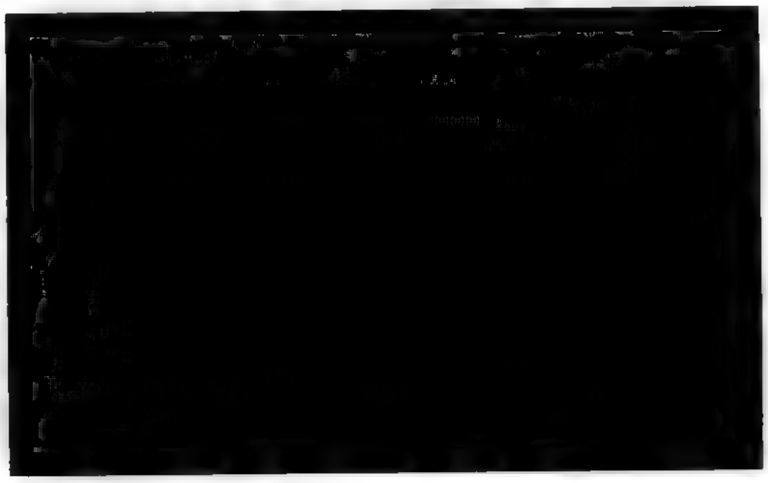

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MICROCOMPUTING

SMALL TALK

William Zachmann

Printer's come a long way

In the summer of 1983 I bought an IBM Personal Computer with my own money. I already had one in my office at International Data Corp. (IDC) that had been paid for by the company.

I knew I couldn't get IDC to pay for a home computer for me, but I also knew that I could get a lot more work done if I had one in my office at home. So I dipped deep into my savings account and paid $5,244.70 of my hard-earned money for an IBM PC with a color monitor, 320K bytes of random-access memory, word processing software and a printer.

My local computer store didn't have my first choice of a printer, so they loaned me another, less expensive printer to use until they got a shipment of the one I really wanted. I took home my brand new system with a Gemini 10X printer from Star Micronics, Inc.

I never did get the printer I'd orignially ordered. By the time it came in three weeks later, I was so pleased with the loaner that I

Continued on page 36

SQL makes its mark in PC arena

BY RICHARD FINKELSTEIN
SPECIAL TO CW

Structured Query Language (SQL) has arrived on the personal computer, and we are already beginning to feel its impact.

In fact, many major corporations and government agencies contacted by *Computerworld* are standardizing on SQL within their data processing and end-user organizations right down to the microcomputer level — and for good reason.

SQL is a powerful but terse data base language that is meant to be used by applications developers, end users and management personnel. SQL's strength lies in its strong theoretical underpinnings. Unlike its predecessors, SQL was designed with a mathematical foundation, which gives it stability, predictability and usability.

Though E. F. Codd, president of The Relational Institute in San Jose, Calif., believes IBM could have done a much better job developing SQL, the language is still a major step in the right direction. "There are problems with SQL, but it is far superior to other languages. With SQL, you can do set processing, which is much better than the row-at-a-time processing required by Codasyl [network] or hierarchical data bases," Codd says. Set processing requires fewer steps to retrieve specific information from a data base.

It is also important to note that with SQL and the SQL catalog structure, an organization is guaranteed to have a data base management system that meets seven of Codd's 12 rules for relational data bases — with the capability of eventually meeting all 12 rules — and can therefore be considered a true relational data base. These rules define the criteria a data base must meet to be considered fully relational.

Fabian Pascal, management information specialist for the district government of Washington, D.C., recognizes the benefits of

Continued on page 32

Clones a deal for colleges

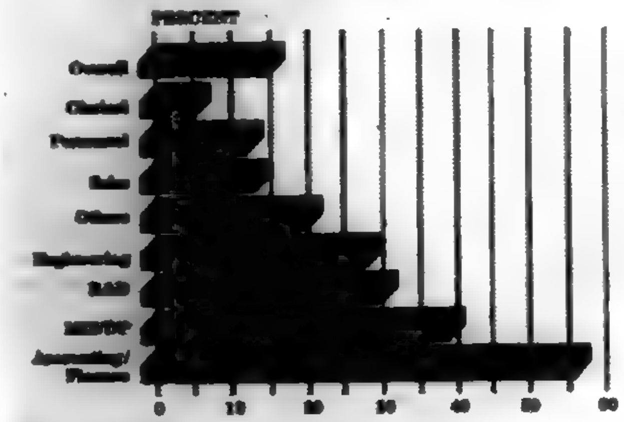
BY JAMES A. MARTIN
CW STAFF

PHOENIX — In an effort to obtain more for its money, the Maricopa Community College consortium recently invested $453,000 in some low-cost, build-your-own IBM Personal Computer clones, saving more than half the cost of buying name-brand microcomputers.

"To buy that many micros from traditional vendors would have cost us about $1.4 million, so we chose to buy the components and assemble them ourselves," says Larry Christiansen, dean of administrative

Continued on page 36

Data View



Personal computers
Market penetration by function as of year-end 1986

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART: MITCHELL J. HAYES

Package taps extra memory

BY DAVID BRIGHT
CW STAFF

SANTA MONICA, Calif. — A memory management software package that helps Intel Corp. 80386-based personal computers address up to 16M bytes of expanded random-access memory (RAM) was recently announced by Quarterdeck Office Systems.

Called Quarterdeck Expanded Memory Manager-386 (QEMM), the $59.95 product reportedly allows Microsoft Corp. MS-DOS-based applications software that supports the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) to access either extended or EMS memory in a system. EMS is a scheme for bypassing the 640K-byte RAM limit imposed by the MS-DOS operating system.

Quarterdeck officials said QEMM's ability to treat extended memory as EMS memory allows the user add memory to an 80386-based system without worrying about whether it is

Continued on page 32

Inside

- Walonick Associates enhances Statpac Gold. Page 40.
- Matrox Electronic Systems offers a two-board set for the IBM PC AT. Page 42.

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SQL

FROM PAGE 31

languages based on Codd's relational model. "The advantages provided by relational technology are generic and intentionally so. As a theory-based, unified approach to data base management, it aims at simplification to increase user productivity and flexibility to handle change.

Thus, using a terse, simple, nonprocedural language like SQL benefits the micro user no less than the mainframe/mini user. He writes less procedural code, memorizes less syntax and does not need tedious menus and prompts to take advantage of the systems automatic optimization and multiple records-at-a-time processing," Pascal says.

"If there is one thing the data processing community has learned," says Ken Cohen, director of marketing for Oracle Corp., "is that standards are important."

'Strategic decision'

These sentiments are echoed by Richard Porter, director of management information services for Nestle Enterprises Ltd. Canada. "We have made a strategic decision to go with SQL based upon compatibility and portability," he says.

Another company standardizing on SQL is Amoco Corp. Howard Fosdick, senior data base administrator for Amoco, explains, "We started using SQL early on our large IBM MVS and VM machines. We felt, in order to keep training costs down and promote portability of programs across different machines, we should standardize on SQL."

Standardization also increases the ability of end users to communicate with professional data processing personnel.

Robert Osacky, manager of data base administration at Commonwealth Edison Co., says he feels that "users who work with SQL on PCs are able to more effectively communicate with the DP staff."

Standardization also translates into productivity. Osacky, who managed the implementation of IBM's DB2 on the main-

Continued on page 37

Package

FROM PAGE 31

EMS or extended memory.

According to Gary Pope, Quarterdeck executive vice-president, extended memory is defined as any amount over 1M byte. Extended memory does not require the extra mapping circuitry of EMS and is typically faster, he said.

QEMM is similar to the expanded memory manager in Compaq Computer Corp.'s Deskpro 386 system, Pope said.

"QEMM provides to the rest of the world what Compaq provides with its memory manager," he added.

QEMM can reportedly be used with 80386-based systems, as well as with accelerator boards that are based on the 80386. While QEMM complements Quarterdeck's Desqview multitasking environment, Desqview is not required.

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Vast improvements to NATO's air defense network are being made to handle modern-day threats more quickly and efficiently than ever. The NATO Air Defense Ground Environment (NADGE), which sweeps a protective radar umbrella from the north capes of Norway to eastern Turkey, is the largest automated air defense system in the world. It was completed in the early 1970s by an international consortium headed by Hughes Aircraft Company. Now, Hughes and its European partners are blending new radars and data-processing capability into the network. Among the systems that update the NATO network are GEADGE for West Germany, UKADGE for the United Kingdom, and AEGIS (Airborne Early Warning/Ground Environment Integration Segment), which uses jam-resistant communications to correlate information from early-warning aircraft with that of ground radars.

Dangerous hot spots that could flare up after a forest fire can be located by rangers. Inspections are made by aiming a hand-held Hughes Probeye® infrared viewer while flying over the area in a helicopter. The Probeye viewer sees heat the way a camera sees light, converting it instantly into an image seen through the eyepiece. Additionally, mining officials report success using Probeye viewers to prevent fires, to search for lost or injured miners in smoke-filled passages, and to inspect structures, electrical systems, and mechanical equipment. The infrared viewer also detects concealed fires and potential spontaneous combustion sources, such as hot spots in coal beds and refuse dumps.

Brazil has expanded its telecommunications service now that the new Brazilsat 2 satellite has gone into operation. The spacecraft joins Brazilsat 1 in uniting the wilderness along the Amazon Basin with the more populated regions in the south. The two satellites carry telephone, TV, and data services. Spar Aerospace Ltd. of Canada built the Brazilsats under license from Hughes for EMBRATEL, Brazil's state-owned telecommunications agency. Hughes supplied antenna reflectors, solar cell arrays, propulsion systems and other electronic components and subsystems.

A new electronic "road map" will enable pilots of helicopters and small tactical fighters to fly safely over unfamiliar territory without the need to wrestle with flight charts. The Integrated Terrain Access and Retrieval System (ITARS), under development by Hughes for the U.S. Air Force, will display color-coded surface features and man-made structures. By touching a button, the pilot can show terrain data in look-down or look-ahead views. The system will share its stored data with other systems aboard the aircraft to aid in navigation, terrain following and avoidance, weapon delivery, mission planning, and threat avoidance.

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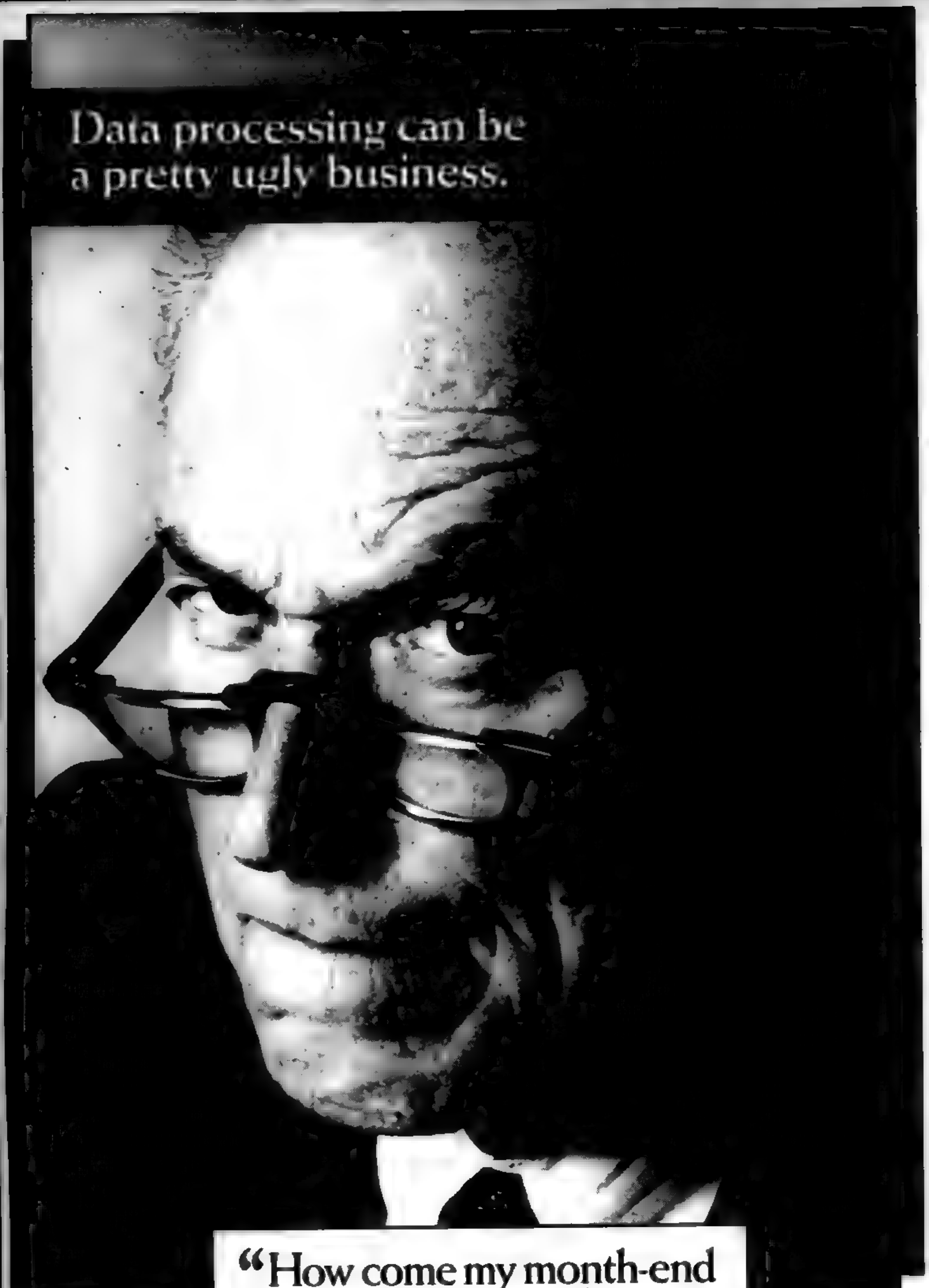

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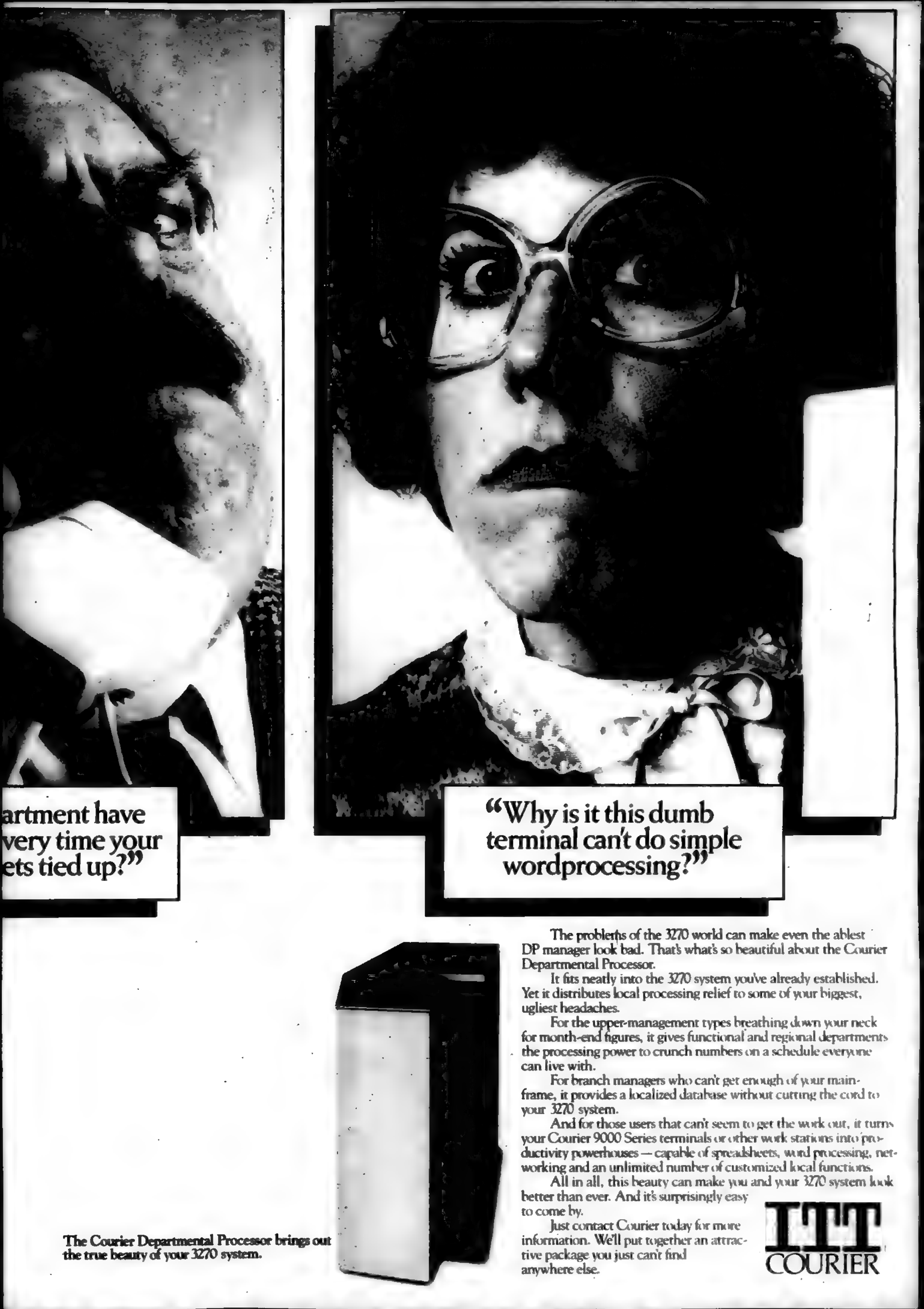

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ITT
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Printer

FROM PAGE 31

kept it, applying the $162.75 price difference toward a 300 bit/sec. Hayes Microcomputer Products, Inc. modem instead. The Gemini 10X did everything I needed just as well as my original choice.

I was also impressed with its simple but rugged construction, removable (and replaceable) print head and the fact that it used simple, inexpensive Underwood typewriter ribbons instead of the special ribbon cartridges most other printers required. In fact, I've still got the old Gemini 10X and use it as a backup printer.

The Star Micronics NB-15 24-pin, letter-quality dot matrix printer introduced last summer shows that the company has come a long way from simply being a relatively unknown source of lower cost printers. The NB-15 is about as state of the art as wire dot matrix printers get.

List priced at $1,449, but typically available from dealers for quite a bit less, the NB-15 offers a host of features that make it an attractive product for anyone who wants just about everything a dot matrix printer has to offer. It produces solid 24-pin letter-quality output at 100 char./sec. and blazes along at 300 char./sec. in draft mode.

The NB-15 has the same straightforward, solid, reliable construction of my Gemini 10X, although it does require a special ribbon cartridge. Clearly engineered for durability and serviceability, it looks just as likely to keep on working year after year as my old 10X has done.

Removable font cartridges priced at $59.95 each offer Prestige Italic, Letter Gothic, Courier, Courier Italic and Orator fonts in addition to the Prestige font that is built-in. Two cartridges at a time can be mounted in slots on the front panel of the printer. It comes with a 16K-byte, built-in print buffer that can be optionally expanded to 32K bytes.

The Star NB-15 can operate in a mode fully compatible with the IBM Graphic Printer and also the Epson America, Inc. LQ1500. The built-in tractor feed easily handles fanfold paper from 4 to 15.5 in. Micro adjustable spacing provides precise forms alignment as well as high-resolution graphics capabilities.

Special characters can be created and downloaded to the printer with appropriate software, in addition to using the read-only memory character font cartridges. Double and quad oversize characters can also be printed. Ten international character sets as well as the standard U.S. character set can be selected.

Best of all, the Star NB-15 puts a wide range of controls conveniently on the front panel. Form length, type style, mode (draft or letter quality) and print pitch (pica, elite, condensed and proportional spacing) can be directly selected from the panel switches.

Other panel controls include micro feeding for lining up preprinted forms, hardware setting of left and right margins, selection of the IBM graphics printer compatibility mode, a Power On self-test and a hex dump facility that can be helpful in program debugging.

The front-panel control for these features makes it easy to use them even when using software without printer drivers written for the NB-15.

The Star Micronics NB-15 is a first-rate printer that will stand up well against competitive offerings from better known vendors.

Zachmann is vice-president of research at International Data Corp.

Clones

FROM PAGE 31

services at Glendale Community College, one of the seven colleges in the consortium.

After considering their hardware options, college administrators decided they could inexpensively expand the consortium's computer-literacy program with PC clones. Taking that one step further, the staff at Glendale Community College saw the possibility of additional savings by building the clones themselves.

"It would have cost us about $20 a unit to build the PCs ourselves," Christiansen says. "But we got a bid to assemble them for $7 a unit, so naturally we went with that."

All but 12 of the some 600 micros are PC XT clones with 256K bytes of random-access memory, dual disk drives and monochrome monitors. The rest are PC AT look-alikes with 20M-byte hard disks and color monitors. Rycom Corp., a microcomputer parts supplier in Phoenix, performed the actual assembly of the micros, although MIS support staff at the colleges built several as well.

"The size of this job was quite unusual," says Michael Shumaker, Rycom president. "It was the first time we had assembled that many micros for anyone." Shumaker says low-cost PC clones are becoming more of a viable alternative as prices drop and technology improves. "It's simply a matter of economics," he adds.

Glendale received the bulk of the micros — about 330 — with the remaining dispersed among the other colleges. When the micros arrived on campus, technical staff at each of the colleges performed first-line troubleshooting.

The failure rate for the clones has been about 10%, according to Christiansen, who says that figure is average. End-user support is offered by the technical staff at each campus and from the central repair site of 65 programmers, technicians and other support staff.

The PC XT and AT clone solution provided more in savings than just dollars. "Part of this entire process was an education for our computer staff," Christiansen says. "As a result of dealing with these machines on a component level, they became much more knowledgeable about the inner workings of the system. It was an on-the-job training opportunity to bring our technical staff up to speed on these units."

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The GQ-3500 delivers versatility with a long list of standard features, including 640K memory, a superior 150 page sheet feeder, Centronics parallel interface, and seven resident type fonts. The GQ-3500 has two built-in IC card slots that accommodate a wide selection of font cards and emulations, and the new Epson Selectype IV Control Panel for easy control of eleven key printer functions like paper size, multiple copies, pitch, font selection and size.

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Use of SQL

CONTINUED FROM PAGE 32

frame and has introduced SQL to his PC users, argues that implementing SQL on micros and minicomputers has a twofold effect on productivity.

"SQL on the micro can be used as a training tool. Users understand the mainframe system better after working with the micro version," Osacky explains, adding that he plans to extend the use of SQL on the micro by using it as a prototyping tool for mainframe applications systems.

Pascal agrees that prototyping and developing mainframe systems on the micro is the trend. "With similar DBMS/SQL implementations on the micros, most of the development effort will be off-loaded to micros where each programmer can write, test and debug applications without affecting or being affected by other users," he says.

Tony DeMeo, data processing manager for the Village of Northbrook, Ill., is using Oracle products to support all municipal operations. "End users do their own ad hoc queries and reporting using Oracle's SQL. SQL is also used for all application development," DeMeo says. "Everything we do is based upon SQL."

DeMeo says he feels that, because of SQL, end users can now do work formerly requiring data processing professionals. His technical staff now has more time to work on solving more difficult problems.

Tony Schaller, manager of systems development with Carnegie-Mellon University, is managing a long-term strategy to connect 6,000 to 8,000 PC workstations with the university's mainframe computers. Central to this strategy are Ingres, a line of products from Relational Technology, Inc., and SQL.

'Must be portable'

"People will not spend the time to learn a language unless it is portable. With SQL, users are trained only once, and then they are able to access information from any one of the university's data bases," Schaller explains..

Nestle Enterprises is also pursuing a distributed data base approach. Porter's intention is to have Ingres running on all Digital Equipment Corp. VAX minicomputers by the end of this year. Concurrent with this effort, Porter plans to begin off-loading applications to PC Ingres and downloading mainframe data to the personal computers using the Ingres Link product.

SQL is a growing language. New tools that enhance its capabilities are being brought to the market almost daily, with increased usability as a major area of concern. "The main weakness of today's SQL DBMSs are their end-user facilities," Porter says. "We expect to take advantage of third-party software, especially in the areas of graphics and natural-language query front ends." Oracle has already integrated several end-user tools to enhance the spreadsheet and graphics capabilities of the Oracle DBMS.

SQL as link standard

One of the primary areas of research is artificial intelligence and expert systems. Arity Corp. recently introduced a product that integrates SQL and Prolog into one system. Peter Gabel, president of Arity, states that "SQL has emerged as the standard for cooperative management between micros and mainframes. Arity recognizes the importance of combining automated expertise with traditional data base processing."

Suzanne Mamet, assistant director of data administration at Travelers Insurance Co., is exploring the use of expert systems in support of data base design.

Mamet's project captures data used for data modeling and stores it in relational data bases. "Because much of our current design work involves relational technology, we have opted for a version of Prolog that contains an SQL development package that is highly compatible with IBM's SQL," Mamet says.

ANSI standard inadequate

While the use of SQL continues to grow, the American National Standards Institute's (ANSI) proposed SQL standard is inadequate in defining the language. Sharon Weinberg, president of Codd & Date Consulting in San Jose, Calif., is disappointed with the committee's proposal. "They chose the least common denominator of all the implementations," she says.

Weinberg points to the lack of a standardized SQL catalog as a major deficiency. When working with different SQL products, one also notices that vendors tend to implement different data definition commands, expand the language, deviate in how a particular command executes and provide vastly different applications development tools. ANSI and IBM provide no real help in these areas.

Codd says he believes that vendors must also move toward full support of his relational model. This includes support for primary and foreign keys as well as domains. Currently, the SQL data definition language does not address any of these issues.

As a result, implementations of SQL, both on mainframes and micros, cause unnecessary data integrity problems that applications developers are forced to deal with on an application-by-application basis. Of course, when the relational model is fully implemented, users will have to absorb additional costs to convert their systems in order to take advantage of the DBMS's new capabilities.

Since SQL is still in its infancy, there are sure to be many more breakthroughs that will enhance the capabilities of the language. By choosing SQL now, you will not only have a language that can increase application productivity and usability today but will also position your organization to take full advantage of the technological advances of the future.

Finkelstein lectures for the Relational Institute and consults for Codd & Date Consulting. His company, Performance Computing, Inc., located in Chicago, specializes in SQL data base management and publishes the "SQL Review" newsletter.

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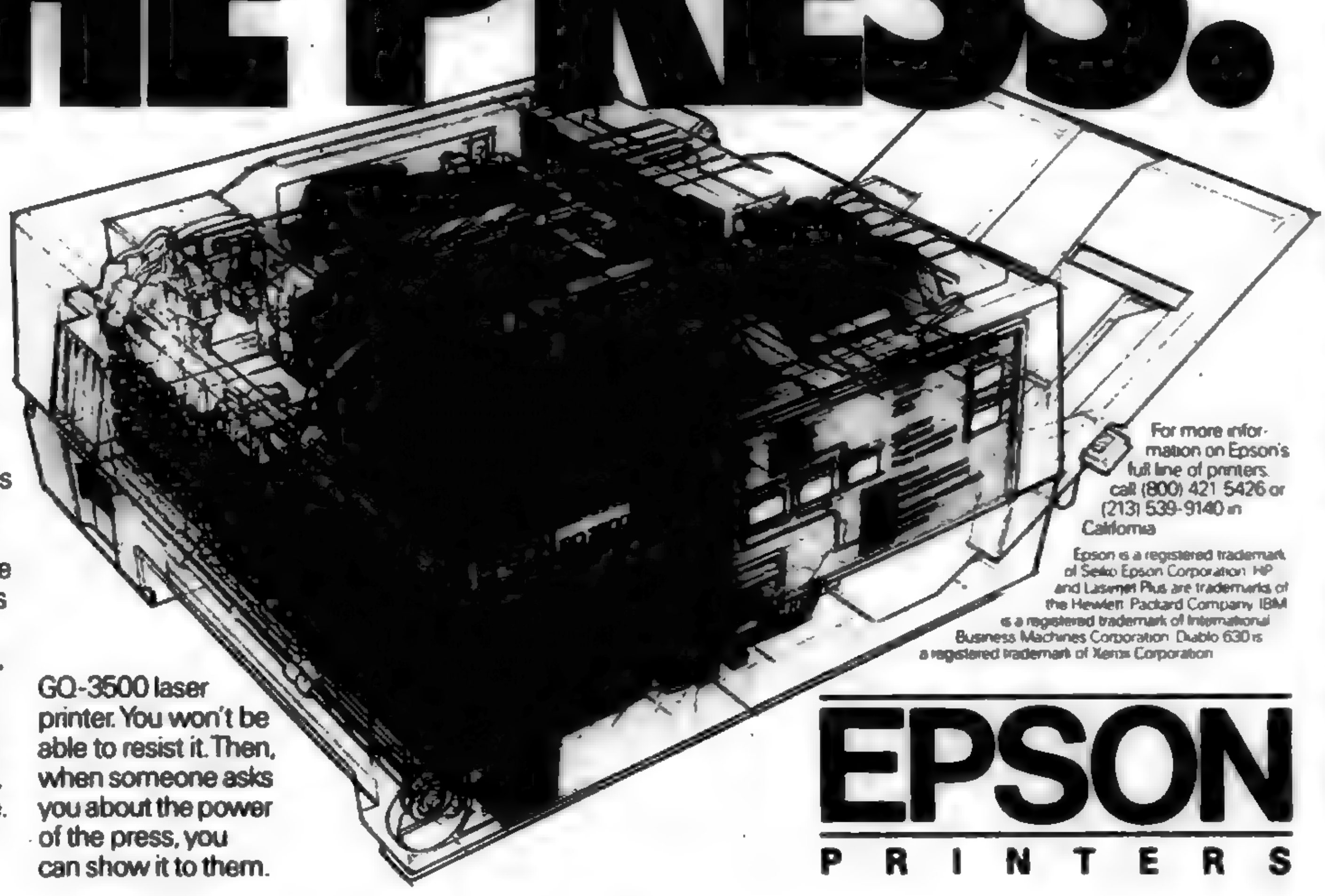

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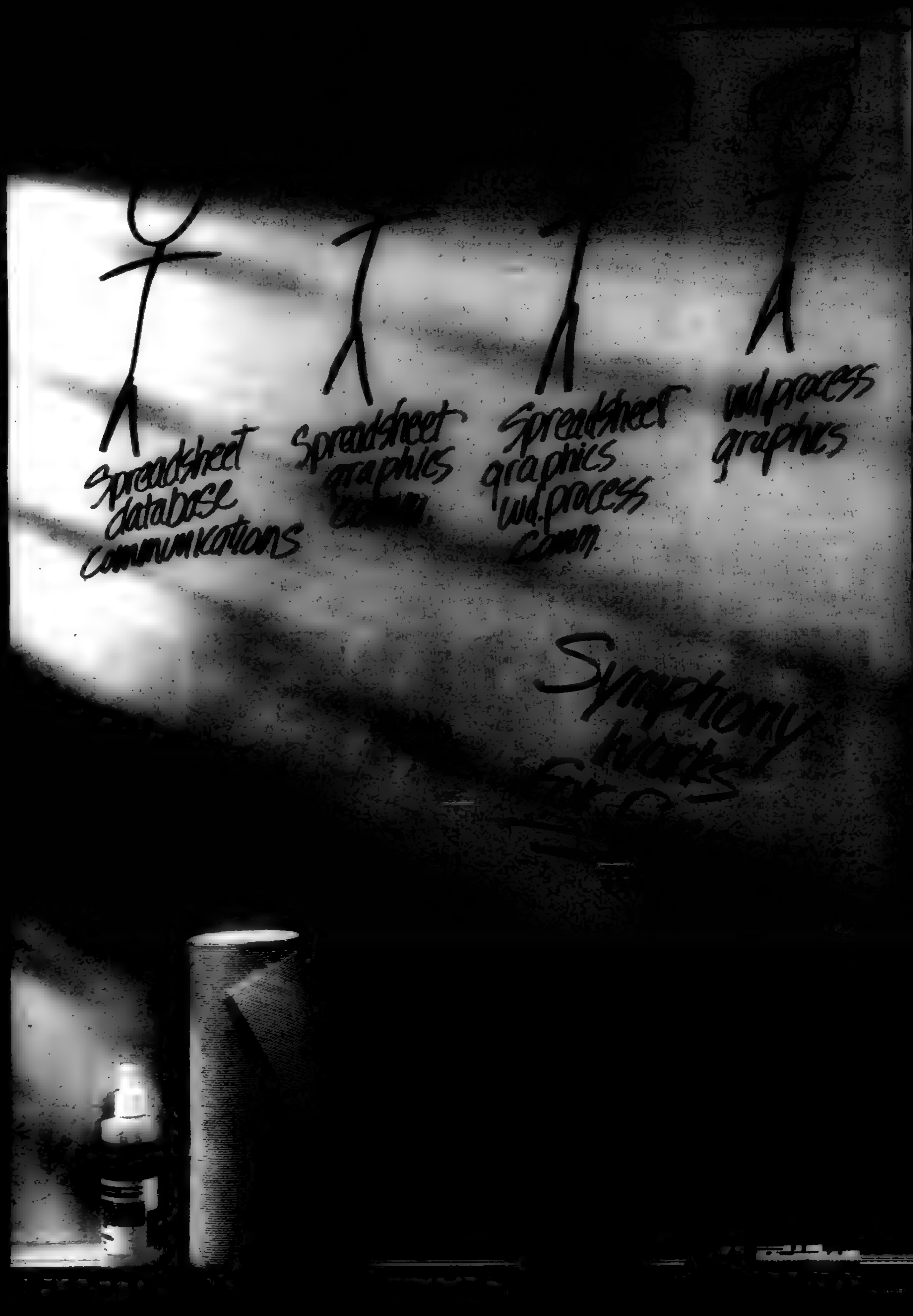
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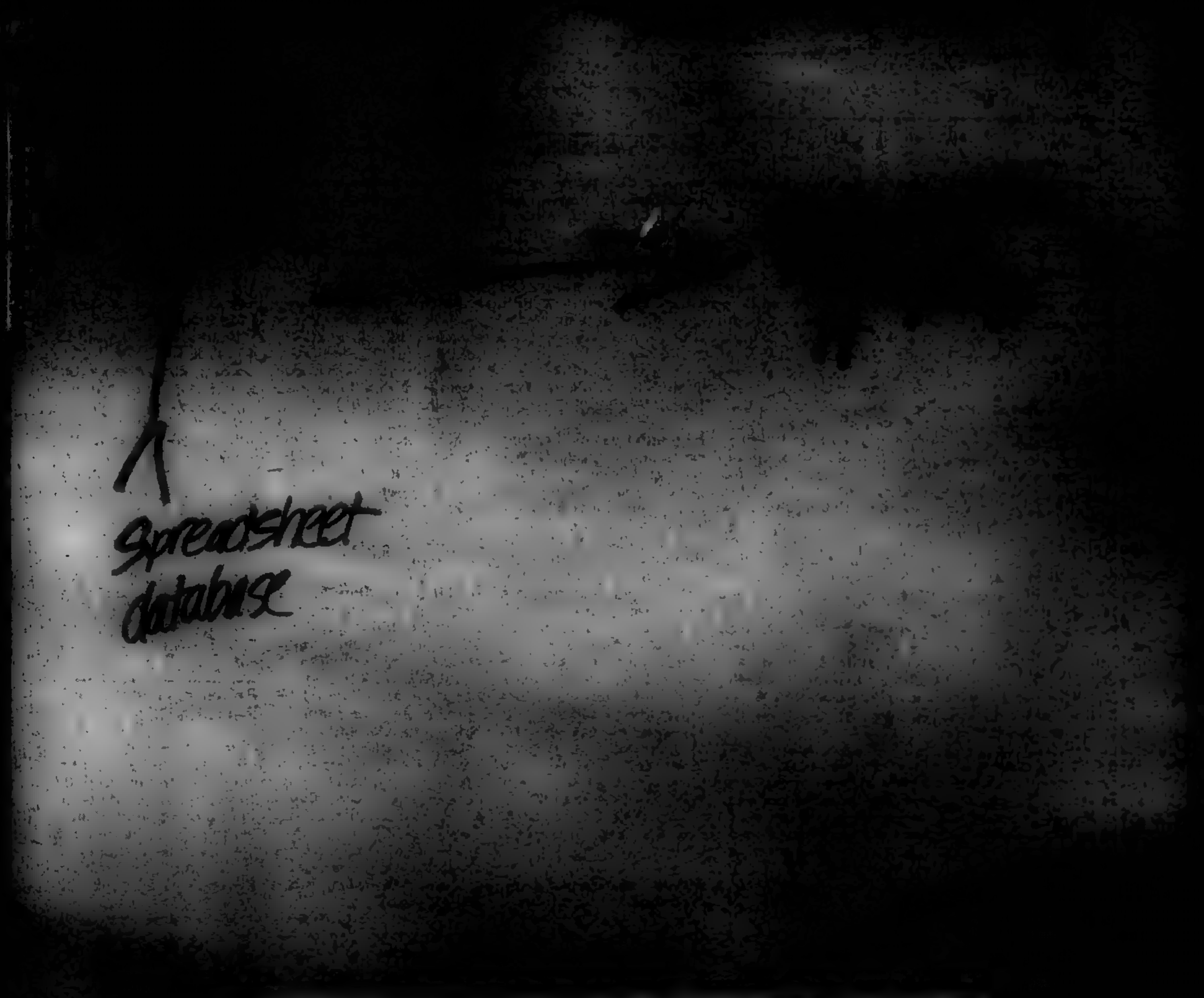

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NEW PRODUCTS

Software applications packages

Walonick Associates has enhanced its **Statpac Gold** statistical analysis software with a forecasting module.

The module provides exploratory data analysis, time-series forecasting and quality control analysis.

The Statpac Gold base package contains three regression modeling techniques. The module adds 11 forecasting methods.

Statpac Gold costs $595. The forecasting module costs $195.

Walonick Associates, 6500 Nicollet Ave. S., Minneapolis, Minn. 55423.

Felsina Software has announced **A-Talk Plus**, a terminal program designed for the Commodore Business Machines, Inc. Amiga that supports Tektronix, Inc.'s 4010/4014 graphics emulation.

A-Talk Plus is said to support the standard Alpha, Graph and Graphic Input modes and two enhanced graphics modes.

Vector line formats include solid, dotted, short-dashed, long-dashed and dot-dashed lines.

In addition to Tektronix graphics emulation, A-Talk Plus includes communication tools, as well as a multitasking spooler, capture buffer, a custom voice option and support for more than 10 modem types.

A-Talk Plus is priced at $99.95.

Felsina Software, Suite 275, 3175 S. Hoover St., Los Angeles, Calif. 90007.

Corporate Class Software Inc. has introduced **Fastar**, a financial reporting and analysis software package for use on the IBM Personal Computer or compatibles.

Fastar is said to collect, organize, manage and consolidate financial data. The product also allows for international planning and analysis.

It can perform financial reporting functions such as currency conversions, journal entries and hierarchy roll-ups. It includes audit trails, data verification and password protection capabilities, according to the vendor.

Fastar costs $25,000 for a departmental system supporting up to 25 users.

Corporate Class Software, 1211 Avenue of the Americas, New York, N.Y. 10036.

Software Technology, Inc. has announced **General Ledger System-M**, **Trust Accounting System-M** and **Critical Data System-M** for Novell, Inc. Novell Netware and the IBM PC Network.

All three packages are said to allow up to nine terminals in a network to make entries into the system at the same time. Each system may be used as a standalone or integrated with the vendor's Time Accounting and Billing System III-M.

The General Ledger System-M costs $700. Trust Accounting System-M costs $500, and Critical Data System-M is priced at $400.

Software Technology, Suite 120, 620 N. 48th St., Lincoln, Neb. 68504.

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ATRIUM

Software utilities

Micro-Z Co. has announced **Direc-Link**, a program that transfers files between laptop and desktop computers.

Direct-Link allows users to copy single or multiple files between computers via serial ports using a point-and-shoot technique. According to the vendor, files are sent at more than 10,000 char./sec.

Direc-Link costs $59.

Micro-Z, #4 Santa Bella Road, Rolling Hills, Calif. 90274.

Interactive Solutions, Inc. has announced **Acacia/OPM**, a personal computer software package said to measure response time exactly as experienced by the end user.

Acacia/OPM measures by transaction and reports response time as experienced by end users. It includes the sum of host and network response time.

The package runs on an IBM Personal Computer or compatible that simulates an IBM 3278 or 3279 using a Digital Communications Associates, Inc. Irma or compatible emulation board. It supports any application that uses standard 3270 terminals such as CICS, TSO, IMS, VM/CMS, ISPF and ICCF.

Acacia/OPM costs $1,995.

Interactive Solutions, 53 W. Fort Lee Road, Bogota, N.J. 07603.

Insight Development Corp. has announced **Laserplotter**, a software utility said to provide Hewlett-Packard Co. HP 7470A plotter emulation for the HP Laserjet line of printers.

Laserplotter allows IBM Personal Computer software to take advantage of the 90,000 dot/in. resolution offered by Laserjet printers. It features pop-up menus and the ability to map any pattern to any pen color.

Insight also announced Jetwriter, said to provide IBM Displaywriter users with full-featured printing on HP's Quietjet printers.

Laserplotter is priced at $150. Jetwriter costs $49.

Insight Development, Suite 140, 1024 Country Club Drive, Moraga, Calif. 94556.

Quadram Corp. has introduced a Lotus Development Corp. 1-2-3 **software driver** for its Quad-EGA Prosync graphics board.

The Prosync board supports the advanced display capabilities of variable scan monitors. The driver provides users of 1-2-3 Version 1A with a 120-col. by 25-line display, according to the vendor. Users of Version 2.0 have the additional option of a 120-col by 43-line format.

The 1-2-3 driver will be shipped with all Prosync boards. Prosync costs $595.

Quadram, One Quad Way, Norcross, Ga. 30093.

Development tools

Expertech Ltd. has announced **Xi Plus**, a personal computer-based expert system shell.

Xi Plus is a rule-based expert system said to provide the application generating capabilities of a dedicated artificial intelligence workstation. The product has extended inferencing as well as interfaces for external files, graphics and telecommunications. It also features an English language interface for creating knowledge bases and applications.

Xi Plus requires a minimum of 512K bytes of memory. It runs on the IBM Personal Computer and compatibles.

Xi Plus costs $1,250.

Expertech, Suite 204, 650 Bair Island Road, Redwood City, Calif. 94063.

Gold Hill Computers, Inc. has announced its **Golden Common LISP 386** (GCLisp 386) **Developer** for the Compaq Computer Corp. Deskpro 386.

The GCLisp 386 Developer is said to provide a Common LISP programming environment for building expert systems and other artificial intelligence applications. These AI applications include natural-language interfaces to Ashton-Tate's Dbase and Lotus Development Corp.'s 1-2-3.

The GCLisp 386 Developer is also said to be able to integrate C programs with artificial intelligence applications.

It supports a large memory interpreter and compiler, on-line Help system and an enhanced editor with more than 150 commands, according to the vendor.

The 386 Developer costs $1,195. A complete Deskpro 386 system is priced from $7,800 to $16,400.

Gold Hill Computers, 163 Harvard St., Cambridge, Mass. 02139.

Software enhancements

Innovative Software, Inc. has announced **The Smart Software System Version 3.1** as well as the Smart Word Processor with Spellchecker, The Smart Spreadsheet with Business Graphics and The Smart Data Base Manager.

Smart Software System 3.1 is said to feature network-ready capability, allowing the program to be used as either a single- or multiuser package. Multiuser capabilities include file and record locking in the data base manager and file locking in the word processor and spreadsheet. In addition, Smart's password protection schemes provide data integrity for all users of the network environment.

Prices for the packages range from $395 for the Word Processor to $895 for the Smart Software System.

Innovative Software, 9875 Widmer Road, Lenexa, Kan. 66215.

Printers/Plotters/Peripherals

General Parametrics Corp. has introduced the **Printmaker 20C** and **Printmaker 20X** desktop printing products designed to provide transparencies and hard copy in full color with thermal and ink-jet printers.

Printmaker 20C produces 1,000-color output in both landscape and portrait forms.

The product is said to include the California Computer Products, Inc. 5902G thermal printer.

Printmaker 20X allows users to produce 1,000-color output with the Xerox Corp. 4020 color ink-jet printer. It offers a color-density mode for color transparencies and a high-resolution mode for hard copy and a draft

Continued on page 42

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Continued from page 40

mode for faster printing of graphics.

Printmaker 20C is priced at $5,595. Printmaker 20X costs $1,960.

General Parametrics, 1250 Ninth St., Berkeley, Calif. 94710.

Dataproducts Corp. has announced the **8070 Plus** dot matrix printer.

The IBM Personal Computer-compatible printer is said to be capable of multicolor, high-resolution graphics. It comes with both serial and parallel interfaces and a universal power supply. It includes eight standard character sets, such as a bold sans serif Courier font. Optional character sets include a choice of bar codes.

Tractor, friction and semiautomatic single-sheet feed are standard, and the optional fully automatic single-sheet feeder holds up to 250 sheets of paper.

The 8070 Plus is priced at $2,099.

Dataproducts, 6200 Canoga Ave., Woodland Hills, Calif. 91365.

Board-level devices

Matrox Electronic Systems Ltd. has introduced a two-board set for the IBM Personal Computer AT, called the **MVP-AT**, that combines true-color frame grab and high-resolution graphics with real-time image processing techniques.

The MVP-AT supports convolutions, frame averaging, histograms, erosion and dilation, profiles, addition, subtraction and nonlinear transformation, according to the vendor.

Other features include support for noninterlaced, flicker-free display, overlay memory and an enhanced graphics adapter switch.

The MVP-AT is priced at $8,995 with an add-on processor module.

Matrox Electronic Systems, 1055 St. Regis Blvd., Dorval, Quebec, Canada H9P 2T4.

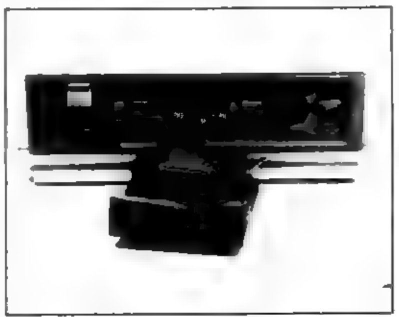
PGX, Inc. has dropped the price of its **HR-1200** series of color graphics boards.

The IBM Personal Computer-compatible add-in cards occupy a single card slot and provide flicker-free graphics on 60-Hz, noninterlaced monitors. They offer resolutions of 1,280 by 1,024 pixels in either 8-bit, 256-color or 4-bit, 16-color versions. The family also includes two 1,024- by 768-pixel boards.

Prices now range from $1,795 to $2,995.

PGX, 3730 Skypark Drive, Torrance, Calif. 90505.

Rohrer Electronics & Consulting has announced **RB20**, an upgrade kit for the Digital Equipment Corp. Rainbow personal computer.



Rohrer Electronics' *RB20*

The RB20 allows users to upgrade the Rainbow with a 21M-byte Winchester disk, a parallel printer port and a real-time clock. Software drivers, diagnostics and formatting routines are included in the package.

The RB20 is priced at $1,440.

Rohrer Electronics & Consulting, L'Haut Bozon, CH-1801 Mt. Pelerin, Switzerland.

General Parametrics Corp. has announced the **Colormetric 20** color graphics card for IBM Personal Computers, PC XTs, ATs and compatibles.

The Colormetric 20 is said to turn the computer into a full-capability graphics workstation.

Users can view images in 1,000 colors, exactly as they will appear as transparencies, hard copy or slides. The card is compatible with such PC graphics packages as Lotus Development Corp.'s Freelance Plus, Microsoft Corp.'s Chart and Chart-Master from Ashton-Tate.

The Colormetric 20 card is priced at $1,875. A Colormetric Videocable is included to allow use with standard enhanced graphics adapter and color graphics adapter cards, according to the vendor.

General Parametrics, 1250 Ninth St., Berkeley, Calif. 94710.

PC Technologies, Inc. has introduced the **286 Ramracer**, which is an accelerator board, and the **Rampartner**, which the vendor said is a Lotus/Intel/Microsoft Expanded Memory Specification (EMS) or Enhanced EMS board.

The 286 Ramracer is a single-slot, 8-MHz accelerator with up to 2M bytes of Enhanced EMS or EMS memory, according to the vendor. Rampartner is a 2M-byte memory board that can be used in conjunction with the 286 Ramracer to provide up to 4M bytes of memory, the vendor said.

The product can be used independently, according to the vendor.

Designed for the IBM Personal Computer, the 286 Ramracer costs $745 with no random-access memory (RAM) and $1,225 with 1.5M bytes of RAM.

A daughterboard costs $150 with 512K bytes of RAM.

The Rampartner costs $360 with no RAM and $960 with 2M bytes of RAM.

PC Technologies, Box 2090, 704 Airport Blvd., Ann Arbor, Mich. 48106.

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And if one of your DCF II ports is connected to a modem, you can dial into the system from home. So after you get the kids to bed you can log onto the electronic mail system and thank your boss for the promotion.

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This one was really easy. With Wall Data's Communications Port Expander (CPX™) unit, a single port on your mainframe's front-end can now support up to eight 3270 controllers or PCs with SDLC cards. Which opens such possibilities as . . .

"THE LEASED LINES WERE DOWN, YET YOU WERE STILL ONLINE? HOW?"

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Because the Wall Data Protocol Converters are the smartest on the planet (perhaps even the Galaxy), they have features too numerous to mention in one ad. Features like dial-back security with audit trails and reports. So when a remote caller dials in, the Wall unit takes the user's name, hangs up, checks the outside phone number from which that user is authorized to call, and then calls that number back and connects the user to the system. Just like the KGB would do it. Or the CIA. Or any company that cares about the security of its data. So you can be a hero, not a news item about hackers.

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You can save the day, the cluster controller ports and four slots, by suggesting a DATAGATE® card for just one of the PCs! That PC becomes a cluster controller for all five PCs, so they can look like 3278/3279 terminals to the mainframe. Complete with error-checked file transfers, unattended operation, Level 2 API and "hot-key" windows between PC-DOS and your mainframe application. Without interfering with the work normally done on the host PC. Because DATAGATE has its own processor. All it does is borrow power and an enclosure from a PC. The other PCs connect with the DATAGATE via RS-232 serial ports.

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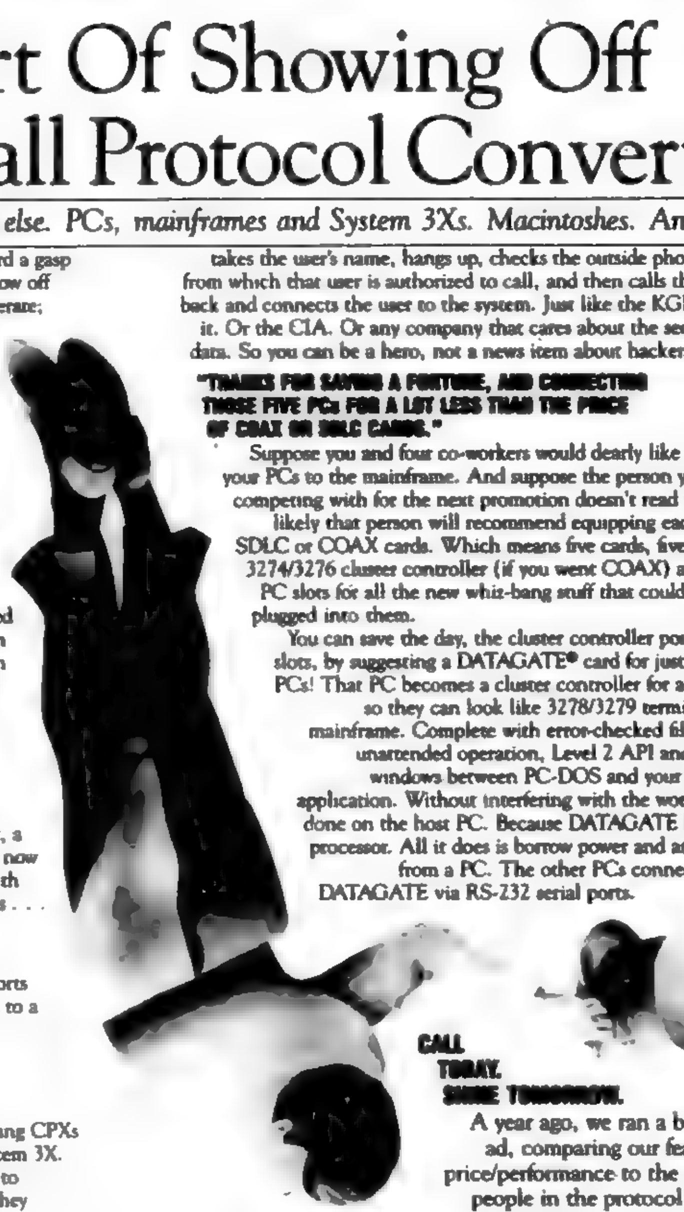


NETWORKING

DATA STREAM

Christine Gianone and Frank da Cruz

Kermit leaps in popularity

At the foundation of many communications programs and systems installed in business and academic environments is a widely used but largely unsung program named Kermit, after the puppet frog of the same name (used with permission of Henson Associates, Inc.).

The program is designed to solve the classic problem faced by large organizations with extensive multivendor environments.

Forced to tie together a hodgepodge of equipment, including IBM mainframes and Personal Computers, Digital Equipment Corp. and Hewlett-Packard Co. hosts, Apple Computer, Inc. Macintoshes, Unix systems large and small, engineering workstations and so on, communications managers look for — and more often than not fail to find — a networking solution that is both comprehensive and affordable.

Columbia University — a large, decentralized organization with a diverse population of central mainframes, departmental minis and personal computers — confronted just such a problem in 1981. The univer-

Continued on page 46

LAN industry skyrocketing

BY ELISABETH HORWITT
CW STAFF

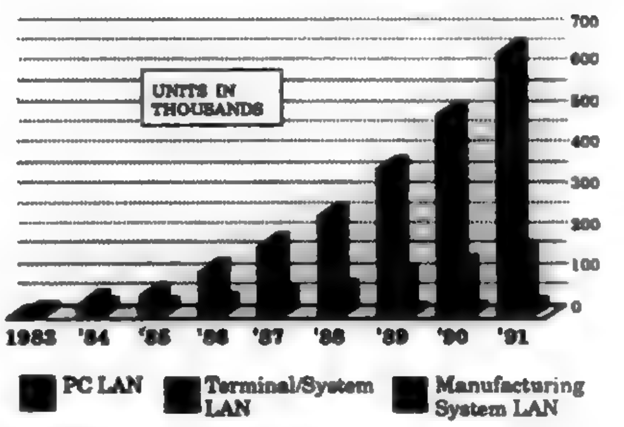
The local-area network (LAN) industry — particularly the manufacturing and IBM Personal Computer network segments — enjoyed significant growth in 1986 that should continue during the next five years, according to the Local-Area Networks report that was published recently by Framingham, Mass., research firm International Data Corp (IDC).

Among the important advances the industry made last year were standardization of networking hardware and media access methods; reduction of interface costs due to lower priced communication servers and the implementation of twisted-pair

Continued on page 46

LAN shipments

PC LANs lead in accelerating network installments



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART: STAFF

T1 switch product line revved up

BY DAVID BRIGHT
CW STAFF

WASHINGTON, D.C. — Infotron Systems Corp. added two products to the high end of its T1 switch product line at the Communications Network Exposition held here last week.

The NX4600 supports 96 high-speed T1 links per node or up to 4,000 local channels, the company said. Up to 64 Infotron NX nodes can be interconnected within one integrated network. An NX4600 base unit with full redundancy is priced at $20,000.

Designed to serve as a remote node to the NX4600, the NX3000 supports as many as four links and 24 local channels. The price of this smaller compatible node is $10,000.

Both units support AT&T protocols for Pulse Code Modulation voice transmission and a private branch exchange link that is compatible with AT&T's D4 framing protocols. This enables the systems to interface with AT&T services such as Accunet 1.5 and Customer-Controlled Reconfiguration.

Because the new Infostream NX products have flexible link speeds, support all network topologies and are compatible with Infotron's Infostream multiplexers and INX switching systems, they enable the construction of varying network configurations, the company said.

The link speeds supported by the products include 56K, 64K, 256K, 1.544M and 2.048M bit/sec.

Network topologies supported include point-to-point, drop-and-insert, pass-through, ring and full-mesh.

Other features of the network

Continued on page 45

Comten enhances Gateway

BY ELISABETH HORWITT
CW STAFF

ST. PAUL, Minn. — NCR Comten, Inc. last week unveiled versions of the Comten Network Gateway (CNG) and Comten Advanced Communications Function/Network Control Program (ACF/NCP) with several enhanced features. Among these are support of the latest IBM VTAM and ACF/NCP releases and an extended network addressing capability that IBM also offers.

Available with the latest Version 4.0 of the Comten ACF/NCP, enhanced network addressing increases the address size used on an IBM network from 16 to 23 bits. This, in turn, increases the number of addressable elements within a network subarea from 1,024 to 65,000,

Continued on page 46

Inside

- Synoptics, AT&T to develop Ethernet in star topology. Page 45.
- Advanced Logic Research releases 80386-based network system. Page 45.
- Mitek Systems announces SNS Presentation Services VAX and IBM PC-DOS implementations.

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Star topology Ethernet to be developed

BY DONNA RAIMONDI
CW STAFF

Synoptics Communications, Inc. has announced an agreement with AT&T in which it will develop an IEEE 802.3 Ethernet implementation in a star topology running at 10M bit/sec. on AT&T's Premises Distribution System (PDS). Currently, PDS and AT&T's Ethernet-compatible network Starlan, which runs on PDS, support rates of up to 1M bit/sec.

Synoptics, formerly Astra Communications, Inc., will work with AT&T to achieve PDS certification for Synoptics' Latticenet, a star-configured implementation of Ethernet. When this is accomplished, Latticenet will be able to share the same unshielded twisted-pair cable with AT&T networks such as Starlan, according to Andrew Ludwick, president and chief executive officer of Synoptics.

"What is important here is that we are going to move to 10M bit/sec. Ethernet on unshielded voice [twisted-pair wiring] with the AT&T system. We already offer shielded data cable with the IBM system," he said. Latticenet currently runs on the shielded twisted-pair wiring version of IBM's Cabling System wiring and supports a rate of 10M bit/sec.

"We are delighted to have Synoptics among the companies who have endorsed our PDS wiring plan," an AT&T spokesman said. There is no AT&T equity involved in Synoptics' product development effort, however. When the products are ready, AT&T will put them through a rigorous certification process in which it will "try in every way possible to technically break" them, the spokesman said.

The new implementation of Latticenet will support both fiber-optic cable and unshielded twisted-pair wire, which is designed for data as well as voice transmission. Using proprietary technology, the products will allow workstations to reside up to 330 feet from the wiring closet, Synoptics said.

T1 switch

FROM PAGE 43

exchanges are clock transparency and digital bridging. With clock transparency, the user's network can accommodate multiple clocks from varying facilities, such as satellite, private fiber-optic and different carrier-provided links, without clock slippage or information loss.

Digital bridging lets a single front-end processor poll multiple controllers located at different NX nodes. By using the Infostream NX backbone network for the data path, the user can reportedly avoid the expense of multiple analog facilities to the multidropped remote controllers.

Infotron said it plans to support the exchanges with its Integrated Network Manager in the near future and that it is committed to developing IBM Netview/PC support for its NX family.

First 386-based network system bows

ALR provides comprehensive, one-vendor networking system

BY PATRICIA KEEFE
CW STAFF

IRVINE, Calif. — Advanced Logic Research, Inc. (ALR) has introduced what it said it believes is the first Intel Corp. 80386-based network system.

The ALR Network 386 features ALR's Access 386 personal computer as a dedicated file server, ALR's PC2/286 PCs as workstations and Novell, Inc.'s Advanced Netware 286 network software.

"We think that this complete system approach will be well received by dealers and vendors alike. It will be a one-vendor approach where a major manufacturer like ALR will offer all the hardware for a complete system approach," observed Dave Kirkey, ALR's vice-president of sales and marketing.

Corvus Systems, Inc., Compaq Computer Corp. and Convergent Technologies, Inc. have all released 386-based workstations that they are also selling as network file servers.

Network vendors, including Novell and 3Com Corp., are working on a 386 file server solution to bundle with their network software.

The ALR Network 386 systems are available in preconfigured four- and eight-user systems, and additional nodes for up to 255 users can be added.

Complete ALR network 386 system prices begin at $16,995 for a four-user system that includes a 386-based file server, an 80M-byte hard disk drive, a 60M-byte intelligent tape backup, four PC2/286 IBM Personal Computer AT compatibles, five ALR Network 386 Arcnet-compatible network adapter cards, an ALR Network 386-active eight-way hub, connecting cables and installed Advanced Netware.

The ALR Network 386 is available through authorized ALR resellers.

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Kermit leaps

FROM PAGE 43

sity solved its problem by developing Kermit, an RS-232-based communication protocol designed to accommodate dissimilar types of computers, operating systems and file systems.

Kermit is especially suited to micro-to-mainframe connections for both IBM and non-IBM systems but works equally well for PC-to-PC or mainframe-to-mainframe connections. Kermit programs provide error-checked transfer of text and, in most cases, binary files through both seven- and eight-bit communications channels.

The only requirements are an asynchronous serial connection (direct or dial-up) and Kermit software running on each machine. Personal computer versions of Kermit, as well as some of the mini and mainframe versions, also feature terminal emulation, usually of the DEC VT52 or VT100.

Because Kermit has always included source code and a protocol specification, it has been relatively easy for users to improve existing Kermit programs, adapt them to new systems or write new Kermit programs. In turn, the results are sent back to Columbia for further distribution and the process continues. There are now Kermit programs for more than 200 different machines and operating systems.

Kermit tips available

Since Kermit is largely enhanced and implemented by in-house programmers and public-spirited volunteers, Kermit programs come without formal support or warranty. However, informal advice or support for Kermit is not hard to find, since the protocols are in wide use in thousands of organizations around the world. Furthermore, Kermit has been added to an increasing number of commercial software packages, dial-up data base services and other products for which formal support is available.

Columbia University has distributed about 6,000 sets of Kermit, approximately 50% to universities and 40% to corporate data centers. Approximately 200 vendors, including financial analysis software vendor SPSS, Inc. and Crosstalk developer Microstuf, Inc. have implemented Kermit in their communications software.

The fact that Columbia retains the copyright to Kermit has prevented vendors from slapping another name on it and selling it at commercial prices — as has happened with public-domain communications software such as Xmodem. The Kermit software is distributed free and unlicensed by Columbia University Center for Computing Activities in New York.

Comten

FROM PAGE 43

according to Comten marketing product manager Michael Becker. The enhanced network addressing feature also permits ACF/NCP 4.0 to handle up to 255 subareas, each of which corresponds to an IBM host or front-end processor.

"The extended addressing, by allowing more network elements per subarea, allows companies to make fuller use of their front-end processors, many of which are underutilized," Becker said.

The Comten ACF/NCP Version 4.0 also incorporates an enhanced version of Comten's Modulo 128 high-speed link. With the enhancement, users reportedly can transmit up to 127 blocks of data over an Synchronous Data Link Control (SDLC) connection between NCP nodes before an acknowledgement must be sent by the receiving node.

The feature is designed to facilitate SDLC communications over satellite-based links, according to Becker.

The Modulo 128 enhancement is functionally compatible with a similar feature that is offered with IBM's ACF/NCP Version 3, according to Comten.

Beats IBM to punch

A third feature offered by ACF/NCP Version 4.0 is support of dial-in terminals emulating BSC 3270 protocol. Switched-line devices, such as personal computers, appear to mainframe applications as if attached to a dedicated line while using the less expensive dial-up lines, according to Comten. This capability is not available from IBM, Becker claimed.

Comten ACF/NCP Version 4.0 will be available in an early support program in the second quarter and will be made generally available in the third quarter.

U.S. licensing fees are as follows: For the Comten 5620 Communications Processor version of ACF/NCP Version 4.0, $1,936 annually; for the Comten 3690 or 3695, $1,344 initial fee and $4,928 annual fee; for the Comten 5660, $2,016 initially and $7,392 annually.

License fees for enhanced network addressing are as follows: For the Comten 5620, $1,056 annual fee; for the Comten 3690 or 3695, $576 initial fee and $2,112 annual fee; and for the Comten 5660, $864 initial fee and $3,168 annually.

NCR Comten also added a version of Comten Network Gateway (CNG) that supports enhanced network addressing and IBM's ACF/VTAM Version 3 Release 1.1 and Multisystem Network Facility.

CNG interconnects up to eight independent systems network architecture (SNA) networks without requiring users to change current network-naming conventions, operation management or security.

Host-free subdivision

Users can subdivide an SNA network into several smaller units and then interconnect them via the gateway. IBM's SNA Network Interconnect performs the same functions but "requires heavy mainframe use, while we allow cross-connection without involving the front-end processor and host," Becker said.

The new release of Comten Network Gateway will be available in the first quarter.

U.S. license fees are as follows: $1,100 initial fee and $2,200 annual fee for the Comten 5620 Communications Processor; $2,200 initial fee and $4,400 annual fee for the Comten 3690 or 3695; and $3,300 initial fee and $6,600 annual fee for the Comten 5660.

LAN industry

FROM PAGE 43

wiring; and the availability of PC-based multiuser application software packages from leading vendors such as Microrim, Inc. and Ashton-Tate.

The report indicated, however, that LAN products still fail to address problem areas that have plagued the industry since its inception. For example, only 15% of 68 large organizations surveyed by IDC believe that PC LANs today are effective substitutes for departmental minicomputers.

The report adds that "LANs are still difficult to install and debut, expensive [average cost per PC exceeds $1,000] and require extensive training. Many organizations are *still* looking for LAN applications which justify the cost and difficulty of installing LANs."

LAN future bright

Several favorable trends highlighted in the report should result in steady growth in LAN installations, according to the IDC report. The typical PC LAN today links eight nodes; today's typical PC LAN is also unconnected to other networks or to host systems through gateways.

However, the report goes on, "the introduction of low-cost [under $10,000] Intel Corp. 80386-based servers in late 1987 will offer PC networks the CPU power to link more workstations, improve network speed and offer advanced communications gateway functions.

"However, the full effects of the 80386-based systems will not be felt until Microsoft Corp. makes available a new version of MS-DOS that takes full advantage of 80386's increased power with features such as 32-bit addressing and extended RAM [read-only memory] support."

That operating system is not expected to be released until the middle of this year, according to IDC.

In the overall LAN market, manufacturing systems will be the fastest growing segment, with shipments increasing at a compound annual rate of 70% between 1984 and 1991, according to IDC (see chart page 43).

The overall market during the same period will grow at a compound annual rate of 35% with an expected $3 billion in shipments by 1991. The PC LAN market will also grow at 35% per year during the same time frame, IDC predicts.

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NEW PRODUCTS

Local-area network hardware

Mitek Systems Corp. has announced implementations of its **SNS Presentation Services** for Digital Equipment Corp.'s VAX and Microvax computers running the VMS operating system and IBM Personal Computers using IBM PC-DOS.

Both implementations utilize Mitek's approach of distributed Systems Network Architecture (SNA) services for Transmission Control Protocol/Internet Protocol Ethernet local-area networks (LAN). The SNA Network Server provides Ethernet LAN connectivity either directly channel-attached to an IBM mainframe environment or remotely attached, with speeds of up to 64K bit/sec.

Pricing for the SNA Network Servers ranges from $21,000 to $29,500. Pricing for the SNS Presentation Systems ranges from $750 to $4,500.

Mitek Systems, 2033 Chennault Drive, Carrollton, Texas 75006.

Network services

Dow Jones News/Retrieval has introduced an enhanced version of its Dow Jones Tracking Service, **Track**, that allows users to automatically monitor stock quotes and news from their micros.

Track allows users to create and monitor as many as five groups of up to 25 companies contained within Dow Jones News/Retrieval. Users now have the option of viewing only the news information or stock price quotations of the companies included in the profile.

Membership options to Dow Jones News/Retrieval include a corporate membership for $49.95 and a personal membership for $29.95. Track users pay a $5 monthly fee plus standard use charges.

Dow Jones News/Retrieval, P.O. Box 300, Princeton, N.J. 08543.

Customer-premise equipment

Voice Control Systems has announced the **VCS1000** speaker-independent voice recognition system.

The VCS1000 is said to support an 82-word vocabulary divided into three application areas: home security, machine control and telephone function control. It responds to any speaker without having been trained to the speaker's voice.

The system does not require a separate computer system for operation.

VCS is priced from $995, including a microphone and voice-response software appropriate for the particular application.

Voice Control Systems, Suite 100, 14140 Midway Road, Dallas, Texas 75244.

Links

IBM has announced that the Interactive Communication Facility Finance Subsystem of IBM's System Support Program (SSP) for the System/36 has been enhanced to include primary **communications support** for the IBM 5170 Personal Computer AT Model 849.

The connectivity enhancement is said to allow all models of the departmental processor line to communicate with IBM's 4680 Store Systems point-of-sale (POS) terminals. The 5170 PC AT Model 849 acts as a communications controller for up to 128 4680 POS terminals, acting as a gateway between them and a host processor such as the System/36.

Release 5 Modification Level 1 of the SSP communicates with the 5170 PC AT through IBM's SNA/Synchronous Data Link Control (SDLC).

IBM's Interactive Communication Facility Finance Subsystem costs $1,600 for System/36 Models 5360 and 5362 and $1,500 for the System/36 Model 5364.

IBM, 44 S. Broadway, White Plains, N.Y. 10601.

Protocol converters

Simpact Associates, Inc. has announced a Digital Equipment Corp./Manufacturing Automated Protocol (DEC/MAP) interface called the **MAP7510 subsystem**.

The product is said to provide an interface to MAP 2.1 broadband networks for DEC Microvax II computers. The subsystem consists of a Q-bus-compatible controller and modem assembly, a distribution panel kit and applications interface software for the host.

Prices for the MAP7510 subsystem range from $6,000 to $12,000.

Simpact Associates, 9210 Sky Park Court, San Diego, Calif. 92123.

Electronic mail

Interactive Network Technologies, Inc. has introduced **Intermail PC**, its IBM Personal Computer interface for the Intermail system.

Intermail is a desktop communications system that enables users to exchange electronic mail and files. The Apple Computer, Inc. Macintosh version also allows users to move object- or pixel-oriented images from one Mac to another. Its server-to-server feature lets micros on both local and remote networks communicate.

Intermail PC is site licensed at $199 per server for IBM PCs and compatibles.

Interactive Network Technologies, 20 Amy Circle, Waban, Mass. 02168.

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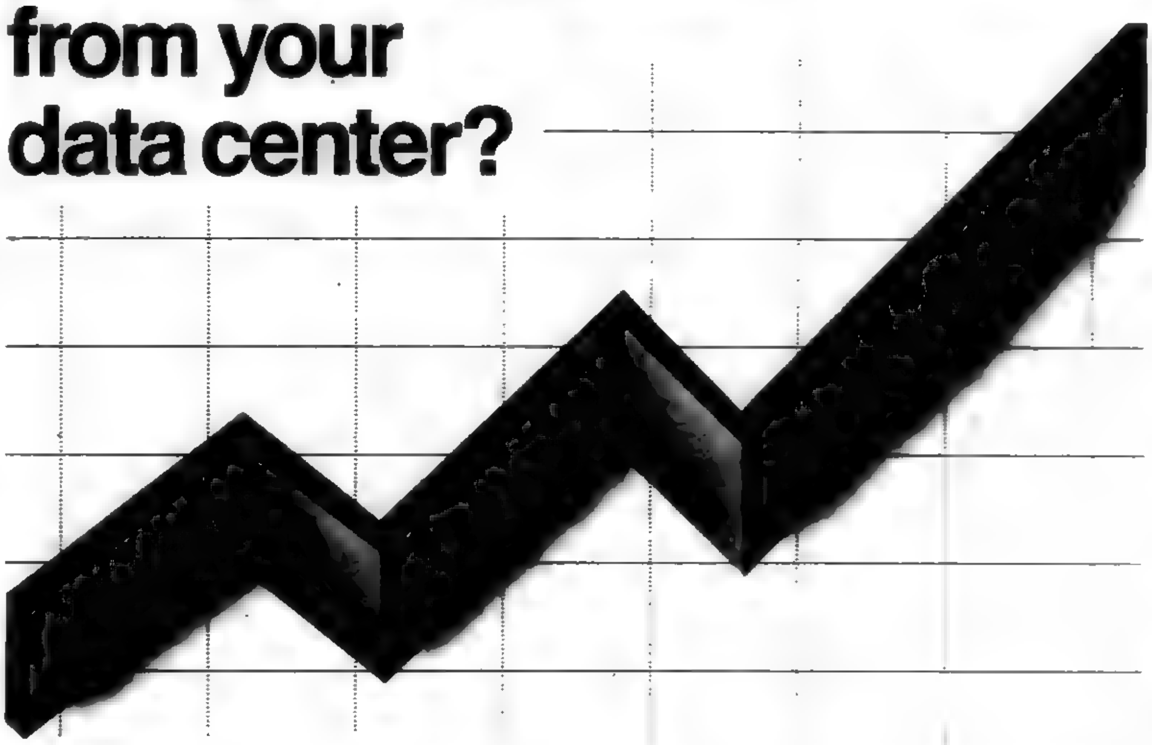

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

IBM invades DEC territory

With so much attention focused during the past year on Digital Equipment Corp.'s incursion into IBM's world of commercial data processing, it has been easy to overlook the fact that a second company is trying to drive into the heart of a competitor's territory.

The irony is that the second company is IBM and the competitor, naturally, is DEC.

Some users and most industry observers have been talking about DEC's efforts to profit from certain IBM weaknesses, such as poor connectivity in the mid-range processor market.

One of DEC's stated goals is to increase its presence in commercial DP, particularly in the major corporations that historically have been IBM's best customers. DEC says it is promoting its distributed processing approach for new applications rather than trying to replace IBM mainframes, although DEC did make a point

Continued on page 51

Users evaluate Wang VS 7150

BY ALAN J. RYAN
CW STAFF

Users of Wang Laboratories, Inc.'s VS 7150 machine recently said Wang seems to have eliminated the kinks in its VS Operating System Release 7 and that the unit runs well, but true performance figures will not be available for a number of months.

Wang announced a restructuring of the top half of its minicomputer line in mid-January and introduced the VS 7000 series to succeed the VS 85, VS 100 and VS 300 [CW, Jan. 19].

"Speed-wise, [the VS 7150] is just like a VS 300 internally," said Phil Dowlin, director of information services at Midcon Services in Houston. He said the unit was set up at his company in early January.

Dowlin claimed Wang's latest offering has doubled the performance of his VS 100. Midcon, a natural gas pipeline company, continues to run its VS 100 and three VS 300s.

"As far as we're concerned, [the VS 7150 is] very stable," claimed Alan Wein, director of information services at insurance agency Cal-Surance Associates, Inc. in Torrance, Calif. "It took a few days to get the thing going, but it's been stable ever since."

Cal-Surance was not using a Wang installation prior to the purchase of the VS 7150. "But all I can say is it is giving us very good response time," Wein commented, adding that the unit is not currently being used to its full potential.

Although he said he was slightly nervous running the unit's software because of some reputed problems with running Wang's VS Operating System Release 7 on the VS 300, "those haven't been repeated. We're on 7.11, and it's absolutely rock solid," Wein said.

"Certainly I've heard about unreliability with the 300 operating system, and the [VS 7150] is just a stripped-down 300,"

Continued on page 51

Flexos operates with industrial Intel 80386

BY DAVID BRIGHT
CW STAFF

MONTEREY, Calif. — An operating system that takes advantage of Intel Corp.'s 80386 microprocessor for industrial applications was released recently by Digital Research, Inc.

With the latest version of Flexos, Digital Research joins the rush to develop operating systems specifically for the powerful 32-bit chip.

Digital Research describes Flexos as a real-time, multitasking operating system with the power of Unix and the programming ease of a Microsoft Corp. MS-DOS environment.

The Flexos 386 beta release is scheduled for distribution in the second quarter. Like the current Flexos 286 version, Flexos 386 will support Intel's 82786 advanced graphics coprocessor.

Also planned for the two versions of the operating system is an emulation feature for concurrently running some MS-DOS applications in the processors' protected mode to make real-time applications run more smoothly. With Flexos 286, the processor does not switch to real mode; Flexos 386 uses the 80386 chip's Virtual 86 mode.

One of the first implementations of Flexos will be performed by American Manufacturing Systems, Inc., which is designing a system for controlling factory automation equipment. Currently an alpha-test user, the Maitland, Fla.-based company will combine the operating system with its own 80386-based board and 80186- and 80286-based single-board computers on an Intel Multibus II backplane.

The firm plans to produce beta units of its system by the end of June, according to President Jerry Horn. Priced at less than $200,000 for a complete system, the system will be used to orchestrate work cells such as robots and milling machines, he said.

M6000 gets growth, power kick

BY JAMES CONNOLLY
CW STAFF

IRVINE, Calif. — McDonnell Douglas Computer Systems Co. has enhanced three of the five models in its M6000 line of small business systems.

The three models, introduced in January 1986, were reportedly enhanced to include technology included in the two high-end models announced in October. The additional features, including a new operating system release, were designed to provide more power and growth capabilities while freeing up backplane slots.

The enhanced models are the M6415, M6425 and M6635. The comparable earlier models were the M6310, M6325 and M6527.

The upgraded models run a new level of McDonnell Douglas's Reality relational data base management-oriented operating

Continued on page 51

Inside

- AST Research designs a stand-alone workstation. Page 50.
- ADDS introduces entry-level, Pick-based system. Page 50.
- Nemonix unveils Version 2 of its Synchronized Clock Accelerator. Page 54.

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(919) 467-8000 Telex 802505

Workstation emulates IBM 5250

IRVINE, Calif. — AST Research, Inc. has introduced a workstation based on the Intel Corp. 80286 microprocessor and designed for use as a standalone workstation or in IBM 5250-emulation mode with IBM minicomputers.

The AST 5250-Premium/286 is said to combine the processing power of AST's IBM Personal Computer AT-compatible microcomputer with 5250 emulation that enables communication with an IBM System/34, 36 or 38 minicomputer.

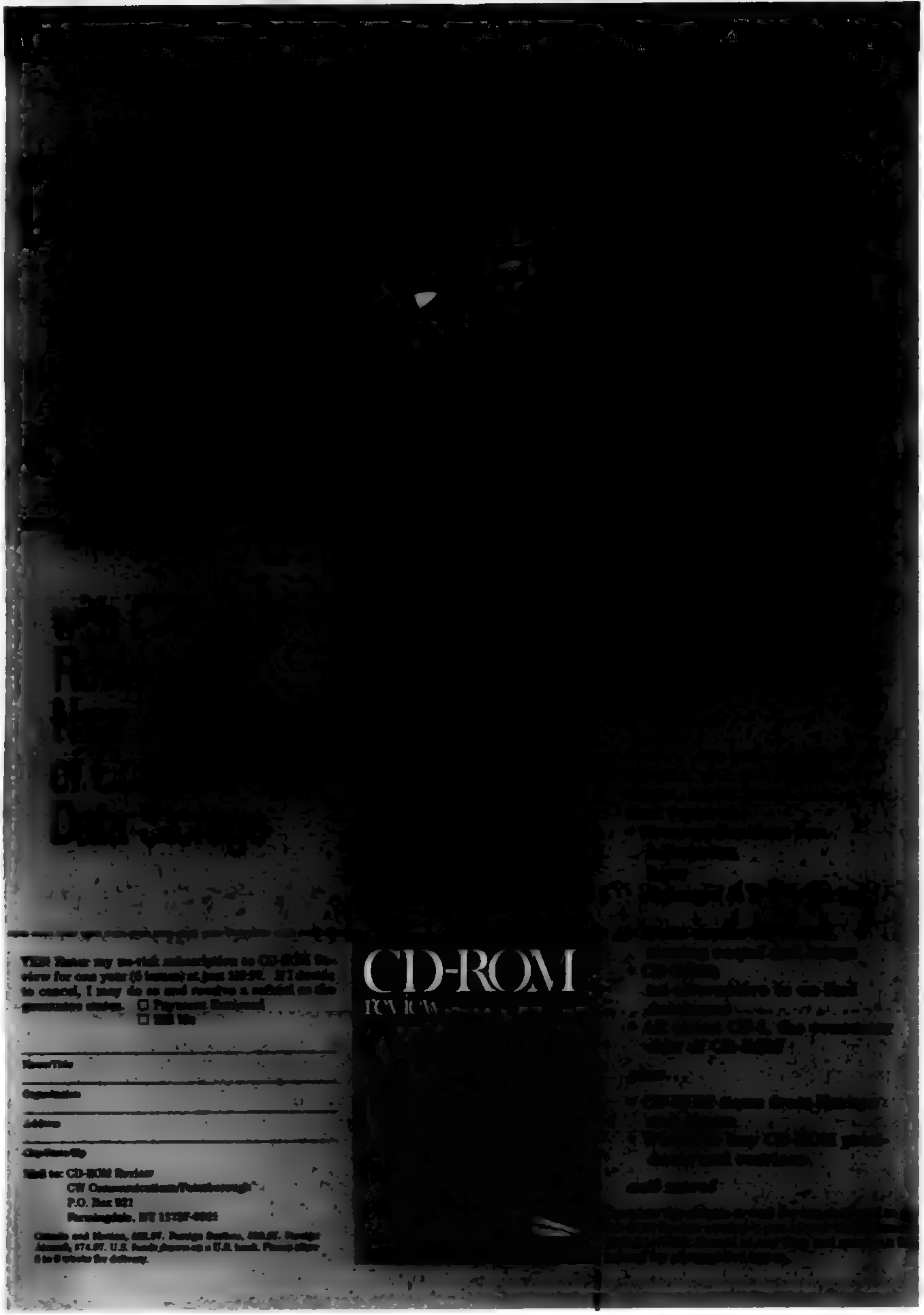
The product uses a bus architecture that operates with zero-wait states, which the company said increases computing speed to 1½ times that of the PC AT. It can reportedly function as a gateway from a local-area network or as a cluster controller supporting Microsoft Corp. MS-DOS personal computers or Digital Equipment Corp. VT100-type terminals.

The 5250 emulation capabilities are said to include all 32 IBM 5251/11 display and field attributes and up to seven simultaneous System/34 through System/38 sessions. It was designed to emulate various IBM display terminals and support twinax and remote communications.

The company said the bidirectional file-transfer software eliminates rekeying errors and enables manipulation of System/34 through System/38 data using personal computer software such as Lotus Development Corp.'s 1-2-3. It also supports various System/34 to System/38 software packages. A hot key allows users to toggle between MS-DOS and System/34 to System/38 sessions.

The company said several 5250-Premium/286 models are available. Options include an AST-5250/Gateway option for a single connection between an IBM Netbios network and a System/34, 36 or 38, an AST 5250/Cluster Controller option supporting up to four additional personal computers and the AST 5250/Async Dial-up option that enables a user at a remote site to run 5250 emulation using a standard telephone line and a modem.

The AST 5250-Premium/286 with 1.2M-byte disk drive, a display and twinax emulation costs $3,095. A 20M-byte version costs $3,595.



Mail to: CD-ROM Review
P.O. Box 921

ADDS system to support 32 terminals

HAUPPAUGE, N.Y. — Applied Digital Data Systems, Inc. (ADDS), has introduced an entry-level member to its ADDS Mentor 6000 series of 32-bit multiuser systems.

The company said the Model 2 is designed to support 32 terminals and printers while using the same architecture of ADDS's larger Models 4, 6 and 8.

"This newest member of the family packs a powerful price/performance punch, making it an ideal solution in a decentralized office environment where large amounts of processing power serving up to 32 users is a requirement," said Robin White, vice-president and general manager of ADDS's Systems Division.

"Its target market consists of fast-growing small businesses which demand sophisticated computing power now and expandability for the future," White continued.

It runs the Mentor Operating System, ADDS's enhanced implementation of the Pick Systems, Inc. Pick operating system and uses a Motorola, Inc. 68020 microprocessor.

The basic configuration includes an 85M-byte disk drive, a cartridge tape drive, 1M byte of memory, eight serial ports, one parallel printer port and a console terminal. That configuration costs $24,000.

IBM enters

CONTINUED FROM PAGE 49

of offering its multiple-CPU VAX 8974 and 8978 high-end systems as alternatives to traditional mainframes.

The severity of the DEC-vs.-IBM confrontation came to light in honest observations made by a couple of managers of combined DEC/IBM computer operations who were interviewed after the 8974 and 8978 were introduced. Each manager runs DEC equipment on the scientific/engineering side of his shop and IBM gear in his commercial operations.

Asked if they had noticed increased efforts by DEC sales agents on the IBM side, the managers expressed surprise. The reverse is true, they said. The real sales push they see is IBM's drive into the technical computing arena, the area in which DEC built its reputation.

The managers acknowledged their circumstances might prove exceptional if it turns out that they happen to be in geographic areas where DEC has not yet beefed up or stimulated its sales force.

Putting in overtime

Those managers said IBM has been working overtime to promote its 4381 small mainframes and 9370 mid-range system as technical computers. They noticed the continuing emphasis IBM has placed on technical computing in every 3090 mainframe announcement.

Much of that promotion has been related to the 3090's vector facility, which lets customers serve commercial and technical users with a single mainframe rather than making them buy separate superminicomputers, such as VAXs, for basic engineering and scientific applications. That strategy fits with what IBM tried to do more than 20 years ago when it developed its 360 mainframe, providing the first single architecture for commercial and technical applications.

Nobody expects IBM and DEC to trade places. One will not see IBM abandoning the commercial DP market, and DEC will not leave the technical market, but it could be interesting during the next year or so to see how the companies offset lost accounts in each market.

It also raises the concern that DEC, with fewer resources than IBM, may insult its longtime technical users by paying too much attention to the IBM-dominated commercial market. Similarly, IBM cannot take for granted the loyalty of what some call "all Blue". MIS shops, which have accepted enough DEC equipment already to make IBM executives take notice. Those executives cared enough to bring 500 MIS executives to Florida recently for the most high-powered briefing session IBM has offered.

Connolly is *Computerworld's* senior editor, systems & peripherals.

M6000

CONTINUED FROM PAGE 49

system, which is based on Pick Systems' Pick operating system.

Like the models they replace, the enhanced systems are said to support between 512K and 1M bytes of memory. The M6415 and M6425 reportedly support up to 225M bytes of disk storage, and the M6635 is available with up to 485M bytes of disk storage. Ports supported a range of 16 on the M6415 to 48 on the M6635.

Prices of the enhanced systems, which range from $26,000 to $41,000, are the same as they were for the comparable earlier models.

Users evaluate

CONTINUED FROM PAGE 49

Wein admitted. "I had some concern that we would have some reliability problems, but that's not been proven. I've been very pleased."

Cal-Surance is using Wang's local-area network, Wangnet, to connect the VS 7150 with 20 users. "That's been working fine also," Wein noted. Once the company implements a Wang-based insurance agency package from Harte Systems, Inc. in Oak Brook, Ill., the number of users will jump to more than 70, Wein said. That is expected to happen by May.

Cal-Surance is currently using the unit with Wang WP Plus and Wang Office for program development, implementation and training activities.

At Midcon, the VS 7150 is used as an executive system, Dowlin explained. "It's the one that all the managers, directors and up to the president of the company are all tied into with the management software that they access."

Midcon uses the VS 7150 to track contracts, points, calculation of supply, planning and sales and delivery, Dowlin said. Midcon follows all of the production data on some 550,000 oil and gas wells each month.

Dowlin said his VS 7150 is connected, via an IBM SNA network, to an IBM 3081, a National Advanced Systems Corp. 6000, two Digital Equipment Corp. minicomputer units — including a VAX — and a Concurrent Computer Corp. minicomputer. There are 90 Wang workstations tied into the VS 7150 and 700 workstations connected to the network.

While an upgrade of the machine would require only a box swap and there would be no problem with the software, "I doubt I'd upgrade," Dowlin said, because his select group of users must have access to data quickly. "I'm not going to load that machine down with users."

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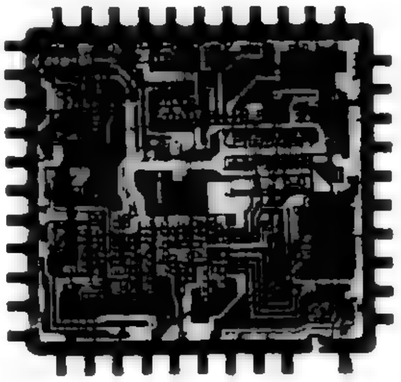

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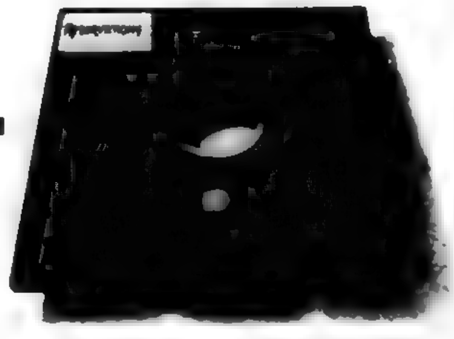

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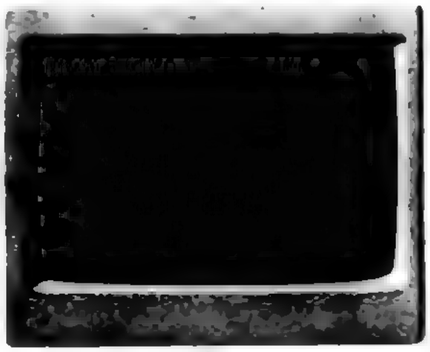

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NEW PRODUCTS

Processors

Nemonix, Inc. has announced **Version 2** of its **Synchronized Clock Accelerator** option for the Digital Equipment Corp. VAX 11/750.

Version 2 provides greater throughput speed. It is a backplane attachment said to increase the clock speed of the 11/750. It incorporates an on-line/off-line switch that enables the user to isolate the accelerator.

The Synchronized Clock Accelerator costs $8,200.

Nemonix, 106 South St., Hopkinton, Mass. 01748.

EMC Corp. has announced a **4M-byte** and an **8M-byte memory board** for the Wang Laboratories, Inc. VS 300 system.

The memory arrays, said to be designed with 256K-byte random-access memory (RAM) and very large-scale integration (VLSI) technology, are compatible with all VS 300 systems. Both boards feature a power light and an activity light for monitoring main memory-level usage.

The 4M-byte memory board costs $19,200. The 8M-byte board costs $38,400.

EMC, 171 South St., Hopkinton, Mass. 01748.

Iverson, Inc. has introduced the **Ivac 750**, an accelerator card for the Digital Equipment Corp. VAX 11/750.

The Ivac 750 is said to improve system speed by providing a new clock that pulses variably, according to the exact time required for each instruction, rather than a fixed pulse. The accelerator plugs onto the back of the backplane of a VAX 11/750.

According to the vendor, the Ivac 750 is transparent to system- and application-level software. It features an on/off toggle switch for returning the CPU to its standard clock.

The Ivac 750 costs $9,950.

Iverson, 850 Auburn Court, Fremont, Calif. 94539.

Aida Corp. has announced three simulation accelerators: the **Personal Simulator Processor** (Persim) **Models 1 and 2** and the **Software Simulator Processor** (Softsim).

The Persim Model 1 is said to be capable of simulating up to 64,000 gates at 1 million gate evaluations/sec. The Persim Model 2 can simulate up to 128,000 gates at 2.5 million gate evaluations/sec. Both models are IBM Personal Computer AT bus-compatible and were designed for use with the Apollo Computer, Inc. DN3000 workstation.

Softsim can handle up to 64,000 gates at 20,000 gate evaluations/sec. It is compatible with any Apollo workstation.

Persim Model 1 costs $7,500. Persim Model 2 costs $20,000. Softsim is included with the Aida Design System.

Aida, Suite 342, 3375 Scott Blvd., Santa Clara, Calif. 95054.

Input devices

Barcode Industries, Inc. has added a series of bar code readers to its **Mindreader** product line.

The bar code readers are said to support IBM 3179, 3180, 3191, 3196 and 5291 terminals as well as Digital Equipment Corp.'s VT220 and VT240, Unisys Corp. UTS-30, AT&T 6300 and 7300, Zenith Data Systems Corp. 148, 150, 151 and 241 and Wyse Technology, Inc. 50.

The readers connect to the terminals as wedges between keyboard and screen. Signals from the bar code reader emulate input from the keyboard. Input devices that are supported include pens, laser scanner and bar code badge readers.

The Mindreader line ranges in price from $595, including light pen, to $2,090 including hand-held laser scanner.

Barcode's ***Mindreader***

Barcode Industries, 17 Barstow Road, Great Neck, N.Y. 11021.

Data storage

Distributed Logic Corp. (Dilog) has announced the **DQ606** floppy disk controller for Digital Equipment Corp. Microvax, MicroPDP-11 and LSI-11 systems.

The controller is contained on a single dual-height board and is compatible with DEC's Mass Storage Control Protocol driver. It is also compatible with standard RX50 drives and media.

The DQ606 is said to store controller specification information in nonvolatile random-access memory. It has an on-board formatter and an 8K-byte buffer. It supports 16-, 18- and 22-bit Q-bus addressing in block and nonblock memory modes and can inhibit the standard direct-memory addressing increment.

The DQ606 costs $950.

Dilog, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

EMC Corp. has introduced the **Falcon Series** of mass storage products for the Hewlett-Packard Co. HP 3000 computers.

The Falcon I subsystem is configured with 388M bytes of mass storage. The Falcon II has 776M bytes of storage. Both combine Winchester disk drives with EMC's disk-cache processing cards, which feature 4M bytes of high-speed cache.

Up to six Falcon I subsystems can be combined in a single cabinet for a maximum capacity of 2.3G bytes of storage. Up to four Falcon II subsystems can be housed in one cabinet for a maximum capacity of 3.1G bytes.

Falcon I is priced at $12,900, and the Falcon II costs $23,400.

EMC, Natick Industrial Centre, Natick, Mass. 01760.

Terminals

Burr-Brown Corp. has introduced the **TM8450**, a multifunction microterminal or numeric data entry application.

TM8450 accepts data both manually and through automatic identification interfaces such as bar code wands, laser scanner and magnetic stripe readers.

The base unit is said to contain display and keyboard with 23 keys. It can operate as a simple display, two 80-character lines at a time; can send and receive block mode data; and can operate as a troubleshooting communications monitor.

The TM8450 costs $795.

Burr-Brown, P.O. Box 11400, Tucson, Ariz. 85734.

Maintenance Equipment

Gen/Comp, Inc. has introduced its **Model 2042 DMA Interface** for the Unibus.

The interface and interprocessor link is said to emulate the Digital Equipment Corp. DR11-W, DR11-B or DA11-B. It features hardware parity generation and checking of transferred data to assure integrity. It provides switch-selectable direct-memory addressing (DMA) pacing. Interface can be selected through the range of 30,000 to 500,000 words/sec.

The Gen/Comp Model 2042 DMA Interface costs $1,000. An optional on-board opto-isolator for long-line data transmission costs an additional $500.

Gen/Comp, 6 Algonquin Road, Canton, Mass. 02021.

Printers/Plotters

BDT Products, Inc. has introduced its **DL-500 Emulator**, a hardware controller said to allow word processing systems to upgrade from daisywheel printers to laser printers.

According to the vendor, the DL-500 provides laser printing capabilities to more than 250,000 stand-alone word processing systems from such companies as Lanier Business Products, Inc. and CPT Corp. The DL-500 Emulator used on these systems provides system compatibility to laser printers from vendors such as Hewlett-Packard Co., Ricoh Corp., Xerox Corp. and Epson America, Inc. It is also compatible with BDT sheet feeders.

The DL-500 is priced from $1,295.

BDT Products, 17152 Armstrong Ave., Irvine, Calif. 92714.

Interleaf, Inc. has announced the **LPR-308** and the **LPR-326S**, two printers compatible with IBM's RT Publishing Software package for the IBM RT Personal Computer.

Both printers feature resolutions of 300 dot/in. The LPR-308 prints 8 page/min and the LPR-326S prints 26 page/min.

RT Publishing Software features integration of text and graphics and a what-you-see-is-what-you-get display.

The LPR-308 costs $8,000, and the LPR-326S costs $25,500.

Interleaf, Ten Canal Park, Cambridge, Mass. 02141.

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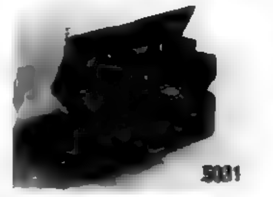

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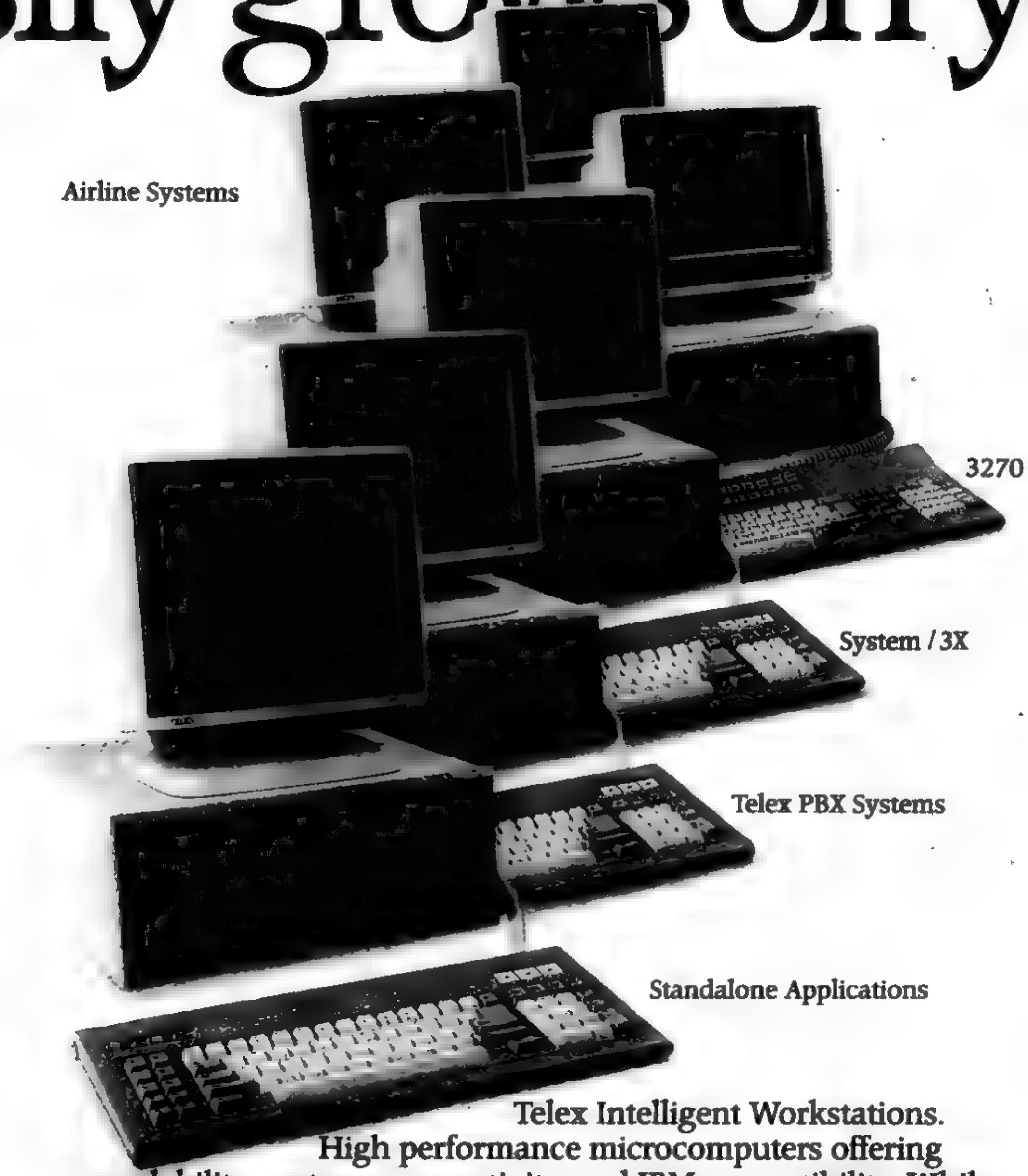

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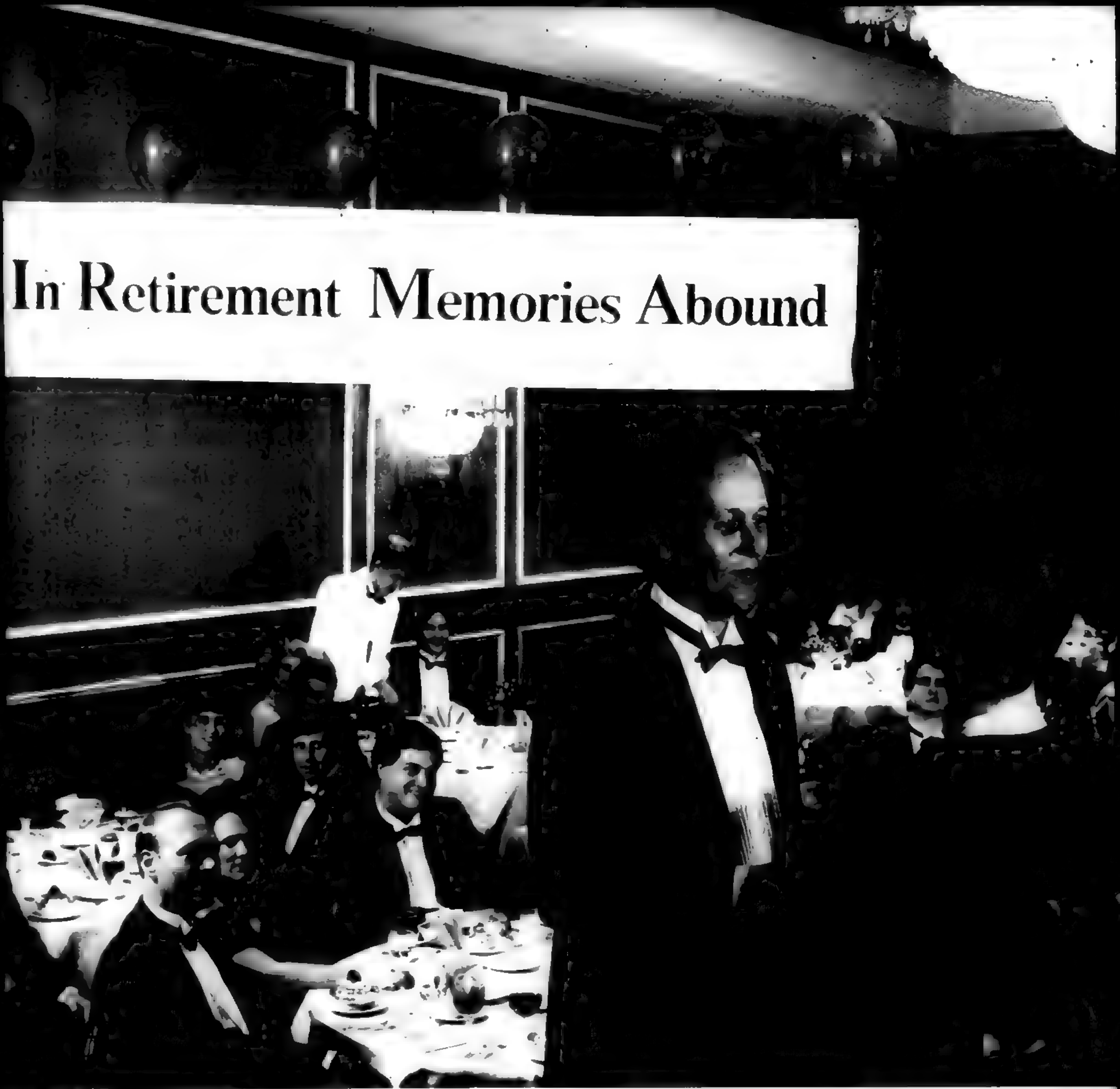

Retire Your PC Coax Connection

The PC-to-host coax connection. She was a good piece of equipment working with coax cable and cluster controllers, but time just passed her by. End users started needing more than simple host access. They also needed their PCs to share resources around the office. That's when local area networks came along to fill the need.

LANs are dramatically increasing office productivity through efficient information management. And Gateways are exploiting LAN versatility by providing cost-effective host communication for PCs and other network devices. Now for thousands of dollars less, LANs and Gateways provide PC-to-PC and PC-to-host communications all without a cluster controller.

INS Gateway PC Adapters are engineered around proven INS SNA 3274 cluster controller emulation. A single INS Gateway PC Adapter in an IBM NETBIOS compatible LAN, including Token Ring, will support up to 32 logical unit sessions. The LAN allows each PC on the network to share disks, printers and other resources while the Gateway allows performance of any host-supported function and maintains host access.

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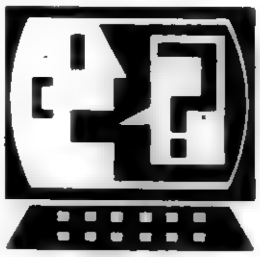
INSIDE

Q & A

Lotus's Maurice Shore discusses application connectivity, the current prevalence of simple file transfer and the need for interface flexibility in tools like T-A-C. Page S3.



Ask the Vendor

Vendors respond to user queries regarding future plans, product capabilities and compatibility issues. Page S7.

Vendor Viewpoint

Politics can get hot and heavy in the three-party process of link selection. The trick is balancing the priorities of MIS applications, MIS communications and end users. Page S8.

State of the Union

Users may have to wait for distributed DBMS networks to reach their potential. Page S14.

Foreign Exchange

Multivendor micro-to-mainframe configuration helps Prudential-Bache clear nearly $5 billion worth of government bonds daily. Page S17.

Product Chart

An easy-reference guide of micro-to-mainframe link software products. Page S19.

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DESIGN EDITOR
Marjorie Magowan

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P. Charles Ladouceur

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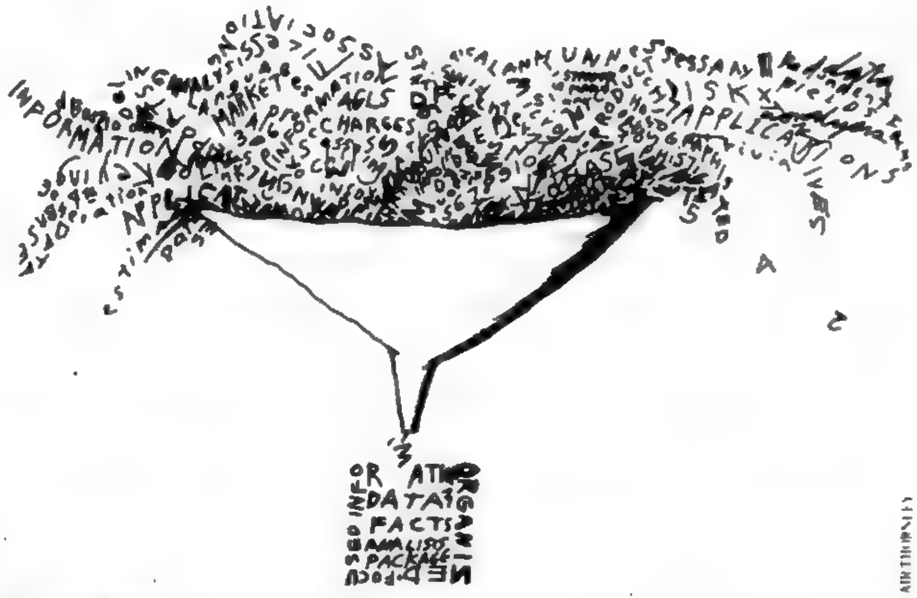
The next step is to make extraction of data from mainframes a user-driven, application-oriented process.

THE WORK CONNECTION

BY MERV ADRIAN



Micro-to-mainframe users are beginning to demand solutions. They have had their fill of partial answers in the form of technologies like terminal emulation or file transfer or applications development tools. Now, what they are really looking for is the ability to get the data they need to get their jobs done — when they need it and in the form they need it.

Until recently, users appeared to be content with much less. Requests usually focused on access to this or that specific data base or the ability to use the information in this or that production report without rekeying.

As a result, not many organizations looked at the problem from an organizationwide perspective. Application by application, they eventually provided access to the necessary data. Programs were written to do the necessary extraction and to set up subset copies of the production data bases for the micro community.

How and why micro-to-mainframe implementation stalled for so long has something to do with the technology's evolution as well as with its basic nature.

At the beginning of the micro era — when these machines were still listed on expense vouchers as "office supplies" — stand-alone applications were perfectly sufficient.

A small spreadsheet for a local need, a little word processing for memos, maybe some rudimentary data bases to support the local salesmen's Christmas lists — these were all we needed.

Eventually, though, people began to realize that they could get double duty out of these new boxes — and, incidentally, help to justify the expense — by using them to emulate terminals. Then it was discovered that, better yet, some of the terminal emulators actually permitted file transfer, so users could move data from the mainframe right into their micros.

It did not take long for reality to rear its ugly head, however. The files were much too big. Even a few thousand records could tie up the micro for hours. The process was quicker than typing in all the data from reports, and it was less prone to error, but the data usually had to be massaged extensively once it was downloaded.

There were loads of unnecessary fields, several times too many records, and every time a slightly different set was needed, someone had to start programming a new request or a new way of extracting the necessary data from that big morass.

Well, we have certainly progressed beyond that now, haven't we? Surprisingly, the answer is no.

Even in large companies that have invested heavily in micro-to-mainframe technology, links are often used for nothing more than simple file transfer.

The reason for this gap between need and actual use is a lack of understanding about what micro-to-mainframe links are and what they can do.

Precisely because these products tend to fall

Adrian is chairman of the micro-to-mainframe Special Interest Group of the New York PC Users Group and a project manager at a New York brokerage firm.

Connection

FROM PREVIOUS PAGE

between two well-developed bodies of expertise that are generally mutually exclusive, a full view of the issues is rare.

A major personal computer-oriented publication, for example, recently presented a cover story on micro-to-mainframe products.

Were there reviews of vendor-specific links from fourth-generation language vendors, products capable of using mainframe storage for micro data accessed as virtual floppy disks or generalized link packages that permit data extraction from a variety of different file formats for transfer to the PC?

No. The article was exclusively about terminal emulation boards.

It would be easy to blame the problem on poor media coverage, but it would not be accurate. Several PC-oriented magazines have done extensive reviews and product comparisons. The mainframe publications have also done their part.

Put more precisely, the problem is that each publication has a different emphasis.

Growing significance

There are a number of reasons that the micro-to-mainframe issue is becoming increasingly significant. These reasons include the following: the growing number of micros in major firms; the growth of applications built around the micro products that have become analytical standards, such as Lotus Development Corp.'s 1-2-3 and Ashton-Tate's Dbase family; and the continuing decentralization of DP work as departmental computing takes hold via local-area networks (LAN) and minicomputers and soon the new IBM 9370s.

As the demand for micro-to-mainframe products has heated up, vendor after vendor has provided micro support, links or stand-alone packages.

This is especially true in the market for information center products. Fourth-generation languages, sophisticated graphics and statistical analysis, financial modeling and so forth have been provided.

Heavy involvement

The fourth-generation-language vendors have been heavily involved in the early stages of this delivery.

One by one, these vendors have created, with varying degrees of success, products that permit the users of their data base management systems and graphics or modeling tools to access and use the data on microcomputers.

A good example of this is Information Builders, Inc.

Information Builders' Focus product is far and away the dominant fourth-generation language.

Installed in 46% of the information centers that use a fourth-generation language, Focus runs in IBM's MVS, DOS and VM/CMS environments; on Digital Equipment Corp. VAXs; Wang Laboratories, Inc. VS hardware; and on AT&T's 3B series under Unix.

Information Builders' PC/Focus was the first, and is still the most complete, implementation of a mainframe fourth-generation language on a PC.

Currently, it is in Release 2.0, and part of the continuing effort to upgrade the product has been the extension of its micro-to-mainframe capabilities.

Incorporates data access

In December, Information Builders took a totally different tack with its marketing with the introduction of the Focus Data Connection.

This product, which is essentially the communications piece of PC/Focus, incorporates the menu-driven Talk technology that has been used throughout the Focus product line for some years now and the Focus Report Writer module from the mainframe product.

Perhaps most significantly, Focus Data Connection incorporates the various interfaces to other file architectures that Information Builders has continually offered and added to with its mainframe product.

The significance of all this is that Information Builders has decided to target another market: the users who may not want or need Focus in its complete form but who do need a general data access method, standard interface and the ability to move data to the personal computer in a form readily usable by micro applications.

The company's success with that exact set of features in its own user community led it to believe that a significant market was out there for similar capabilities in non-Focus shops.

So Lotus in its market, and Information Builders in its, both perceived a ground swell of demand for data extraction and movement and reformatting that was not being met by current products.

These features define the core product that is now being sought by users (see story this page).

What users have now

The next question is this: Are users getting this from anyone today?

What is being delivered today is a bewildering array of products from all sorts of vendors.

To make sense of it all, it is useful to categorize the many efforts that have and are being made, utilizing two broad cate-

Continued on page S4

Data exchange today: It's not just PCs and mainframes anymore

There is a persistent tendency to define micro-to-mainframe products as boards that emulate terminals in an IBM 3270 environment. In fact, the reality is far broader. What is more, rudimentary file transfer capabilities are only one part of the job description.

First, let us dispense with the idea that personal computers and mainframes are the sole components of today's computing environment.

Vastly more complex configurations — involving minis and mainframes from several manufacturers, protocol converters for asynchronous access, local-area networks and more — are needed to satisfy current information exchange requirements.

Data exchange between CPUs may also be involved if PCs emulating terminals on one vendor's system need data residing on a different vendor's mainframe.

These are not simple problems, but they are not insuperable either, and they are just as good an example of workstation-centered data access as an IBM Personal Computer with a Digital Communications Associates, Inc. Irma board communicating with an IBM mainframe running MVS. Micro-to-mainframe links are near the end of their run as an issue. They will increasingly be subsumed by workstation data links.

Just what are the components of a workstation data link? They may be conveniently broken down into three parts that represent the major steps in utilizing the link: data extraction, data movement and data restructuring.

These pieces correspond to the three hardware and software environments involved in the link: the mainframe source data structure, the communications network and the workstation.

Data extraction involves far more than simply finding a file. A number of issues that have plagued information centers revolve around this process. Obvious ones are access, integrity of data and physical availability.

Consider the following: I have security access rights to a file. Even if providing myself and other micro users with that access did not in some way compromise the integrity of that data — for example, by permitting the accidental upload of model data into a production file — it may still turn out that the data is not even available on-line.

The data might, for example, be in a generation data group on tape, which means that the typical micro user may not have the tools or the skill to arrange to have the tape mounted. In fact, the user may not even know how to identify the particular tape at all.

Even if it is assumed that all these problems are solved, however, a serious issue remains: What am I going to do with a typical production file that may run into the millions of records and that may be in a format for which I have no ready access method available?

For example, how can I get data out of a VSAM file, an IMS or an Information Builders, Inc. Focus data base or get the 1,200 records I specifically need from a six-million-record flat file structure? Data extraction deals with all these issues.

THE characteristics of the data link are, or should be, speed, accuracy, generality and transparency.

First, of course, data extraction must provide ready and understandable access to the data. If I have to ask for Cobol code from the DP staff every time I need a newly defined data subset, I am going to run into the same applications backlog that micro-to-mainframe products are supposed to alleviate. It is necessary to have some form of data dictionary that a user can scan to determine which data elements are needed.

Second, data extraction must permit selective or conditional retrieval of the required elements based on some logical screening — for example, state equals Utah — or computation — for example, total sales for the region is greater than $10,000. Note that the computation may not be possible until retrieval time. In the regional sales example, the sales may not be summarised by region until I summarize them as part of the extraction process itself. The product must permit this kind of dynamic postretrieval, pre-output selection capability.

Third, the data extraction component should pass the data to the link with definition information built in so as to facilitate processing across the link itself as well as at the micro end.

Moreover, the data should be compressed wherever possible. Transfer rates being what they are, even carefully optimized queries can take a long time to process if more than a few hundred records are transferred.

Data movement should be relatively hardware independent. That is, it should be viable to use Irma boards, IBM boards, modems with various software packages and so on with the product.

It also follows that the interface should be stable throughout these environments. Other than setting parameters in an asynchronous world where they are required, the user should not have to do anything different if a different link technology is implemented. The characteristics of the data link are, or should be, speed, accuracy, generality and transparency.

The custom wiring of communications protocols for a specific application may be very satisfying for those involved and might even optimize the particular data transfer involved, but in the long run it is the wrong approach. It creates a need for continual in-house support, which is a serious management problem in a very technical field characterized throughout the industry by high turnover.

Furthermore, the acquisition of new technologies, like X.25 or satellite links, imposes a development burden better borne by the commercial product vendors that are committed to supporting the users who are paying them for their services.

Data restructuring is a fairly simple process, yet one that has not received sufficient attention from link vendors. Certainly the improved import capabilities of the current micro packages make it more simple than ever to take data coming in and mold it into the necessary form.

But why should the micro user need to do that at all? The difference between putting some financial data into comma-separated variable form or putting the same data into Lotus .WK1 form, for example, is utterly trivial to the mainframe but significantly less trivial for the micro, especially as the file size increases.

For the user, mastering the particular import commands is a waste of time. The user should be able to ask for data and have it as easily as if the data were already on the hard disk. Obviously, transfer time itself is a limiting factor in the ease of use, but if the data is already structured, the user may never have to leave the application software.

The goal of data restructuring is to present the extracted information to the application in the form it can most easily, efficiently and transparently use.

MERV ADRIAN

INTERVIEW

NEW STYLE INTERFACING

The year 1986 may well be remembered as the year Lotus Development Corp. shook off the "one-product-company" image for good. Amid a host of acquisitions and new product releases, the company moved strongly into a number of areas, some more successfully than others.

In September, The Application Connection (T-A-C), announced in June, began shipping. T-A-C consists of software at both the micro and mainframe ends that is designed to extract, manipulate and transfer data between devices and to format it appropriately with the software at the other end.

Maurice Shore, product manager for Lotus, recently spoke about the product with Merv Adrian.

Can you categorize purchase responses to T-A-C?
It's running to our expectations. Remember, we shipped in September, so the typical evaluation cycle is ending now for the first group.

Your initial mainframe interfaces were all fourth-generation languages rather than production-oriented data base management system products like Adabas from Software AG [of North America, Inc.] or IBM's IMS. Has that succeeded as a strategy?
Absolutely. We've actually discovered some very interesting trends. First of all, it's astonishing how widespread the Focus from Information Builders, Inc. plus SAS from SAS Institute, Inc. combination is. In fact, the "plus SAS" [option] itself is extremely widespread. Another interesting thing we've noticed is that, despite the wide availability of micro-to-mainframe products, and even in shops where some of these products are in-house, the number of people doing straight Irma file transfers is incredible.

No data extraction to speak of?
No, and where there is, it's usually Cobol code written by the traditional DP staff.

You don't seem to be finding demand for those production-oriented packages, then. What are you being asked for?
No. I've been very surprised at how little we've come under criticism for not providing direct bridges to production. We expected it to be much more of an obstacle. The shops we're talking to are already using the fourth-generation languages for access to that data, and, by and large, they're doing a very good job of it. The No. 1 request by far has been VSAM access.

You've committed to an IBM DB2 interface soon. Is that on schedule, and do you expect to tackle VSAM after that?
DB2 is on schedule. Right now we're testing it internally. I can't talk about plans we haven't announced yet.

Can you speak about your philosophy regarding the structure of micro-to-mainframe use in an organization?
It's inappropriate to hem an information center into a purely batch or on-line mode. It's preferable to give users the option to select the mode in which they create the extract program to execute on their machine — on-line, background batch or foreground batch submission. Some firms, with limited use and a high amount of available million instructions per second, want to stay in the on-line environment. Others want to submit queries to batch and store the responses for later processing. Our direction is to give them all those options.

That implies enhanced functionality on the personal computer side: validation, optimal query creation, some knowledge of the mainframe capabilities.
I can't really talk about any specifics at this point.

To date, you've been independent of the communications package in use. Do you see a need for Lotus to get into the link piece itself, either for optimization, as a marketing option or any other reasons?
Let's say this: It certainly makes sense to have a highly integrated offering available as long as we don't twist the arms of our customers who have already evolved their own alternative communications strategy. Most of them have, so our priority is to accommodate them.

So a modular strategy might make sense. You've already done that with both the mainframe and PC interface.
Yes, although there's nothing there yet. But let's go a little further. If you look at what information centers are trying to do for their end users, you could say they're building toolboxes to fit user needs. That translates into buying patterns. In order to accommodate their budgets, they build based on priorities. What vendors have to do is to be intelligent in unbundling the products to permit the customers to get at the pieces they need as they become critical.

Let me make another comment here. Some people are coming to us and saying, "We want to use your data transfer protocol; can you let us have the specifications?" For one reason or another, they don't want or need our complete product. We're trying to work with requests like these as much as possible because we're interested in standards too, and of course we wouldn't mind it a bit if our architecture qualified. That's another example of intelligent unbundling.

I'd like to turn to the micro side briefly before we close. At the rollout of the product, you had a Lotus 1-2-3 interface, a Lotus Symphony interface, which is now shipping, and an Ashton-Tate Dbase interface. There has been some press about you and Microrim working on an R:base piece. Can you talk about that yet?
In the same spirit that we look at standard transfer formats, we've considered it essential to get other products to work with T-A-C if it is to be as successful as we want it to be. Our intent is, as much as possible, to work with other micro product vendors to help them build their own interface to T-A-C. And yes, a perfect example of this is Microrim's release of R:base System V, in which Microrim developed a module with us that provides users with T-A-C integration. Another good example of this would be Ansa [Software Co.'s] interface to us from Paradox. Those interfaces should look like the products they come from, not like some Lotus-imposed standard; that's why we want the vendors to help them provide the interfaces themselves in cooperation with us.

ALAN WITSCHONKE

Maurice Shore

A final question: What is your advice to managers evaluating micro-to-mainframe products for possible purchase? Other than buying Lotus, of course.
Basically it's this: The criteria for success in micro-to-mainframe applications are just the same as they are for the other applications you implement and support. The most critical element of all is to know exactly what you want to do. Every DP manager knows the importance of specs; it's just as true here as it is anywhere else.

We get our share of tire kickers, people who just want to do a strategic evaluation of our product. We accommodate them, but the bottom line is that you can't evaluate a product unless you know what you want to do with it. Buyers must be intelligent about identifying real applications where a connectivity product will yield a rate of return worth their investment in it. ●

Connection

FROM PAGE S2

gories: vendor-specific products and generic ones.

Within each category, there are micro- and mainframe-oriented offerings, although, as will soon become apparent, even these distinctions are beginning to blur.

Vendor-specific products can be recognized by their close relationship to other products produced by the companies that market them. Some products are offered directly by their micro vendors, as is the case with Lotus's The Application Connection (T-A-C).

Introduced in mid-1986, T-A-C consists of software at both the micro and mainframe end that is designed to extract, manipulate and transfer data between devices and to format it appropriately with the software at the other end.

Group effort

Other products are the result of collaborative arrangements, like those Ashton-Tate has forged with mainframe product vendors.

> THE REAL question here is twofold: One, how transparent is the import? And second, how easy is it to select, sort and reformat exactly the data needed?

The latter take the form of strategic agreements that permit the exchange of technical information, allowing one vendor's products to interface optimally with another's.

Given the dominance of Ashton-Tate's Dbase products in the microcomputer environment, it makes a great deal of sense for the company to seek these agreements, which would permit users of its products to import data after extraction from the mainframe vendor's file architecture.

It is less clear, however, whether the mainframe vendors see their best interests being served in this way. If the jointly developed product is their only product offering, it extends the potential use of their products for a client; if they have links of their own, however, it may compete with their own link/workstation product.

Issue: The user

The ability to import data is not at issue here; most micro products can handle output that has been created as flat files, especially if delimiters such as commas are used.

In fact, in any major micro analysis package, the import capabilities are generally robust and easily selected.

The real question here is twofold: One, how transparent is the import? And second — much more important to micro users with little mainframe expertise — how easy is it to select, sort and reformat exactly the data needed?

These two questions define the principal approaches taken by today's vendors.

Considering the micro-vendor-specific products, then, really comes down to understanding how much the transparency of data importation depends on the sophistication of the mainframe access capability.

It is very difficult to create a general data access tool that will permit transparent data extraction from many different mainframe architectures unless there exists a complete product structured in a modular fashion to permit the development of specific interfaces for those different architectures.

For transparency to be implemented, the interfaces must hook to a standardized central engine with a consistent user interface.

Of the big three micro vendors, only Lotus has recognized and addressed these issues so far. Microsoft Corp. has no product to speak of unless Access is considered, which is only a communications tool.

And Ashton-Tate's products depend on the vendors with whom it develops agreements. Even with these agreements in place, specific steps must be tak-

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And programmers can also be more efficient because of all the supporting software IBM has developed: high level programming languages, program generators and extensive programming tools and aids.

A User's Dream

What's more, SQL is based on English, which means that users can easily access information in DB2 files, either directly or by means of products like Query Management

en outside of the microcomputer environment, such as logging on, starting the mainframe products needed, performing the extraction and downloading the results.

Even where some of this process is automated by the mainframe vendor, there is still either a significant learning curve or the need for extensive and continuing DP support for the mainframe product procedures because the process is driven from the mainframe end.

By contrast, Lotus's approach permits the kind of seamless interface best suited to end-user computing.

Alternative strategies

Outside of the big three, the strategy depends on using someone else's product or developing an import facility.

To date, several other vendors have opted to work with Lotus, and a number of interfaces are said to be under development at this time.

Microrim's new release of R:base System V, which includes support for T-A-C, is a good example of this.

In a shop where T-A-C is used, creating an environment that supports it permits continuing end-user access from within R:base itself. The menuing aspects of T-A-C permit development of new queries without DP involvement once interfaces to the necessary files have been created.

There are also micro-oriented connectivity products that are not vendor specific.

Answer Systems, a division of Sterling Software, Inc., offers a product line that includes a general product called Micro/Answer and some tailored versions, including Lotus Answer and Dbase Answer.

The strategy that Answer Systems has pursued is one of developing relationships with micro vendors, notably Lotus and Ashton-Tate.

Formal agreements with these firms have resulted in the ability to create files in the necessary format directly, rather than requiring import processing or reformatting at the microcomputer end.

Extensive development of Application Program Interfaces allows processing efficiency to be addressed. Answer Systems' products, for example, generally submit batch jobs on the mainframe, freeing up links and the micro resources.

The issue of a seamless interface, a key strength of Lotus's T-A-C, for example, is also addressed by Answer Systems' products. All requests result in the creation of batch jobs for which IBM JCL is automatically generated. Submission then takes place without direct user involvement.

OPEN architecture is what makes seamlessness possible. Technology exchange has contributed to a growing ease of use in today's products.

Answer Systems' product line was recently enhanced with the introduction of Answer/Link, one of several licensed implementations of Tempus-Link from Micro Tempus, Inc.

Other vendors have offered Tempus-Link, including Pansophic Systems, Inc.

What Tempus-Link pioneered is the transparent use of mainframe storage as if it were another disk on the PC, a technology known as virtual floppy disks. This approach facilitates the creation of files specifically for PC users by mainframe production jobs. These jobs can perform extractions and create files as part of the normal overnight batch stream.

By centralizing the location of commonly used production data extracts, the load on the system can be minimized through the provision of a common resource for micro users.

Tempus-Link continues to be a major and viable product in its own right; there were more than 1,800 installations in mid-1986. Tempus-Link's architecture pioneered the use of servers on the mainframe and requestors at the workstation. This was a model echoed by IBM's ECF, a product

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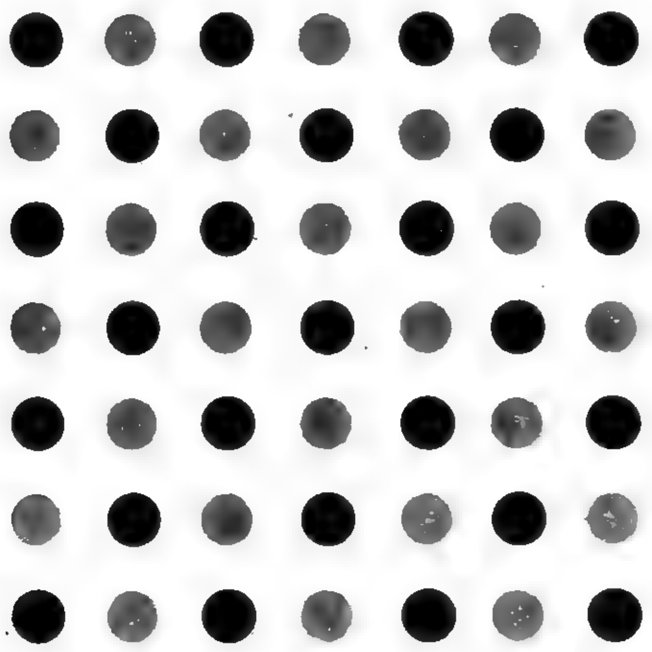

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2-16

DIAL-INQ READER SERVICE NUMBER 19

Connection

FROM PREVIOUS PAGE

introduced in mid-1986. IBM's Server Requestor Program Interface (SRPI) operates in a similar fashion.

Lou Bubala, executive vice-president of Innovative Computer Products, Inc. in Indianapolis, the U.S. distributors of Micro Tempus products, points out that Tempus-Access's Host Application Program Interface (HAPI), an extension of the existing Tempus-Access module, has been "validated even more strongly by IBM's recent connectivity announcements. What IBM is doing with SRPI," he says, "is virtually identical to what our HAPIs have been doing all along."

In mid-1986, Micro Tempus added a new product, Tempus-Access, which directly addresses the seamlessness issue. Tempus-Access is itself a licensed product, Dyl-270 from Dylakor, a division of none other than Sterling Software.

Transparency and seamlessness

These relationships are Byzantine, to be sure, but they make a very significant point: Open architecture is what makes seamlessness possible. Technology exchange by vendors has contributed to a growing ease of use in today's products.

Tempus-Access provides menu access to mainframe data, allows job submission, writes data out to Tempus-Link virtual floppy disks and may be invoked as a memory-resident program on the micro. A major weakness is that it does not create files immediately usable by micro applications, such as Lotus' .WKS or Dbase's .DBF. However, this is not necessarily a serious problem.

The creation of a .WKS or .DBF file on the mainframe is certainly a provocative issue, and it pays real benefits in ease of use at the micro end, but it is not an unalloyed blessing. In fact, the addition of all that overhead to micro file formats creates a much larger file and hence vastly increases the amount of time necessary to transfer data, even via coaxial connections.

The architecture used by Lotus for T-A-C, including a minimal transfer data base describing the data in a few records at the top, looks much more attractive in this light, given that T-A-C handles the importation transparently by reading the transfer data base and processing the data automatically on the micro.

It would not be appropriate to move on to the mainframe-oriented packages without discussing a major development in the communications area. Although it does not fit into the model of a complete link product (see story page S2), the Irmalan product from Digital Communications Associates, Inc. (DCA) is highly significant for a number of reasons.

Let us define our terms here. Of the three pieces addressed in the functional model, Irmalan concerns itself only with the middle block — the actual communications link. The significance of Irmalan is not that it does a better job of providing connectivity but that it provides a connectivity solution to a whole department by hooking a LAN to the mainframe. This is generally referred to as a gateway, and it is certainly not new with DCA's introduction of Irmalan.

However, at the time of the product's introduction, there were more than 300,000 Irma boards installed. That does not include the installations using products from Forte Communications, Inc., which was acquired by DCA in 1986. That volume itself is significant, because what this is is a standard interface, something that users have grown accustomed to.

Irmalan leverages that familiarity, permitting the same interface to be available to LAN users simply by installing hardware in one personal computer — which need not be the file server — and installing software in whichever workstations need mainframe access up to the limits of the board. If users need more sessions, they install another board. It is that simple, providing there are the requisite mainframe lines and ports available.

To its credit, DCA recognized that, to adequately differentiate the product, it needed more than just another pretty interface. The company included as an option the well-developed Forte Communications graphics capabilities, creating a true workstation product with capabilities far beyond those of IBM's 3279-type terminals.

For example, if you are using a 3279 terminal and want to recall an SAS Institute, Inc., SAS/Graph image you have to run SAS again, with all its attendant CPU use — not an easy or inexpensive way of doing things. On the Irmalan All Points Addressable workstation, however, you can store and redisplay the image without even logging on.

Another development on the DCA front is its recent acquisition of Microstuf, Inc., which created Crosstalk, long a dominant asynchronous communications product. Although no information is currently available concerning DCA's possible plans for cross-fertilization, one can certainly speculate that it may be looking to forestall the approach of another company, Simware, Inc. Simware's new Sim/Xfer product supports Irma boards as well as modems, permitting an organization to have a consistent interface for both asynchronous and hard-wired PCs.

VM Personal Computing, Inc. in Danbury, Conn., has recently provided terminal emulation board support with its Relay Gold product for similar reasons.

What all this points out is that communications vendors have realized the value of a consistent interface just as the applications software vendors have.

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these various communications products transparently, as, for example, T-A-C and Linkware Corp.'s Linkware do, the user is spared yet another set of commands to learn.

No vendor of full micro-to-mainframe data access and reformatting capabilities wants to force customers to revamp their communications strategy just to use its product.

The mainframe side

The mainframe-oriented products may also be looked at from the point of view of vendor-specific vs. generic. The issues for vendor-specific products in the micro and mainframe spheres are similar with two exceptions.

First, there is a major divergence in approaches to the desktop, and second, while the micro products concentrate on providing direct access to a number of mainframe architectures, the mainframe vendors try to create one or two general formats on the micro end and rely on the micro packages to take it from there.

The problem with this approach is that unless the vendor has its own micro analysis products integrated with the overall scheme, as Information Builders and Cullinet Software, Inc. do, the user is forced to take additional steps to get out of the link product, start the micro package and import the data before finally beginning to do some work.

By the same token, a user may not wish to be tied to using Cullinet's Goldengate spreadsheet component after learning Lotus's 1-2-3, for example, especially if a large number of analyses have already been developed using the latter. This was a factor in Cullinet's release of Infogate, which allows the user to integrate the micro package of choice into the scheme and keep it under the control of a workstation manager.

For several years, Information Builders has had a complete micro implementation of its mainframe product in PC/Focus and in recent years has added a spreadsheet of its own. There are limits to the product's capabilities on the PC, but they are imposed by hardware and operating system constraints, which may soon be lifted.

Vern Sheidler, director of marketing at Information Builders, says, "We're very excited about the new hardware coming in. The Compaq 386, for example, runs PC Focus three times faster than an AT, and we're still using the same operating system."

Vendors are coming to market with complete implementations or near clones, like Applied Data Research, Inc.'s Ideal Escort or D&B Computing Services, Inc.'s PC Nomad.

The goal of these products is to permit not only communica-

Continued on page S9

ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

Will a future release of Omnilink support direct interfaces to custom-designed, closed personal computer applications so users can upload or download data automatically without having to go into Omnilink?

Allen Banick
Systems analyst
Cedar Sinai Medical Center
Los Angeles

ON-LINE SOFTWARE INTERNATIONAL, INC.: It is our intention to incorporate into a future release of Omnilink a powerful generic Application Program Interface. This interface will allow a user-written application program on the PC to invoke most of Omnilink's host functions. The user program could be written using any of the most common PC languages. For users not wishing to code a program, a powerful script language will be provided.

In addition to controlling Omnilink functions, this Application Program Interface will allow user programs to interact with any other mainframe system. The PC program will have direct interaction with mainframe screen images. No changes to the user programs will be necessary to support different communications boards.

What are VM Personal Computing's plans regarding a network version of Relay Gold? Would such a version allow users to get IBM 3270 screen services without requiring that each personal computer have its own 3270 emulation card? Could users receive Relay error-corrected file transfers?

Rick Hoffman
Senior programmer/analyst
Data Resources, Inc.
Lexington, Mass.

VM PERSONAL COMPUTING, INC.: A network version of Relay Gold will be available this June. Our mainframe software, Relay/3270, allows PCs running Relay Gold to emulate a 3270 terminal without any emulation boards at all. So each PC on a network running Relay Gold will be able to do 3270 emulation without a 3270 emulation board if it is connected to a mainframe running Relay/3270.

We are in the process of developing a mainframe program that will make this hardware-free 3270 emulation possible for Relay Gold PCs connected to MVS/TSO mainframes. Error-free file transfer will also still be possible when connected to mainframes running Relay/3270, Relay/VM and Relay/TSO. You can do this error-free transfer through 3270 emulation boards and protocol converters as well.

How soon will Linkware give IBM Personal Computer users full Digital Equipment Corp. VT240 emulation in 132-column mode with DEC Regis graphics?

Steve Gokorsch
Manager of end-user services
General Electric Lighting
Business Group
Cleveland

LINKWARE CORP.: Linkware is now beta-testing full DEC VT220 terminal emulation. Initially, Linkware VT220 terminal emulation will display 132 columns on 80-column screens using horizontal scrolling or 132-column screens that use the Tseng Laboratories, Inc. video display board. Availability is slated for the second quarter.

Full VT240 graphics terminal emulation, including 132-column and Regis graphics support, is under development and planned for third-quarter release. Linkware VT240 terminal emulation will support the IBM Enhanced Graphics Adapter and Tseng display hardware. Market demand will dictate support for other boards.

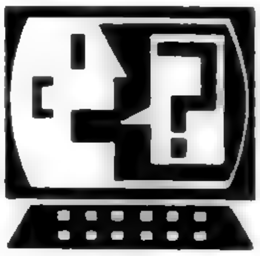
We'd like to stress that these are our current plans and not commitments to product releases, as we have not formally announced either product.

When can we expect Tangram to take advantage of the expanded memories available in personal computers? Does Tangram have plans to make Arbiter compatible with Microsoft Corp. Windows? And are there any plans to offer a program generator that would allow users to build their own LU6.2 applications?

Roland Ebright
Manager, technical services
Scientific Atlanta, Inc.
Atlanta

TANGRAM SYSTEMS CORP.: The PC component of Arbiter requires less than 32K bytes of resident memory for most connectivity options. Since the majority of this memory usage is for executable code, it is not advisable to migrate Arbiter into expanded memory. However, Arbiter allows the user to allocate segments of memory as a cache for data being transmitted between the host and PC. This cache is a candidate and will be migrated to expanded memory in a future maintenance release of Arbiter.

In Arbiter's PC component, the menu and control functions are bound together. We are currently reorganizing this component to segregate these functions. When accomplished, users can integrate Arbiter into Windows or IBM Topview applications. Tangram is currently soliciting customer dialogue to determine the degree of integration into these products that is needed. The reorganization is scheduled for completion by April.



We will release PC and host application program interfaces (API) to several beta-test sites by April. These APIs will allow host applications running under IBM CICS and PC programs to communicate on a peer-to-peer basis via Arbiter's LU6.2 interface. Arbiter will provide peer-to-peer functions even for PCs using asynchronous and IBM 3270 emulation — coax or IBM Synchronous Data Link Control — connectivity options. We anticipate production availability during the second quarter.

Can we expect a universal terminal emulator product for the IBM Personal Computer family of workstations to provide direct IBM Systems Network Architecture, asynchronous and local-area network (LAN) interconnect capability for IBM 3278 and 3279 — meaning seven-color, full-graphics — emulation, and will it also support a similar connection to Digital Equipment Corp. hosts?

Marty Goldberg
Senior systems analyst
Chevron Information
Technology Co.
San Ramon, Calif.

SIMWARE, INC.: It is one of Simware's goals to provide universality in its approach to PC-mainframe integration. This goal includes all of the features mentioned in your question.

Simware currently provides full-featured support for both coaxial and asynchronous communications in SIM 3278/PC, in combination with its sister product, Sim/Xfer.

LAN interconnect is of particular strategic interest to Simware. Research is under way for this aspect of connectivity.

Simware is committed to providing extended color, and development is under way. Some Simware employees are currently using prototype software that provides seven-color support through a coax connection.

SIM PC has DEC VT100 emulation as a feature in its current release. We plan to significantly enhance SIM PC's support for non-IBM hosts to allow users full functionality.

Allegheny International is in the process of installing a number of Digital Equipment Corp. VAXs both at its headquarters and at member companies. What plans does OBS have for creating a VAX version of Excellink to facilitate micro-to-mainframe file transfer?

John Petrush
Microsystems analyst
Allegheny International, Inc.
Pittsburgh

OBS SOFTWARE: OBS has been studying the impact of DEC VAX support in both our software products and remote computing service businesses. While our just-released Version 3.2 of Excellink is focused on improvements for the IBM user, we are considering DEC VT100 emulation and a suitable file transfer protocol for the DEC environment for our next Excellink release.

Does Innovative have plans to release a version of Tempus-Access that will interface with Adabas and Natural from Software AG of North America, Inc.?

Jeff Sorensen
State of South Dakota

INNOVATIVE COMPUTER PRODUCTS: Tempus-Access, developed by Micro Tempus, Inc., has been designed to support a wide variety of data bases commonly found in the corporate environment.

Tempus-Access uses two methods for this compatibility: direct reads to files and data bases and call facilities to data bases that support direct calls.

Currently, Tempus-Access offers direct read interfaces to sequential, ISAM, BDAM and VSAM files as well as to IBM's IMS, DL1 and Cullinet Software, Inc.'s IDMS and IDMS/R as optional product features.

Tempus-Access provides both a call and user exit facility for user routines to interface with most other data bases such as Adabas, Natural, Applied Data Research, Inc.'s Datacom/DB, Total and others that support these calls.

The future direction is to create direct interfaces with data bases that are in line with market demand such as IBM's DB2. •

VENDOR VIEWPOINT

Link politics and the art of compromise

BY JACK RODGERS

Micro-to-mainframe departmental politics is a three-party system involving MIS applications management, end users and MIS communications. Companies face common political problems and obstacles evaluating, selecting and implementing a micro-to-mainframe link.

A successful integration of personal computers into the mainframe environment must take into consideration interdepartmental needs and the balance of power. Political problems can be overcome or avoided completely if a company takes the right approach.

In most areas of corporate game playing, the well-known and generally accepted rules of the game provide guidelines to resolve conflicts. However, the micro-to-mainframe link game is new, and as yet, it has no rules.

The first step in building the right approach to micro-to-mainframe link integration is to understand the special interests of each party involved. MIS applications management wants to minimise the impact of the link on system response time. The extent of that impact depends on how large the files are and how often they are transferred as well as how many users are on the system at one time. But even if the initial work load is acceptable, link usage tends to grow over time.

End users are application oriented. To them, important issues are ease of use, speed and functionality. End-user departments may have significantly different needs, however, as well as different definitions for those terms. MIS communications is a support function to MIS applications management, but the micro-to-mainframe link issue introduces a new element into the political arena.

MIS communications plays a dominant role in the link process: It becomes judge, jury and traffic cop between MIS applications management and end users. Since the link must be compatible with the existing and planned network hardware and software, MIS communications is concerned with issues such as the number of asynchronous ports, dial-up vs. local communications and protocol converters designed for finger speed, not line speed.

End users may not understand data communications, and MIS applications management may not be fully aware of the limits of the network, but MIS communications has to understand them both.

Satisfying the needs of each party is not a problem. The conflict arises when the needs of one party are sacrificed to meet the needs of another. Further, the needs do not even stay the same; — this is a moving-target problem. During the typical requirement of six months to a year for micro-to-mainframe link integration, the environment evolves, and conflict evolves with it.

Not only does the communications network change, but personnel changes also. In some cases, the responsibility for the link switches from one player to another.

IN THE three-party micro-to-mainframe link political system, interdepartmental needs must be acknowledged and a balance of power maintained.

The evaluation phase, in which reviewers screen products to select a few of them for further consideration, is chancy when delegated to an inexperienced user. A negative or prolonged evaluation may result because the user cannot get the micro-to-mainframe link to work. The link might be erroneously dropped before MIS becomes involved, thereby unintentionally avoiding conflict before it begins.

The political climate can really heat up, however, when MIS does not involve end users in evaluation and selection at all.

MIS may do this either because users do not have time or because these tasks are perceived to be MIS functions. A common failing here is neglecting to stress-test the micro-to-mainframe link to consider the end-user volume demand. If the link performs well during testing but bogs down in production, it is too late to avoid a finger-pointing conflict. Either the link is replaced or the use of the existing link is restricted.

How severe this restriction on use can be is illustrated by a Houston oil company. The company, currently seeking a replacement for its CICS-based micro-to-mainframe link, specified this policy: The link cannot be used in production until after 10 pm.

The potential for conflict is greatly increased if a company uses different hardware vendors at different levels.

At one large packaged goods company based in Cincinnati, MIS favored the use of IBM products, which was a standard in the MIS department. End-user departments had Apple Computer, Inc. machines and Digital Research, Inc. CP/M-based computers. The conflict arose because MIS and end users had not agreed upon a standard for the company.

In this case, the link selected supported all three types of computers, but subsequent enhancements for the Apple and CP/M machines had to be limited.

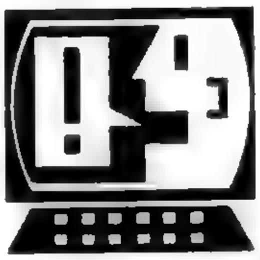
And now, a new conflict rages about micro-to-mainframe link support of IBM vs. non-IBM mainframes. The recent news of Intel Corp. 80386-based IBM microcomputers, incompatible with current IBM Personal Computers, indicates hardware standards will be a continuing source of conflict.

Not only MIS and end users need to be satisfied. MIS communications also has to determine which micro-to-mainframe link solutions are feasible, given the communications network. In all of the above examples, feasible micro-to-mainframe link solutions that could be supported by the communications network were not practical.

In another situation, MIS communications for a Southern California aerospace company required that the link support a specific IBM protocol converter and run transparently on an Ungermann-Bass, Inc. local-area network. Any product that did not meet these communications criteria could not even be considered, regardless of the needs expressed by the other parties.

The conflict was resolved when the end users accepted the limitations of the data communications network.

MIS communications is in direct conflict with end users on the use of autologon scripts. The script feature of micro-to-mainframe links enables end users to complete complex communications and transfers with a simple — sometimes even a one-key — interface. However, using these features means revamping the way that the mainframe network logon process is managed, because the frequent changes that MIS communications often makes in logon procedures would invalidate autologon scripts.



Because the benefits of an autologon are significant and the job of network maintenance is not made impossible — it is only made more difficult — MIS communications usually loses this battle.

Micro-to-mainframe link implementation typically begins with the purchase of a minimum configuration. In a successful integration, the link usually expands and the company purchases a site license. If the needs of each party are not met, however, the link stagnates and is eventually replaced.

Another common cause for stagnation is the hands-in-pocket standoff that occurs when payment is mentioned. The real problems do not occur at the outset, when end users usually pay if the link is primarily a micro link or when MIS pays if the link resides on a mainframe. It is when use of this technology is going to spread, though, that rules must be in place to govern how the additional usage is financed.

Three-way communication

In the three-party micro-to-mainframe link political system, interdepartmental needs must be acknowledged and a balance of power maintained for successful integration. If one party dominates, the wrong link may be elected.

MIS communications plays a well-defined technical veto role but should not otherwise bias the decision. If MIS applications management dominates in the evaluation and selection phases, problems may surface during implementation. If MIS passively accepts the link selection as a service bureau, the result may be less than optimal, however, since vocal end users may satisfy their needs at the expense of other end users or the MIS applications group. Even the best intentioned end users, left completely to their own devices, might select something that meets today's needs but not tomorrow's.

A regional telephone operating company provides an example of what can result from an unbalanced selection process. In this company, the MIS group wound up purchasing a second link product to replace one selected and used by the information center but which was disliked by a coalition of MIS and some end users. The information center, at first reluctant, eventually accepted the new link after a six-month learning and adaptation period.

The task force has been found to be the most successful approach to micro-to-mainframe integration. Representatives from each party form a steering committee to inventory the needs requirements. This inventory evolves into a request for proposal (RFP) for vendors. The coequal committee structure maintains a balance of power. The RFP guarantees that the interdepartmental needs are addressed.

A New England state agency recently used the task force approach in a successful micro-to-mainframe integration. The needs and priorities of every party formed the foundation for a comprehensive RFP issued to vendors nationwide.

But having an RFP does not guarantee that the link chosen will satisfy all needs specified in the RFP. In this case, when the selected link was OBS Software's Excellink product, it did not support all of the required communications hardware. Nor did it satisfy the needs of the end-user departments. OBS had to enhance the product within a specified time frame to meet all the RFP conditions.

The right approach only provides a good start. Micro-to-mainframe integration must be dynamic: It must evolve over time as the environment and needs within the company evolve.

Link technology is composed of different evolving components: file transfer, data management, security, data transformation and network topologies. No one product can provide the flexibility and functionality required in all those areas on a long-term basis yet, since every change creates the potential for new interdepartmental conflicts.

Micro-to-mainframe integration must be constructed on a central open-architecture product that integrates the component technologies. In this way, flexibility and functionality can be maintained over time to successfully deal with moving-target political problems. ●

Rodgers has 16 years experience in MIS management and applications development. He is director of marketing for OBS Software, a division of On-Line Business Systems, Inc. in San Francisco

Connection

FROM PAGE S7

tions and data exchange, but also applications development. Projects can be developed and tested on the micro without tying up mainframe resources at all. The links help prevent duplication of existing modules and can also aid in the creation of test data by subsetting real data and downloading it for simulations.

Even more interesting is the possibility of creating shared processing applications. Local validations and edit checks can precede upload, and download results can determine the direction of continued operations. Still, we are a step or two away just yet.

Another approach, and one that makes no bones about its mainframe orientation, is that of using micros purely as workstations and not as stand-alone development sites. Some examples of this are Software AG of North America, Inc.'s Natural Connection and the Ramis PC Workstation from On-Line Software International.

The latter is not a micro version of Ramis; programs do not run in it, but they may be developed, and queries designed and performed via the mainframe link, with results being downloaded to other packages. All this occurs under the control of a workstation manager that handles menus and the links.

The workstation manager, originally developed separately, has recently been bundled into a cohesive and integrated whole by On-Line Software. In this configuration, it is far more attractive than the Focus link facility, which supports asynchronous communications by presenting the user with a blank screen and waiting for commands to be entered in the modem's command language.

This should not be construed as a fatal flaw on the part of PC/Focus or Focus Data Connection, although it is annoying. More to the point for Focus product users is the huge array of available interfaces to other data structures. IBM's IMS, DB2 and competing vendors' products such as Software AG's Adabas or IDMS, VSAM — can all be read with Focus.

In fact, now that the product runs on DEC equipment and the micro product supports DEC's VT100, it could actually be used as a bridge between IBM and DEC, since the mainframe product is available on both.

It is precisely this flexibility that generic vendors seek to achieve, but this particular vendor-specific product has more interfaces than any of them.

All of this makes it fairly obvious why Information Builders would bring the Focus Data Connection to market. The completeness of the Focus report writer — it is widely perceived as one of the best of its kind — the large number of available interfaces, the ability to join dissimilar file architectures together for reporting purposes, coupled with a menu-driven front end make this an attractive option for shops that do not need the full Focus product.

Based on interviews with Information Builders management, one can expect significant enhancements to the user interface soon. For example, a scripting facility, which remains a major omission, is slated to be released soon.

Competition in the mainframe-oriented market is likely to be between Information Builders and the generic link vendor. No number of features is going to sell a vendor-specific product to a shop that has multiple products with data to access. That shop could, to be sure, purchase all of the proprietary products, and in the absence of general solutions, some have done just that.

But this solution is no solution at all, because it requires the development of a whole host of specialists. As for the rare shops with only one or two mainframe products to support, they are probably considered only a secondary market to these vendors, and if they stay with their vendor's like product, they will most likely get what they need.

IBM is a special case. It obviously loves link products, since it has so many of them. The industry will probably wait a long time for any kind of general solution in this area from Big Blue.

There are a number of interesting products to consider: Linkware, a subsidiary of Ungermann-Bass, Inc.; Arbiter from Tangram Systems Corp.; and Excellink and VDAM from OBS Software. However, the fact is that these products do not constitute total solutions to the issues discussed here. Each falls short of the primary goal of accessing the data needed on the mainframe and extracting just what is desired.

Combinations of strength

One interesting approach, however, is the combination of two products, Linkware and Carleton Corp.'s CQS-Infotec. Linkware, a premier communications package, can provide an outstanding communications environment. Data transfer among dissimilar host environments, such as DEC, MVS, VM and Unix, is possible through commonly used protocols, including asynchronous and X.25 as well as IBM's Systems Network Architecture (SNA).

A nice touch is minicomputer support, an issue we have not discussed here, but one that is highly significant in many large organizations in which minis, more than LANs, are used as departmental solutions.

The Linkware PC interface is attractive and very well organized. Data transformations available include direct .WKS conversions and others, and the scripting allows the development of the seamless applications we have alluded to. What is missing in this product are extensive mainframe data access capabilities. Enter Carleton with a copy of CQS-Infotec in hand. The previously missing functionality is here, with direct access to VSAM, ISAM, Adabas, IDMS and others.

Carleton has no ownership relationship with Ungermann-Bass, parent of Linkware, but there is a certain amount of joint marketing. The two products are well integrated and provide a mix of features that would qualify not only as a complete connectivity product, but as an ultra-high-performance one, especially with Linkware's new VTAM-resident version.

Optimized communications

The optimization of the communications link is an area that has received increasingly more attention in the last year with the introduction of faster modems, VTAM-resident links and the like. Driven by increasingly large demands on their systems as well as greater volumes of data per download as the applications themselves become more sophisticated, companies have begun to look for optimal communications products.

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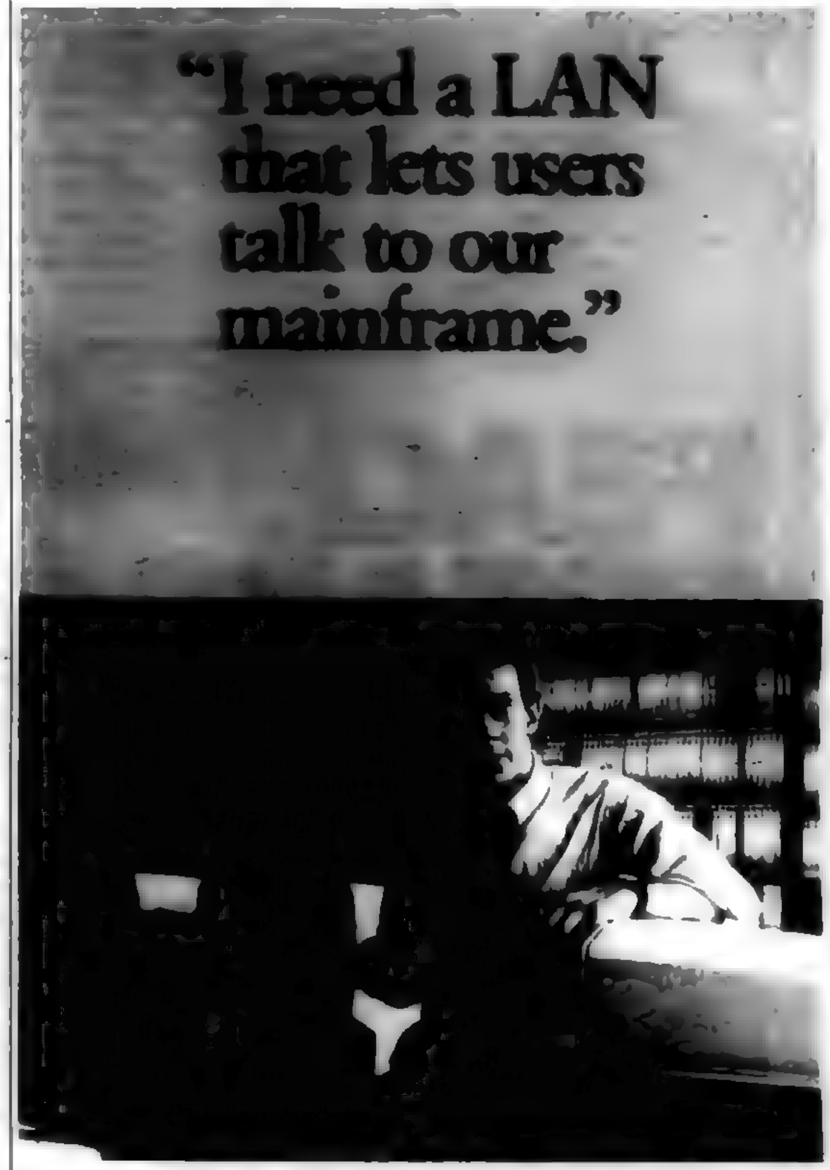
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One example of these is Arbiter from Tangram, a firm formed by some former SAS personnel with a great deal of SNA sophistication. Arbiter is a VTAM-resident application; that is, it bypasses the telecommunications monitor such as TSO or CICS. This strategy improves efficiency by removing a layer of overhead.

It is important to note, however, that the performance benefits of Arbiter do not become apparent for the first few users. A user of TSO gets a certain amount of memory for a working set, and Arbiter uses more than that. Subsequent TSO users get just as much, however, while the Arbiter increment is fairly small. The crossover comes at four or five simultaneous sessions. At that point, Arbiter begins to show its advantages.

Even more interesting is Arbiter's capability of differentiating among the devices to which it interfaces. Instead of simply seeing a 3270 device, Arbiter knows it is looking at an IBM Personal Computer XT, at which level of DOS it is running, how many megabytes of storage it has and so on.

This is a useful management tool in terms of resource reporting, and it also has implications with respect to optimizing the link, since the device drivers are different for dissimilar devices and can take advantage of a particular machine's capabilities. And, of course, with LU6.2 in place, the ability to pass this kind of information back and forth could be used in a variety of interesting ways.

Michael Camp, president of Tangram, says, "It has become obvious to some of the major micro software vendors that they can use the intelligence of the PC for more than file reformatting and directly accessing the host. There is a need to put in layering or messaging software that will allow a user on a PC to kick off tasks which may run on a host or a LAN. The messaging software could more or less act as a traffic cop to receive and distribute the messages, which could be as simple as, 'The batch job is finished' or as complex as reformatting a file."

Background task functions will be able to integrate with Advanced-Program-to-Program Communications (APPC), an early IBM implementation of LU6.2, as if the protocol were brick and mortar, thus providing functionality that APPC promises but cannot itself deliver.

In the current release of the product, for example, Arbiter can be used to multitask on the mainframe: Users can begin an Arbiter session, start a download, then begin a TSO session from the same PC workstation while the download proceeds.

The future

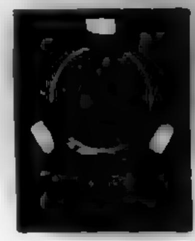
In the next two years or so, there are likely to be more developments than can possibly be covered here. There are, however, some key areas to watch.

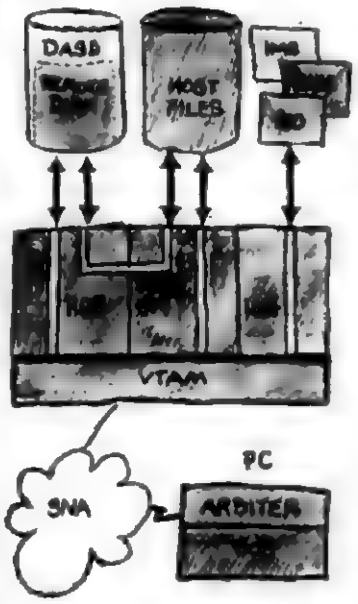
First, there is the continuing evolution of SNA. IBM, of course, wants to keep SNA as the standard for the whole computing community, but there is a competing standard in Open Systems Interconnect (OSI) that may make for some interesting moments.

For example, in principle, Linkware could serve as a bridge between systems running the two environments, although that is not possible today. Linkware's parent company, Ungermann-Bass, has been heavily involved in some of the efforts to promulgate the OSI standard.

The link and application vendors are beginning to butt against some issues that are fundamental to SNA. For example, Information Builders' Sheidler says, "We're all dealing with the dawning realization that the PC is replacing the 3270 terminal. The possibilities of enhancements to user interfaces are huge. In the future, the way that mainframe cycles are used will be very different."

There is a deeper truth here. As discussed above, buzzwords like LU6.2, PU2.1 and APPC are only a piece of the picture. John Crocker, executive vice-president of On-Line Software, points out that "LU6.2 is only a tool. Extensive development must be





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Arbiter interfaces directly with VTAM and executes in its own address space, where it presents none of the performance or integrity exposure problems associated with CICS- or TSO-based link products.

Because Arbiter is a VTAM application, there are fewer layers of software between the PC user and the information, saving processor overhead. Arbiter's advanced data compression scheme also saves valuable network resources.

As a subsystem, Arbiter fully supports RACF and other popular security packages. It also feeds data into IBM's SMF—data you can use to tune Arbiter. Or use for network capacity planning, usage accounting and auditing.

Instead of time-consuming file transfers and data reformatting, Arbiter allows the PC user to access corporate data via remote disks—already formatted for Lotus 1-2-3,® dBASE II® or III,® or other popular software in formats like WKS, DIF® or CSV. Remote disks are accessed exactly like the disks attached to the PC.

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Arbiter has three components. The Remote Disk Environment (RDE) provides a seamless interface to remote disks on the host, which may be accessed by PC users or host application programs. The External File Interface (EFI) transfers data to and from files on the host and the remote disks. The Interactive Session Relay (ISR) allows "power users" to connect a PC to another mainframe subsystem—for example, TSO or CICS—without disconnecting from Arbiter.

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DIAL-IN READER SERVICE NUMBER 22

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devoted to ensuring that the micro end is intelligent enough to handle its duties."

The implications of all this are very interesting. First, expect the vendors to remain poised until IBM lets the other shoe drop and gives some idea of how APPC services and the SRPI will be provided and supported. The required degree of sophistication virtually ensures that no vendor will bring anything to market that might be obsoleted by the full specification of operating system services that are available.

The possibility of allowing users to create their own unique cooperative processing environments is already in the cards, according to Tangram's Camp. "Customers want to build applications where the PCs provide presentation services and contextual editing," he says, "for example, policy processing for insurance companies. We currently have a client who used to use the typical approach: present all transactions to CICS for editing, validation, computation and updates. Using Arbiter, the PC does presentation services and makes conditional decisions for processing [contextual editing], such as prompting for spouse's name if the form indicates 'married' but that field is not filled in."

> THE GROWTH of distributed processing will not only continue but should take a quantum leap with the availability of these tools.

It is safe to predict that the growth of distributed processing will not only continue apace, but should take a quantum leap with the availability of these tools and others like them. Consider that a Focus user today could design a true shared processing application, except for the fact that no ongoing communications can proceed in both directions. While a line can exist between devices, the connection is half-duplex. Until true program-to-program communications arrives, any distributed architecture is too specific to the particular job to represent a real trend.

Nevertheless, serious work on distributed processing has been done by Relational Technology, vendors of Ingres, and Oracle Corp. vendors of Oracle and others. In addition, Cullinet Software is working on a distributed version of IDMS. As services become available to handle dissimilar architectures transparently, it no longer will matter that a network includes a LAN in Chicago, a 9370 in Detroit and 1,000 salesmen in the field, all of whom rely on the central information server machine for the data they need.

Jack Armstrong, Cullinet product marketing manager, information center products, has said on several occasions that Cullinet believes this kind of information resource, centrally stored and managed and serving diverse needs within a large organization, is the architecture of the future, regardless of whether the departmental solution is a LAN or supermicro/small mainframe hardware. For this vision to become reality, the continuing evolution of connectivity will be critical.

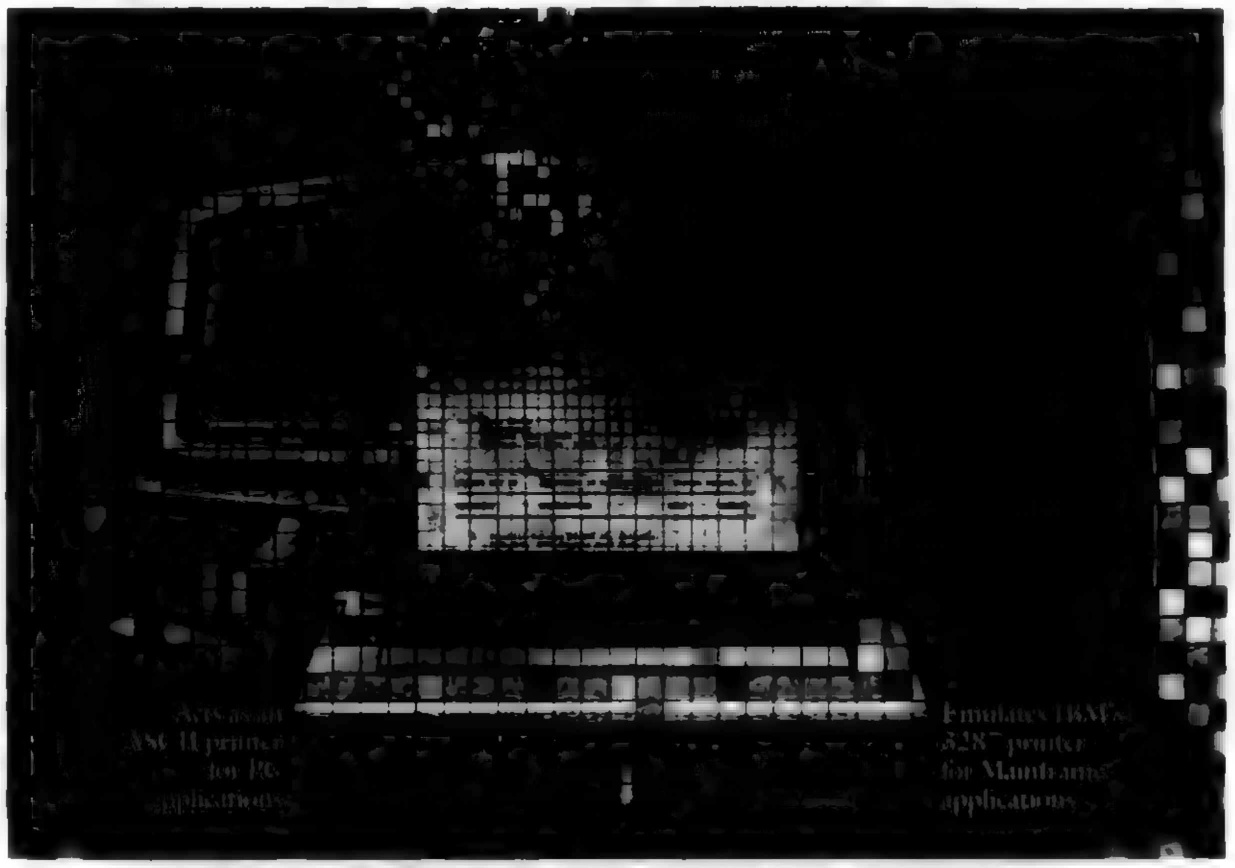
Information Builders' Shiedler acknowledges this and notes, "We have established a formal group on connectivity, and we expect to devote considerable resources to it."

This brings us to this question: Is connectivity just another buzzword or does it represent a new level of functionality?

I believe the latter is true, and in fact, the micro-to-mainframe issue as it is understood today will not even be an issue two years from now, having been subsumed into the larger concerns of connectivity and the workstation data link (see story page S2).

In a true connectivity environment, even a scenario as outrageous as the following could be functional. A file server that is on a LAN that is connected to a departmental processor connected to a mainframe could provide data to a remote workstation asynchronously communicating with another mainframe

Continued on page S19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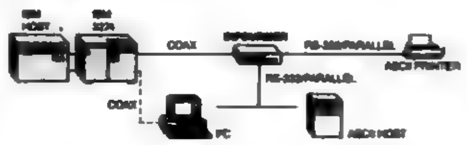

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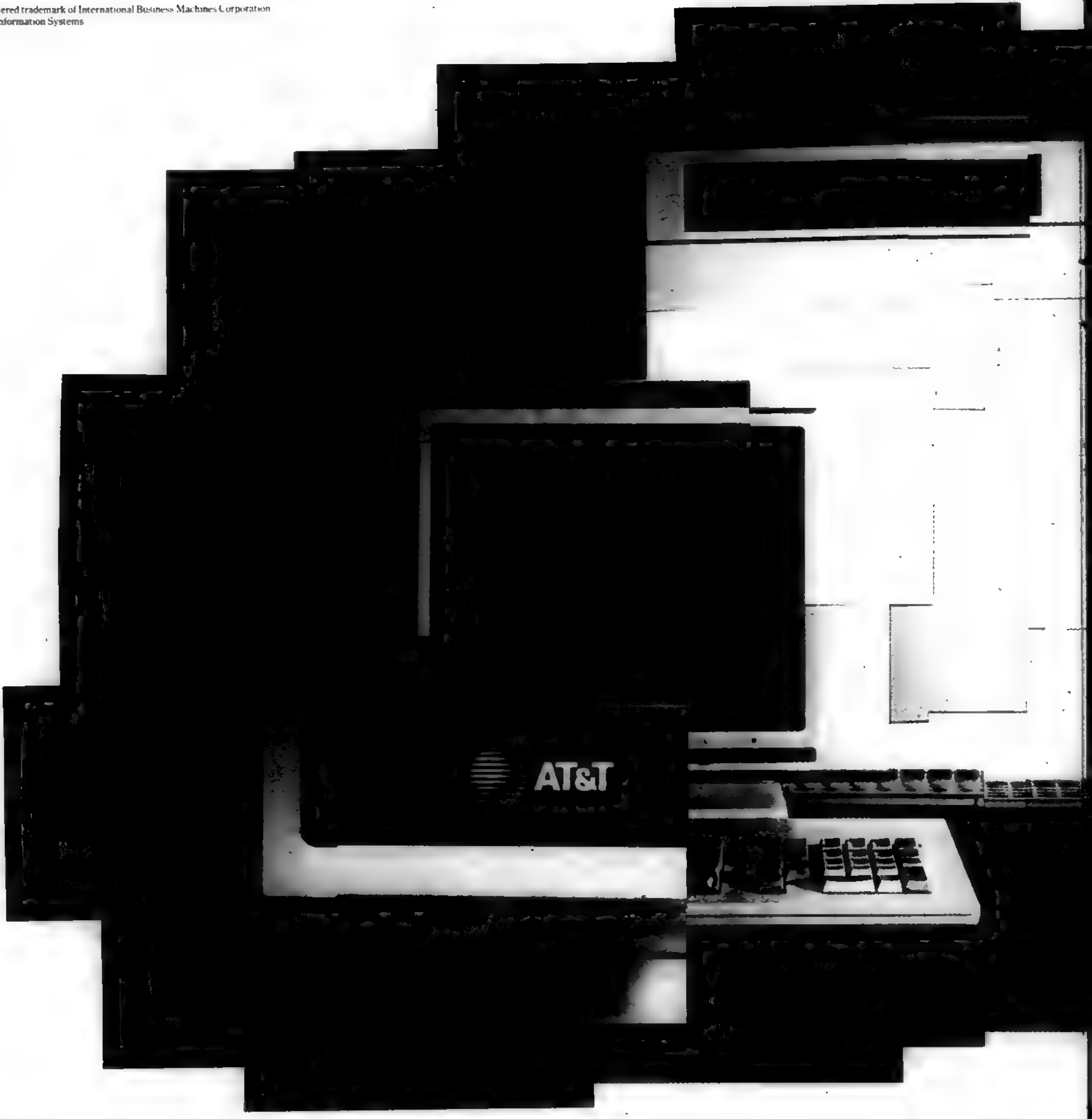

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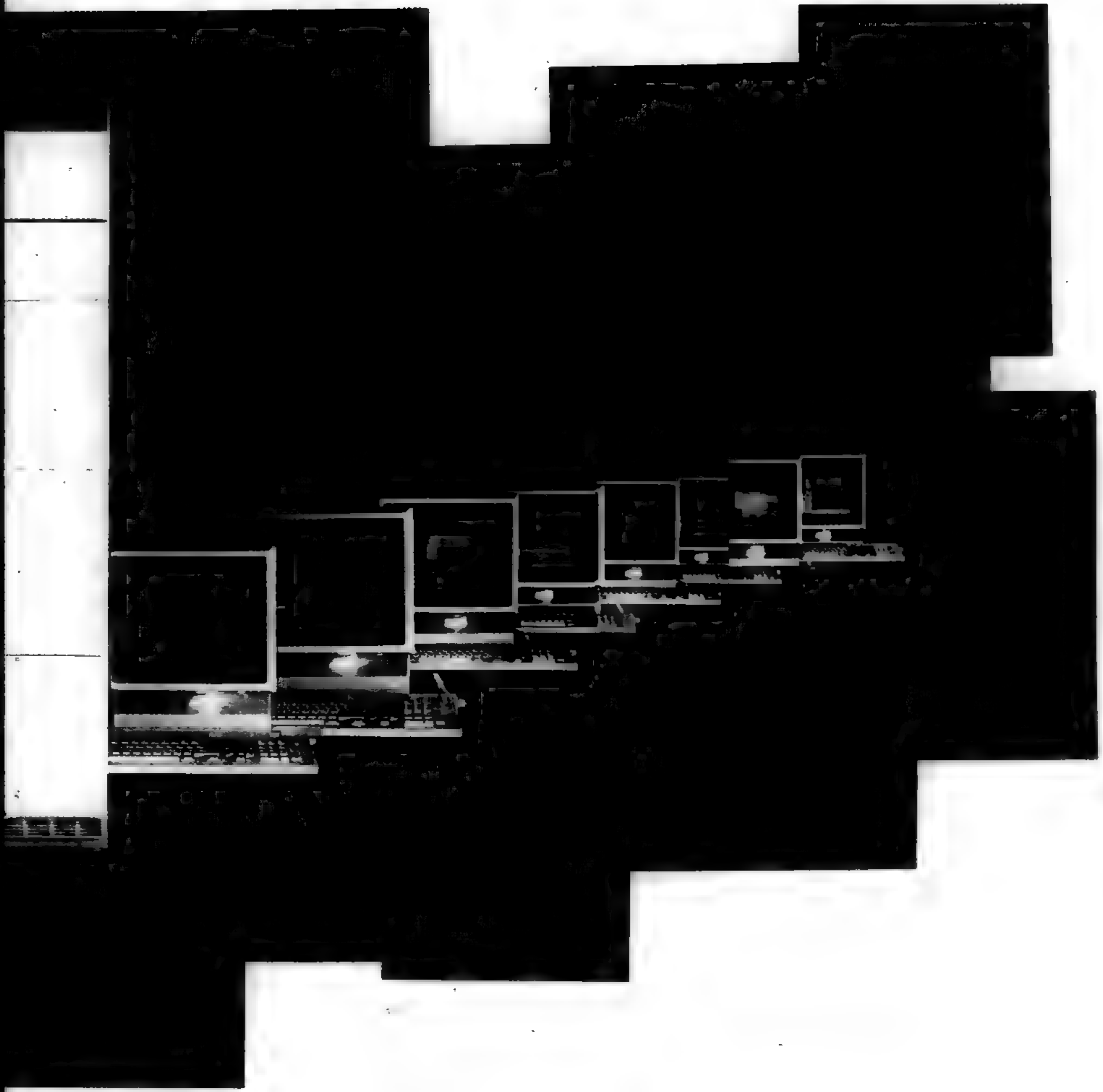

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Sketches of distributed DBMS

BY STEVE FELDMAN

To create a micro-to-mainframe masterpiece, start with a heterogeneous distributed data base management system that spans multiple systems and operates against a range of data base products and file structures. Then give microcomputer users a single relational view of all data stored over the entire computer network.

Make sure this view is transparent so users can query the system without knowing how or where the data is stored, even if information requested is on multiple remote data bases.

Now, add extremely high levels of coordination between data bases residing on individual nodes so the entire system functions with global data integrity, concurrency and recovery. This picture includes support of a two-phase commit and rollback protocol to permit synchronized updating of transactions at multiple sites.

The final touch that is needed is performance optimization so queries are processed in the most efficient manner across the DBMS network.

Compared with this ideal, today's distributed data base management technology seems very crude. Recent releases of the much-ballyhooed Ingres and Oracle products are really no more than preliminary steps.

The industry will probably have to wait at least two years before IBM unveils a networked DBMS, analysts project.

Meanwhile, Oracle Corp. in Belmont, Calif., with its SQL*Star and Relational Technology, Inc. (RTI) in Alameda, Calif., with its Ingres/Star, represent the state of the art in distributed IBM SQL-based DBMS.

Observers point out, however, that the first releases of these products lack extensive system support, provide multisite querying but no multisite update capabilities — an extremely complex chore — and remain untested in performance and integrity.

"Distributed DBMS is totally uncharted waters, and nobody really understands the implications for data base integrity, file recovery and restart recovery," says Michael Braude, vice-president of software research at Gartner Group, Inc. in Stamford, Conn.

"It took IBM eight years to put backup disk recovery for IMS into place just between two processors on a floor. Now you're talking about any number of processors with their own data — not even on the same disk. Just in terms of the file and data integration mechanisms that must be put in place, the problem is awesome," Braude says.

Today's heterogeneous distributed DBMS products support a distributed read (query) environment but not a distributed write (update) environment. "Recovery and update mode must be local with the current products," says James Davey, senior research associate at Digital Consulting, Inc. "Vendors don't offer a distributed data base with full location and replication transparency," he says.

Updating

Nevertheless, many, if not most, applications required by today's users can be satisfied with a networked DBMS that permits updating at a single data base site, Davey notes.

Yankee Group analyst Nina Lytton points to the tremendous challenge of efficiently balancing performance in distributed DBMS networks.

"You're not only dealing with searching algorithms but also complex network tracking issues," she says.

Lytton credits Tandem Computers, Inc. as being the first vendor to deliver highly functional distributed DBMS, which evolved as an integral part of Tandem's fault-tolerant architecture. Tandem partitions data

---

Feldman is a technology writer, based in Boston.

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into mutually exclusive but collectively exhaustive data base subsets distributed across a network. "That means there is no duplication of data between subsets, which together give a sum total of the data base," Lytton explains. "A user can grow his data base in sise just by adding another node."

Oracle and RTI take exception to the picture observers paint of distributed DBMS technology. For example, Oracle points out the following:

- SQL*Star's current support of IBM VM/CMS hosts, Digital Equipment Corp. VAX/VMS, Unix and IBM's PC-DOS satisfies a major portion of the market.
- Oracle's support for a two-phase commit protocol for multisite updating is due this year, along with additional interfaces to non-Oracle products such as IBM's DB2 and ISAM.
- Tandem's distributed DBMS, while homogeneous, demonstrates that data integrity can be preserved in multiupdate environments.

> "NOBODY really understands the implications for data base integrity, file recovery and restart recovery."
>
> MICHAEL BRAUDE
> GARTNER GROUP, INC.

- Academic research and IBM's R* project provide an enormous body of work addressing data integrity and recovery. "Although this has not been implemented and shipped commercially, we have a good understanding of these issues," says Ken Cohen, Oracle's product marketing director.

Oracle emphasizes that SQL*Star is an open system that "faithfully" adheres to IBM's R* specifications.

"We believe the more uncharted course is in administrative procedures," Cohen says, "which will be needed to manage distributed DBMS."

Oracle points out that its pace for delivering increased functionality meets or exceeds users' ability to absorb it. For example, by the time it delivers a two-phase commit protocol, the company says, customers will still be implementing applications for single-site updating.

Standardization on SQL will help drive the integration of mainframe and personal computer processing and simplify development of distributed applications. "Every hardware and software vendor is rushing to develop SQL data base systems," says RTI's Robert McCord, project manager for distributed technology. "This will make our job easier, since we will want to access as many of those SQL engines as possible. This will give us a nice, clean interface to work with."

RTI has formed a five-year partnership with Carnegie-Mellon University, which will be implementing Ingres/Star over its campuswide network. "We're putting all our eggs in the Ingres basket," says Tony Schaller, Carnegie-Mellon's manager of systems development. "We feel that distributed relational systems provide the most capabilities for both developers and querying by the client population. The key thing between the micro-mainframe link is management, and we now feel with our distributed DBMS we have the good software to do the management and handshaking."

RTI has just introduced Ingres on IBM Personal Computers. With this product, networked PC users can run Ingres applications locally that will process data residing on minis and mainframes in distributed configurations. As a bridge between micros and mini and mainframe data base systems, Ingres on a PC will allow users to access Ingres data from heterogeneous distributed systems and use that data within their popular PC packages such as Lotus Development Corp.'s 1-2-3.

In addition, Ingres can also run on PCs in stand-alone fashion. Ingres will enable PCs to act as full-function fourth-generation application development systems. Applications developed on PCs can be ported without change to run on minis and mainframes, according to the firm. ●

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DIAL-IND READER SERVICE NUMBER 26

Untangling the web of multiple-vendor linkage

An MIS acquaintance recently recounted a dream he'd had. In it, he said, a huge computer corporation seized control of the country, wresting power from the weakened reigns of a scandal-plagued president. As its first order of business, the new corporate ruler mandated that only his company's personal computers, mainframes, networking and data base management software would be used throughout the world.

I consoled the man for suffering through such a nightmare.

"What nightmare?" he responded. "They just solved my micro-to-mainframe problems."

It is true that MIS departments and information centers can only dream about a link strategy as simple as connecting systems from a single vendor. Reality is a nightmarish, tangled web stretching across multiple-vendor hosts, micros, minis, emulation boards, data bases, link software, local-area networks (LAN), private branch exchanges, public networks and leased lines.

There is some hope for order, however, as General Electric Co.'s Lighting Business Group in Cleveland discovered when it set about finding a way to connect approximately half of its 1,200 personal computers to both IBM VM and Digital Equipment Corp. VAX hosts. What GE discovered was software from Linkware Corp. in Waltham, Mass. Applications running on the hosts create summary data sets stored within Linkware's host-resident file servers — staging areas accessed by PCs running Linkware's user interface.

"I wanted a micro-mainframe link that looks exactly the same in the IBM world as it does in the DEC world," says GE's Steve Gokorsch, manager of end-user services. "We now have a single interface to train people on and support."

By installing Linkware, Gokorsch has been able to eliminate various link products previously in use, which, he says, "each worked a different way and were driving us crazy."

Support for sanity

Linkware, notable for its broad range of support spanning multiple-vendor hosts, PCs, local-area networks, asynchronous communications, IBM Systems Network Architecture and IBM 3270 protocol converters, was purchased last February by LAN supplier Ungermann-Bass, Inc., exemplifying the trend toward hardware and independent software vendors combining to address multivendor communications.

For example, with Linkware software, an IBM Personal Computer or Apple Computer, Inc. Macintosh user could employ a single menu-driven interface to access remote information on any combination of IBM MVS/VTAM, MVS/TSO, VM/CMS and System/38 hosts; DEC VAX/VMS computers; Hewlett-Packard Co. HP 3000 systems; and Unix machines. Other personal computers supported include the Wang Laboratories, Inc. Professional Computer, DEC's Rainbow and Decmate and Unisys Corp.'s B25.

Linkware President Wayne Benoit says large MIS departments are "tired of trying to support many different link products to deal with the problem."

By focusing on a single multivendor link, information centers will not only simplify training and support, but improve control of information, Benoit stresses.

> IT IS true that MIS departments and information centers can only dream about a link strategy as simple as connecting systems from a single vendor. Reality is a nightmarish, tangled web.

Convincing customers, however, to commit to a comprehensive strategy in today's cloudy and volatile market is difficult. The challenges Linkware faces in selling its broad link solution may shed light on the state of today's micro-to-mainframe marketplace.

Quarters of resistance

The first wall of resistance comes from a market that still underestimates the complexities of multivendor micro-to-mainframe communications — and thus, the workings of Linkware software, according to Linkware Marketing Director Norman Saunders. "People say, 'Why do you want to sell me $25,000 worth of file transfer when I can get Massachusetts Co.'s Kermit for free and Microstuf, Inc.'s Crosstalk for a couple of hundred dollars?' "

Beyond file transfer, Linkware's modular architecture allows the software to do the following:

- Collect and organize summary production data in file servers running on hosts from multiple vendors.
- Transform data into the appropriate format of the recipient PC application or host.
- Provide session-layer control, data security, error-checking data integrity and backup.
- Supply PC users with a menu interface for automatic host logon, file transfer, data translation, Help and library services and a script language for automating terminal transactions.
- Provide tools for programmers to build distributed multiple-vendor applications. These applications render Linkware the communications glue between disparate computers and networks; programmers need little knowledge of communications functions.

However, Linkware does not provide data base extraction. A user's off-the-shelf or custom extraction facilities are used to place data tables in Linkware's host file servers.

For example, an information center could sandwich Linkware communications between Lotus Development Corp.'s generic The Application Connection — which provides extraction from a range of popular data bases — and a Lotus PC front end.

The less PC users see of Linkware the better. Artificial Intelligence Corp. (AIC) in Waltham, Mass., a Linkware OEM, adds value to its natural language extract capability by embedding Linkware into an offering that downloads results running on a PC. "The end user never sees us," says Linkware Product Support Director John Burns. "But we're providing the network support, the error recovery and the scripting totally transparent to the user. So [AIC] can sell a product like this without getting into the communications business."

Linkware often faces charges that its host-resident file servers do not provide direct access to live production data and that they contain redundant information. Benoit responds by saying that MIS requires first and foremost a manageable environment, which Linkware's architecture provides.

"MIS doesn't want end users rummaging through their live applications from a security, integrity and performance standpoint," he says. "And end users just want the piece of information critical to their jobs. Data doesn't reside in one place anymore, but must be cut up and moved to where it's pertinent."

The rest of the story

Nevertheless, Linkware's file server architecture represents just one approach to linking micros and mainframes. Tangram Systems Corp. in Cary, N.C., for example, creates a virtual disk on a host, which IBM PC users perceive as a local disk device. The virtual disk is an application running on Tangram's LU6.2-based VTAM subsystem. File transfer is accomplished by reading from and writing to the virtual disk.

PC users can easily relate to the virtual disk concept and do not have to leave their applications to perform transfers. While Linkware provides a clean, simple user interface, PC users must exit their program to invoke Linkware file transfer. Still, both virtual disk and file server approaches have their respective advantages, observers note.

Claiming 43 of the Fortune 200 as customers, Linkware says the market for micro-to-mainframe links is split between tactical buyers looking for quick and dirty solutions to solve specific problems and strategic buyers planning comprehensive strategies for the long term.

But even strategic buyers proceed cautiously, purchasing "a small set of Linkware code, trying it out and growing from there," Benoit says. Follow-on sales composed 35% of 1986 revenue, according to the firm.

While many MIS shops are reluctant to commit to link technology before IBM plays its full hand, Linkware emphasizes to potential customers that IBM, no matter what its direction, "will not do anything for DEC VAXs, Macintoshes or the HP 3000 family." As IBM's LU6.2 and Server Requestor Programming Interface protocols unfold as standards, Linkware says it will support them.

STEVE FELDMAN

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The little IBM PCs that could: Joining hosts of two vendors

Without human intervention: *PCs mediate between different vendors' hosts.*

In an unusual micro-to-mainframe application involving hosts from two different vendors, four IBM Personal Computer ATs networked on an Ungermann-Bass, Inc. local-area network (LAN) serve as a data collections hub, clearing about $5 billion in government bonds traded daily.

The cluster of PCs has been dubbed "the little engine that could" for its modest but steady performance, chugging data along between an IBM MVS system and a Digital Equipment Corp. VAX/VMS host.

Installed at Prudential-Bache Securities, Inc. in New York, the system continuously downloads batches of trades from government trading systems running on an IBM mainframe to the networked PCs. Clearance-eligible trades that must be settled that day are uploaded automatically to a file server on the VAX. A file management system draws these files from the server for processing to a clearing bank. Trade results are sent back down to the PCs for further reporting and are routed back to the IBM host for bookkeeping.

The system runs without human intervention through network- and processor-independent file transfer software from Linkware Corp. in Waltham, Mass., and uses scripts that are written by Prudential-Bache.

These scripts, which are developed from Linkware's Script language, automate logon and polling and also file transfer functions.

No room for error

"This is a time-critical application," says Peggy DeGraff, Prudential-Bache's manager of government systems. "We have to get about 400 to 600 cash trades over to the VAX every business day.

"There is no margin for error," she says.

The micro-to-mainframe link replaces a system involving manual rekeying at several separate stations, dramatically improving efficiency and limiting opportunities for error, according to Prudential-Bache.

"Before, anytime there was a trade, it was input into the government trading system," DeGraff explains. "Then someone else would key it into a clearance system, then into a bookkeeping system.

"Now, instead of keying in trades three or four times, they're keyed once into the trading system, and the PC network does the rest," she says. "We don't need various clerks all over the place. We now avoid the nightmare of piecing things together when something is keyed in wrong."

PC quartet

Linkware file servers, residing on both hosts, act as staging areas for information needed by the application.

Scripts periodically poll the MVS host server and download files into a server on the PC LAN.

"We put the PCs in the middle to talk to both hosts," DeGraff says.

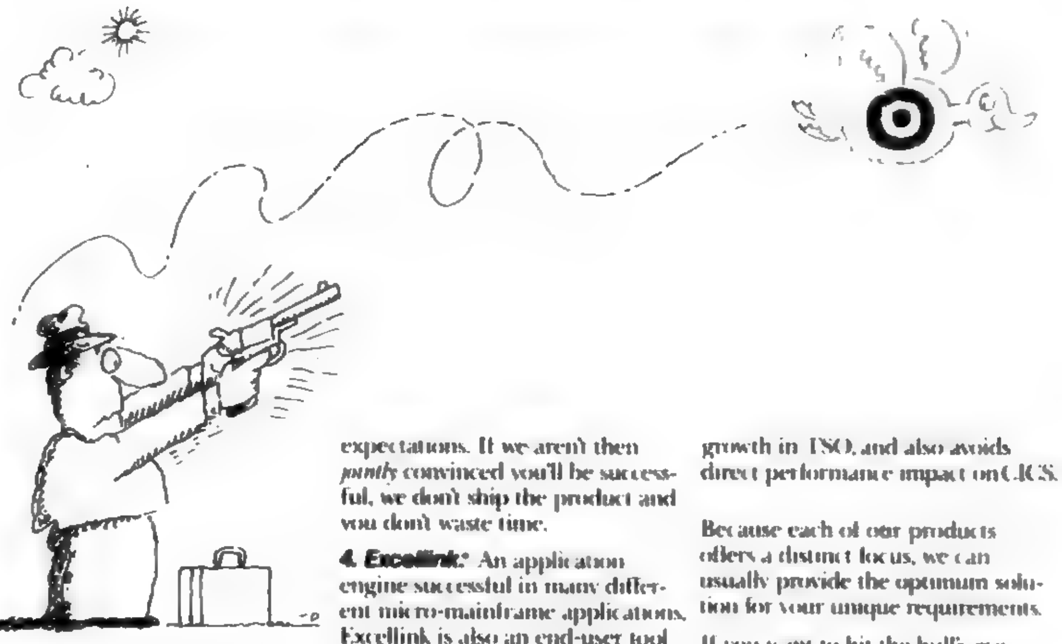
Three of the PC ATs accept file transfers and perform necessary format conversions. "The fourth PC is the central control station, which acts like a traffic cop, handling all the activities the other PCs are bringing it," explains Prudential-Bache's John Quattrocchi, a project manager. The control station maintains a master data base and system statistics.

"The entire system is totally self-supportive," DeGraff says. "No operator has to hit a single key to move files along."

Apart from the application, the control station can also perform transaction queries.

STEVE FELDMAN

Does Your Micro-Mainframe Application Look Like A Moving Target?



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3. Success. Your successful use of our products is what we value. To ensure success, we must first understand your environment and expectations. If we aren't then *jointly* convinced you'll be successful, we don't ship the product and you don't waste time.

4. Excellink. An application engine successful in many different micro-mainframe applications, Excellink is also an end-user tool for ad hoc host access and file transfer. Effective file transfer rates often exceed 100% of line speed due to data compression features. File transfer accuracy is guaranteed, complete transfer status information is available and everything is easy to use.

Through its powerful script language and API, Excellink delivers "one-button" applications for use by novices. XLConvert, our data re-formatting feature, supports all popular PC spreadsheet and database applications.

5. VDAM. An MVS VSAM application, VDAM delivers virtual disk services to end-users, knowledge workers and technicians. It's an easy way to implement centralized control of micro applications, develop integrated micro-mainframe applications, and provide a mainframe alternative to certain local area network applications.

Through its VSAM implementation, VDAM causes no unwanted growth in TSO, and also avoids direct performance impact on CICS.

Because each of our products offers a distinct focus, we can usually provide the optimum solution for your unique requirements.

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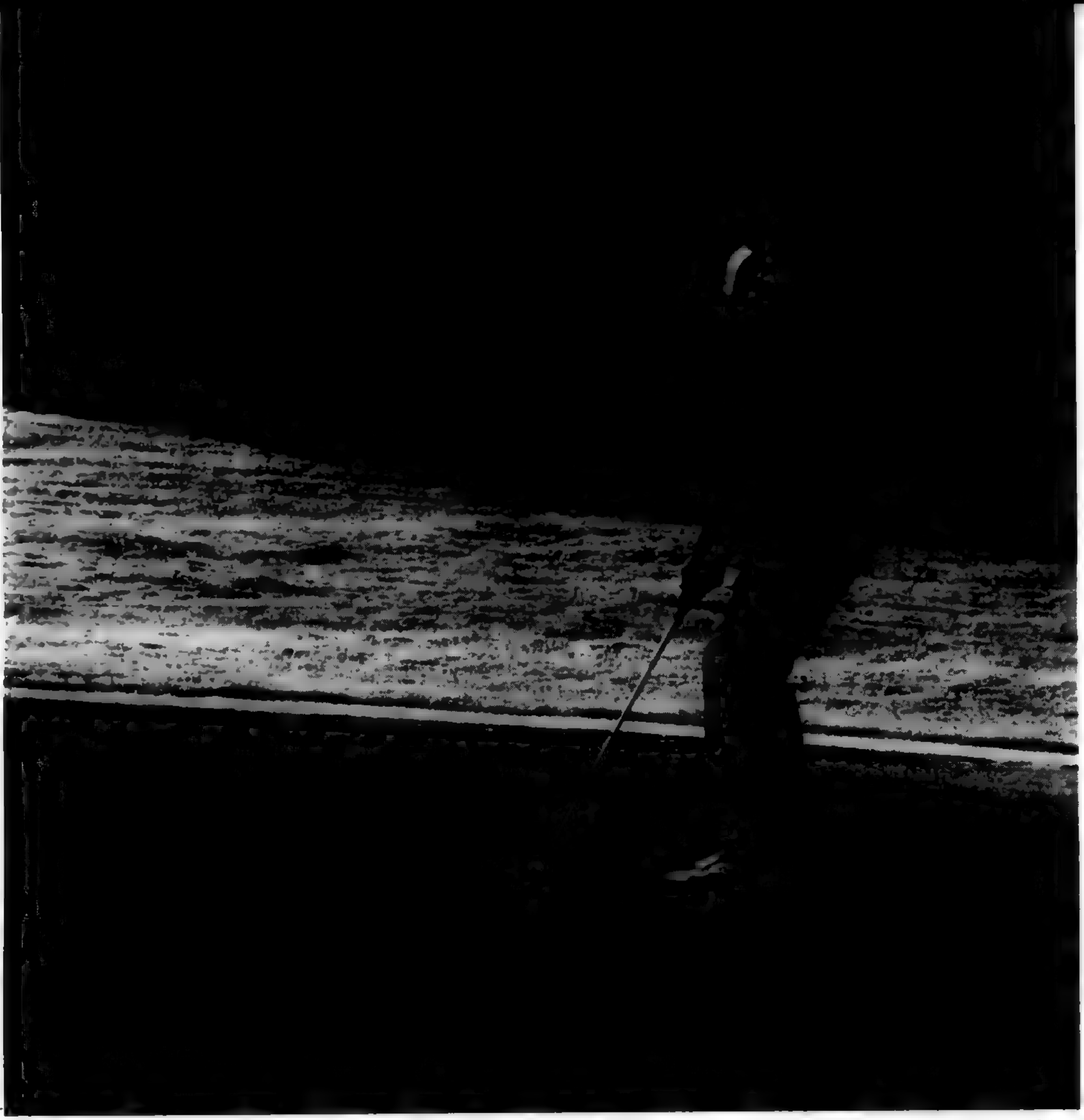
THE INFORMATION TECHNOLOGY LEADERS



Bob Ashworth
VP General Manager
Information Technologies Division
McKesson Corporation
Age: 44
Budget: $65 million
Golfer

With micros, networking and telecommunications becoming more important every day, the influence of Information Services is extending well beyond its traditional boundaries. And with it, the influence of IS professionals. Bob Ashworth and thousands of other aggressive computer professionals like him are clearly on the fast track in America's larger corporations, controlling more than $120 billion every year.

Bob started with McKesson, the world's largest distributor of pharmaceutical products, as a project manager in applications development. His biggest single responsibility: the implementation of McKesson's proprietary Economost micro-based inventory/ordering system for druggists, which has often been credited with the company's fast rise to leadership in the highly competitive pharmaceutical distribution industry. With Economost running smoothly, Bob's attention is primarily devoted to serving the corporation at large. That means providing decision support for those who need it, guiding the company in its acquisition of PCs (600 to date), and assessing the potential applications and value of a corporate LAN.

In his spare time, Bob's an avid golfer, a snow skier, water skier and a jogger.

As you can see, Bob's schedule is full. But if you want to reach him, there's one surefire way.

Send him your message in Computerworld, which he's been reading for 10 years. Bob regards Computerworld as one of the essential tools of the trade. He finds it gives him the big picture far better than any micro book can.

Information Services is full of bright individuals with individual visions. Yet they all seem to have one common insight.

Their favorite newspaper.
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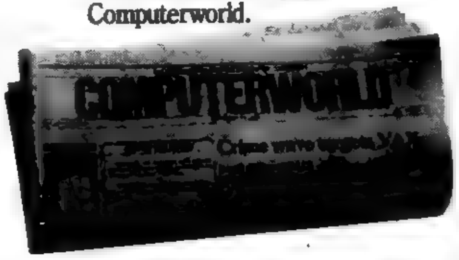

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Micro-to-Mainframe Links

COMPANY	PRODUCT	LAN COMPATIBLE	ACCESSIBLE MAINFRAME DATA BASES	MICRO SECURITY	MAINFRAME SECURITY	SUPPORTS VIRTUAL DISKS	SUPPORTS EXTENDED MEMORY	MENU DRIVEN	DOWNLOAD FORMATS	MICRO MEMORY REQUIRED	EMULATION HARDWARE SUPPORTED	MAINFRAME OPERATING SYSTEM SUPPORTED	SOFTWARE REQUIRED	MICRO PORTION PRICE (PER COPY)	MAINFRAME PORTION PRICE (PER MCU)	DIAL-INFO READER SERVICE NUMBER
Adelie Corp. (617) 354-0400	Close	NA	VSAM	Yes	Yes	NA	NA	Yes	Proprietary	640K	Irma	CICS	NA	NA	NA	582
Agile, Inc. (800) 538-1034	Fusion 3270	Yes	No	No	Yes	Yes	Yes	Yes	NA	128K	IBM 3278, Irma compatible	All IBM	None	Contact vendor	Contact vendor	583
American International Communications Corp. (303) 444-6675	Network Navigator	Yes	QSAM, PDS, CMS	Yes	Yes: ACF 2, RACF, Top Secret	No	No	Yes	ASCII, CSV, DIF	256K	IBM, CXI, Irma, Forte	MVS, VM	NA	$175	$80,000	584
Answer Systems (818) 716-1616	Lotus/Answer	Yes	IMS, VSAM, Adabas, IDMS	Yes	Yes	No	Yes	Yes	1-2-3, Symphony	256K	Irma, Forte, IBM 3278/9, AST, CXI	MVS MVS/XA, DOS/VSE, TSO, IMS/DC, CICS	Answer/DB	$680	$30,000-$45,000	585
	Dbase/Answer	Yes	IMS, VSAM, Adabas, IDMS	Yes	Yes	No	Yes	Yes	Dbase II, III; Framework	256K	Irma, Forte, IBM 3278/9, AST, CXI	MVS, MVS/XA, DOS/VSE, TSO, IMS/DC, CICS	Answer/DB	$550	$30,000-$45,000	
Applied Data Research, Inc. (201) 874-9000	ADR/PC Datacom	Yes	Datacom/DB	No	Proprietary	No	No	Yes	DIF, ASCII	512K	Irma, PCOX, protocol converters, gateways	MVS, DOS	Datacom/DB, Dataquery	$495	Contact vendor	586
	ADR/PC Email	Yes	NA	No	Proprietary	No	No	Yes	ASCII	512K	Irma, PCOX, protocol converters, gateways	MVS, DOS, VM	ADR/Email	$195	Contact vendor	
Artificial Intelligence Corp. (617) 890-8400	PC Link	Yes	Intellect	No	Yes	Yes	No	Optional	WKS, ASCII	256K	IBM 3270/PC, Irma, Microplus, Forte	VM/CMS, MVS/TSO	None	$500	$20,500	587
AST Research, Inc. (714) 863-1333	AST-PCOX	NA	All	Yes	Yes	Yes	NA	Yes	ASCII, Binary	47K	Proprietary	VM/CMS, all MVS, all CICS	Application dependent	$895	NA	588
	AST-SNA	NA	All	Yes	Yes	Yes	NA	Yes	ASCII, Binary	50K	Proprietary	VM/CMS, all MVS, all CICS	Application dependent	$895	NA	
Avatar Technologies, Inc. (617) 435-6872	Macmainframe	NA	IDMS, IDMS/R, Adabas, IMS	Yes	Proprietary	No	Yes	Yes	ASCII, Macintosh Document Format	512K	IBM 3278-2	TSO, CICS, CMS	Avatar HFT	$1,295	$500	589
	PA100 Turbo	No	IDMS, IDMS/R, Adabas, IMS	Yes	Proprietary	No	Yes	Yes	ASCII	256K	IBM 3278-2, 3, 4; IBM 3279-2, 2A, 2B, 3A, 3B	TSO, CICS, CMS	Avatar HFT	$1,195	$500	
Banyan Systems, Inc. ((617) 898-1000	Vines	Yes	Goldengate, PC Focus	Yes	Yes	Yes	Yes	Yes	DIF, ASCII	100K	Any IBM PC compatible	CICS, TSO, MVS, CMS	None	$1,295-$3,995	$1,295 $3,995	590
Barr Systems, Inc. (904) 371-3050	Barr/Hasp	Yes	QSAM	No	No	Yes	NA	Yes	EBCDIC, ASCII, Binary	256K	Barr 2, Barr/3000AB	MVS/JES, VM/RSCS, CDC/NOS	None	$1,290	NA	591
Bridge Communications, Inc. (415) 969-4400	Etherterm 3270	Yes	NA	NA	Yes	No	No	Optional	ASCII	384K	Etherlink	VM/CMS, TSO, CICS	None	$400	NA	592
CAP Gemini Software Products, Inc. (214) 247-5454	Multipro	NA	Multipro Project Library System	Yes	Yes	No	Yes	Yes	ASCII	320K	IBM 3278/9, Irma, PCOX, protocol converters	VM/CMS, MVS/TSO	None	$2,950	$50,000	593

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

Connection

FROM PAGE S11

networked with the first mainframe. There are several areas in which the developments will take place. The first area that will have to be addressed is efficiency. Cullinet's Armstrong says, "Underneath it all, the bottleneck is SNA. Without real breakthroughs in communications capabilities, we have a fairly low ceiling."

A more speculative area is IBM's next generation of desktop machines. IBM has stated that it is not interested in "commodity marketplaces" for cheap boxes like low-level PCs, if that is where the market goes. In marketing, the name of the game is product differentiation, and IBM learned a hard lesson in the clone wars. With a new generation poised to ship, where is IBM likely to do its differentiating?

I believe a good place to look is in connectivity. We have already seen corporate America dig in its heels at the prospect of spending $150 per copy to upgrade 1-2-3 software; is it really likely users will scrap the hardware they have now for new IBM boxes, given the relative price/performance ratios usually associated with new PC-type products from IBM?

More to the point, will a few specialized graphics capabilities, a smaller footprint and incrementally faster CPU speed be enough to spur business to buy? It seems the answer is no. The two pieces that are likely to make a difference are a more powerful operating system and built-in, optimal connectivity.

IBM's powerful advantage with respect to the latter is that it only has to worry about connecting to itself; it can let everyone else scramble to catch up. I believe this is just the bait IBM needs for its hook. By contrast, the operating system, while a key element, is partially in someone else's hands — Microsoft's.

New connectivity facilities could be a fascinating opportunity for Tangram, whose device-driver-based architecture would permit the development of high-end communications software to install with its users. "VM mainframes today, when they first come up, already have several service machines running before a single user logs on," says Jay Kasler, cofounder and senior developer at Tangram.

"That's a model you're likely to see repeated in the future," Kasler says, as multitasking becomes available. The potential to be ready to communicate with a specific and optimized task from power-up is very attractive." ●

COMPANY	PRODUCT	LAN COMPATIBLE	ACCESSIBLE MAINFRAME DATA BASES	MICRO SECURITY	MAINFRAME SECURITY	SUPPORTS VIRTUAL DISKS	SUPPORTS EXTENDED MEMORY	MENU DRIVEN	DOWNLOAD FORMATS	MICRO MEMORY REQUIRED	EMULATION HARDWARE SUPPORTED	MAINFRAME OPERATING SYSTEM SUPPORTED	SOFTWARE REQUIRED	MICRO PORTION PRICE (PER COPY)	MAINFRAME PORTION PRICE (PER MCU)	DIAL-INFO READER SERVICE NUMBER
Carleton Corp. (617) 494-1232	CQS-Infolink	Yes	IDMS, IDMS/R, Adabas, IMS	Yes	Yes	No	No	Yes	PRN, DIF, CSV, Sylk	320K	Irma, PCOX, Forte, Lee Data, IBM 3278	MVS, VM/SP	PL/1 Library, Cobol Compiler	$100-$500	$47,500	594
Cincom Systems, Inc. (800) 543-3010	PC-Contact	Yes	Supra, VSAM, IMS, DL/1, Adabas	Yes	Yes: RACF, Top Secret	No	No	Yes	ASCII, DIF	128K	Irma, PCOX	MVS, VM, DOS	Mantis 4.0	$500	$20,000-$30,000	595
Coefficient Systems Corp. (212) 777-6707	VTERM/220	No	All	No	No	Yes	No	No	ASCII, Binary	256K	IBM CP with asynchronous adapter	RSTS, VAX/VMS, RSX11, M/MT, Unix	None	$245	No charge	596
Communications Research Group (504) 923-0888	Blast	Yes	NA	NA	NA	No	Yes	Yes	Binary	256K	VT100, VT52; Data General D200	[illegible]	None	$250	$5,500	597
Communications Solutions, Inc. (408) 725-1568	Access/SNA 3270	Yes	NA	No	Yes	Yes	Yes	Yes	ASCII, Binary	128K	Any IBM compatible SDLC card	MVS, VM, DOS/VSE	None	$200	NA	598
	Access/SNA APPC	Yes	NA	No	Yes	Yes	Yes	Yes	ASCII, Binary	128K	Any IBM compatible SDLC card	MVS, VM, DOS/VSE	None	$200	NA	
Computer Associates International, Inc. (516) 227-3300	CA-Link	No	CA-Universe, VSAM	Yes	Yes	No	NA	Yes	ASCII, Binary, DIF, Basic	256K	SDLC, Irma, PCOX	VM, DOS/VSE, MVS/XA	None	$100	$9,500-$11,500	599
Computer Corporation of America (617) 492-8860	PC/204	Yes	Model 204	No	Yes	Yes	No	Yes	ASCII, DIF, DBF	384K	Irma, PCOX	DOS, CMS	None	$500	$50,000	600
	Picture/204	Yes	Model 204	No	Yes	Yes	No	Yes	ASCII, DIF, DBF	512K	Irma, PCOX	DOS, CMS	Picture-power	$800-$950	NA	
	PC/Workshop	Yes	Model 204	No	Yes	Yes	No	Yes	User Language Procedure	640K	Irma, PCOX	DOS, CMS	None	$500	$35,000	
Computer Logics (416) 674-1111	PEP	Yes	Mapper, DMS 1100	Yes	Yes	No	No	No	ASCII	256K	Proprietary	OS3,OS/1100	None	Contact vendor	Contact vendor	601
	Comlock	No	IMS, IDMS, Adabas, Mapper	Yes	No	Yes	No	Yes	ASCII	256K	Proprietary	CMS, OS/3, OS/1100, MVS, CMS, MCP	None	Contact vendor	Contact vendor	
Computerized Office Services, Inc. (313) 665-8778	Synchrony	No	None	No	Yes	No	NA	Yes	ASCII	100K	RS-232	Unix	None	$245	$545-$995	602
Comshare, Inc. (800) 922-7979	W/Information Gateway	No	IDMS, DB2, Total, VSAM, SQL/DS, Sequential files	Yes	No	No	No	Yes	ASCII, Binary, DIF, Dbase	512K	Irma	VM/CMS, MVS/TSO, VMS, VAX/VMS	W/[illegible]	$450	$6,400-$13,000	603
Consolink Corp. (800) 525-6705	Microlan 1000	Yes	DB2	Yes	No	Yes	Yes	Yes	ASCII	NA	NA	VAX/VMS	Street Talk	$150	NA	604
	Microlan 2000	Yes	DB2	Yes	No	Yes	Yes	Yes	ASCII	NA	NA	VAX/VMS	Street Talk	$120	NA	
Corvus Systems, Inc. (408) 281-4100	SNA Gateway	Yes	DB2, VSAM, SQL	Yes	Yes: RACF, Top Secret	No	No	Optional	ASCII, Binary	256K	IBM 3278/9	VM, MVS	Proprietary	Contact vendor	Contact vendor	605
Cullinet Software, Inc. (617) 329-7700	C/ICMS	NA	IDMS/R, VSAM, IMS	No	Yes	No	No	Yes	Goldengate, ASCII, DIF, WKS, DBF	384K	Irma, INS, PCOX, Forte	All OS and DOS systems	Goldengate, Infogate	$300-$695	$75,000	606
CXI, Inc. (800) 225-PCOX	PCOX/One-APA	Yes	GDDM, Disspla, SAS/Graph, Telegraph	Yes	Yes	Yes	Yes	Yes	PIF	350K	PCOX	All	None	$595	NA	607
	CXIfile	Yes	CICS, TSO, VM/CMS	Yes	Yes	Yes	Yes	No	ASCII, EBCDIC	NA	PCOX	All	None	NA	$395	
D&B Computing Services, Inc. (203) 762-2511	Beamit	Yes	Nomad2, SQL DB2, IMS, IDMS	No	Yes	No	No	Yes	1-2-3, DIF, Symphony, PC Nomad	64K	Irma, Forte, IBM 3278/9, PCOX	VM/CMS, MVS/TSO	Nomad2	NA	$5,000	608
Datability Software Systems, Inc. (800) 342-5377	RAF	Yes	All VAX/VMS	No	Yes	Yes	Yes	No	ASCII, Binary	256K	VT100, VT220	VAX/VMS, TOPS 20	None	$395	$395-$25,000	609
Dataviz, Inc. (203) 366-4944	Maclink Plus	Yes	None	Yes	Yes: Top Secret, RACF	No	Yes	Yes	ASCII, DIF	256K	Macintosh, Teletype	VS	Omnigate Allegro-server	$350	$495-$4,000	610
Digital Communications Associates, Inc. (404) 442-4000	Irmalink FT/TSO	NA	NA	Yes	No	Yes	Yes	Yes	ASCII, Binary, EBCDIC	128K	Irma	MVS/TSO	None	$75	$125	611
	Irmalink FT/CMS	NA	NA	Yes	No	Yes	Yes	Yes	ASCII, Binary, EBCDIC	128K	Irma	VM/CMS	None	$75	NA	
Diversified Data Resources, Inc. (800) 233-3374	RCOM	No	VSAM, spooler queues	No	Yes	No	No	Optional	Binary, ASCII	96K	Hydra	VM, CICS under MVS, DOS/VSE	None	$69.95	$4,000-$8,000	612

COMPANY	PRODUCT	LAN COMPATIBLE	ACCESSIBLE MAINFRAME DATA BASES	MICRO SECURITY	MAINFRAME SECURITY	SUPPORTS VIRTUAL DISKS	SUPPORTS EXTENDED MEMORY	MENU DRIVEN	DOWNLOAD FORMATS	MICRO MEMORY REQUIRED	EMULATION HARDWARE SUPPORTED	MAINFRAME OPERATING SYSTEM SUPPORTED	SOFTWARE REQUIRED	MICRO PORTION PRICE (PER COPY)	MAINFRAME PORTION PRICE (PER MCU)	DIAL-IN READER SERVICE NUMBER
DTSS, Inc. (603) 643-6600	Datapass	NA	None	Yes	Yes	No	No	Yes	ASCII, Binary	192K	None	GCOS 3, 8, MOD400, Unix, VM/CMS, VAX/VMS	None	$165	$995-$4,900	613
Dylakor (818) 366-1781	Dyl-Vitek	No	IMS, DL/1, IDMS/R, QSAM, ISAM, VSAM, BDAM	Yes	Yes	Yes	Yes	Yes	All	256K	Irma, Forte, PCOX, IDE	MVS, OS, VM, DOS/VE	None	$1,240	No charge	614
Execucom Systems Corp. (800) 531-5038	Link	NA	IFPS	No	Yes	No	No	No	ASCII	512K	Asynchronous, Irma, Forte, IBM 3270/PC	MVS/TSO VM/CMS, Primos, VAX/VMS	IFPS/Plus	$895	$40,000-$85,000	615
FEL Computing (802) 348-7171	Mobius	Yes	All	Yes	Yes	Yes	Yes	Optional	ASCII, Binary	80K	VT100	VAX/VMS, TOPS 10, TOPS 20	None	$250	$3,500	616
1st Desk Systems, Inc. (617) 533-2203	1st Port	NA	All	No	No	Yes	NA	Yes	ASCII, DIF, Sylk	128K	NA	All	None	$295	NA	617
Fox Research, Inc. (800) 358-1010	10-SNA Turbo LAN Mainframe Gateway	Yes	All	Yes	Yes: RACF	Yes	Yes	No	All	512K	IBM 3274	SNA, MVS/TSO, VM/CMS, CICS	File transfer program	$695	$1,995	618
	10-BSC Turbo LAN Mainframe Gateway	Yes	All	Yes	Yes: RACF	Yes	Yes	No	All	512K	IBM 3274	CICS, MVS/TSO, VM/CMS	File transfer program	$695	$1,995	
Gateway Communications, Inc. (800) 367-6555	G/SNAnet	Yes	Any SNA/SDLC supported application	Yes	Yes	Yes	Yes	Yes	EBCDIC, ASCII	256K	IBM 3270/3770 RJE	Any IBM 3270 RJE environment	Any IBM 3270, IND$FILE, RJE environment	$2,530-$4,530	NA	619
Gateway Microsystems, Inc. (512) 345-7791	Synclink	No	All	No	No	No	No	No	Binary, ASCII	256K	Synclink	CICS, TSO, MVS	PCOM, RJE, IBM 3270/SNA/BSC	$995	NA	620
Grafpoint (408) 249-7951	Tgraf-05	NA	NA	No	Yes	NA	NA	Yes	NA	256K	Tektronics	Various	Application dependent	$395	NA	621
	Tnet-05	Yes	NA	No	Yes	NA	NA	Yes	NA	256K	Tektronics	Various	Application dependent	$395	NA	
Hewlett-Packard Co. (916) 786-8000	Information Access	Yes	Image 300	Yes	Yes	Yes	Yes	Yes	WKS, ASCII, DIF	512K	NA	MPE	None	$395	$500	622
Honeywell Information Systems (800) 328-5111	PC 7800	Yes	All GCOS, DBMS	Yes	Yes	Yes	Yes	Optional	ASCII	NA	Any RS-232 port	GCOS	None	$295	NA	623
IBM Information Systems Group (914) 934-4000	IBM PC 3270 Emulation Program 3.0	Yes	VSAM	Yes	Yes	Yes	Yes	Yes	EBCDIC, ASCII	155K	Proprietary	Xenix	IBM PC-DOS	$475	NA	624
Ideassociates, Inc. (617) 663-6878	Ideacomm 3278	No	TSO, VM, CICS	No	No	Yes	No	Yes	ASCII	128K	All	All	None	$995	NA	625
	Ideacomm	No	TSO, VM, CICS	No	No	Yes	No	Yes	ASCII	128K	All	All	None	$895	NA	
Information Builders, Inc. (212) 736-4433	Foctalk	Yes	DB2, SQL/DS, IMS/DB, IDMS, Total, Datacom	NA	Yes	NA	NA	Yes	ASCII, DIF, PRN, WP, 1-2-3	256K	Irma, Forte, PCOX, IBM 3270/PC, IBM 3278	VM/CMS, MVS/TSO, CICS	Focus Report Writer, PC Data Export	$450	Contact vendor	626
Information Resources, Inc. (617) 890-1100	Easytrak	No	Infoscan, Nielson Data, CME, Sam Data	Yes	Yes	Yes	Yes	Yes	DIF	640K	Irma, Forte	VM/CMS, Primos	None	$1,495	NA	627
	PCexpress	No	All	Yes	Yes	Yes	Yes	Yes	DIF ASCII	640K	Irma, Forte	NA	None	$1,495	NA	
Information Technologies, Inc. (800) 431-3440	Linkup	Yes	All	No	Yes	Yes	Yes	Yes	ASCII, EBCDIC, Binary	256K	IBM 3270, 3770, 378	All IBM and IBM compatibles	Application dependent	NA	$720	628
Innovative Computer Products (800) 228-LINK	Tempus-Link	Yes	VSAM	Yes	Yes: Top Secret, RACF	Yes	NA	Yes	PRN	128K	AT&T, Microplus, IBM 3270/PC, Irma, Forte CXI, ITT, Lee Data, Banyan	MVS/TSO MVS/CICS, MVS/IMS VM/CMS DOS/VSE	None	NA	$9,900-$60,000	629
	Tempus-Access	Yes	IDMS, DL/1, VSAM	Yes	Yes: Top Secret, RACF	Yes	NA	Yes	PRN	128K	AT&T Microplus, IBM 3270/PC, Irma, Forte CXI, ITT Lee Data, Banyan	MVS/TSO MVS/CICS MVS/IMS, VM/CMS DOS/VSE	None	NA	$9,900-$60,000	
Integrated Network Systems, Inc. (800) SNA-3270	SDLC PC Adapter	Yes	IDMS	No	Yes	Yes	No	Yes	All	128K	INS	All	None	$995	NA	630

COMPANY	PRODUCT	LAN COMPATIBLE	ACCESSIBLE MAINFRAME DATA BASES	MICRO SECURITY	MAINFRAME SECURITY	SUPPORTS VIRTUAL DISKS	SUPPORTS EXTENDED MEMORY	MENU DRIVEN	DOWNLOAD FORMATS	MICRO MEMORY REQUIRED	EMULATION HARDWARE SUPPORTED	MAINFRAME OPERATING SYSTEM SUPPORTED	SOFTWARE REQUIRED	MICRO PORTION PRICE (PER COPY)	MAINFRAME PORTION PRICE (PER MCU)	DIAL-ING READER SERVICE NUMBER
KMW Systems Corp. (512) 338-3000	SDLC Gateway PC Adapter	Yes	IDMS	Yes	Yes	Yes	No	Yes	All	256K	INS	All	None	$1,995	NA	
	AVSCOM 8400 VME channel interface	Yes	NA	No	NA	NA	NA	NA	NA	2K-10K	NA	All	Application dependent	Contact vendor	Contact vendor	
	AVSCOM 8900 Q-bus channel interface	NA	NA	NA	NA	NA	Yes	NA	NA	8K-32K	IBM	All	Application dependent	Contact vendor	Contact vendor	
Linkware Corp. (800) 356-1212	Linkware Information Server	Yes	None	NA	Yes: Top Secret, RACF, ACF 2	No	NA	Yes	WKS, DIF, PRN, CSV, Sylk	NA	NA	MVS/TSO, Unix, MVS/VTAM, VM/CMS, VAX/VMS	NA	NA	$2,000-$35,000	632
	PC Connection	Yes	NA	No	NA	No	NA	Yes	WKS, DIF, PRN, CSV, Sylk	256K	IBM 3270, PCOX, Forte, Irma	MVS/TSO, Unix, MVS/VTAM, VM/CMS, VAX/VMS	None	$500	NA	
Locus Computing Corp. (213) 452-2435	PC-Interface	Yes	Any Unix data base	Yes	Yes	Yes	Yes	No	All	30K	IBM PC or PC compatible	Unix V.2, Ultrix 1.1, 1.2, 4.2, Xenix	None	[illegible]	$500	633
Management Science America, Inc. (404) 239-2000	Expertlink	No	IMS, IDMS, Datacom/DB	Yes	Yes	No	No	Yes	ASCII; DIF; WKS; WRK; Dbase II, III	256K	CXI, Irma, IBM 3278, 3270/PC, Microplus, PC Pathways	MVS, VSE	Information Expert for file transfer only	$3,000	NA	634
McCormack & Dodge Corp. (617) 655-[illegible]	Interactive PC Link	Yes	IMS, IDMS, VSAM, Adabas	Yes	Yes	Yes	NA	Optional	ASCII	256K	Irma, Forte, CXI, IBM 3278/9, IBM 3270/PC	DOS	None	$1,100	$32,500	635
Metaresearch, Inc. (503) 228-5806	Griffin Terminal-100	No	Chemical Abstracts On-Line	No	No	Yes	Yes	Optional	ASCII, Binary	128K	TEK4012, VT100	VMS, Unix	None	$99	NA	636
Micro Decisionware, Inc. (303) 443-2706	PC/SQL-Link	Yes	VSAM, SQL, DB2, Terdata, Britton Lee	Yes	Yes: Any TSO security package	Yes	Yes	Yes	DIF, IXF, DBF, PRN	320K	Irma, Forte, IBM 3270/PC, 3278/9; SDLC; CXI	MVS, VM	None	$295-$595	$19,800	637
Micro-Integration, Inc. (800) 237-5888	Micro-SNA/3270	Yes	None	Yes	No	Yes	No	Yes	ASCII, Binary	256K	RS-232	All	None	$695	NA	638
	Comxsys	Yes	None	Yes	No	Yes	No	Yes	ASCII, Binary	64K	Proprietary, Irma	All	None	$895	NA	
Micro Tempus, Inc. (800) 361-4983	Tempus-Access	Yes	Total, Adabas, VSAM, IMS, DL/1, IDMS	Yes	Yes	Yes	No	Yes	PRN	84K	Irma, IBM, Forte, PCOX, AST, Microplus	MVS/CICS, MVS/TSO, DOS/VSE/CICS	Tempus-Link	No charge	$13,900	639
	Tempus-Link	Yes	Total, Adabas, VSAM, IMS, DL/1, IDMS	Yes	Yes	Yes	No	Yes	NA	128K	Irma, IBM, Forte, PCOX, AST, Microplus	MVS/CICS, MVS/TSO, MVS/IMS, DOS/VSE/CICS, VM/CMS	None	No charge	$9,800-$60,000	
Midwest Data Source, Inc. (513) 752-3311	Intercom	Yes	DMSII	Yes	Yes	Yes	No	Yes	ASCII, Binary, WKS, DIF	256K	Intercom 1000	MCP	XTRACT, ICC/Link	$295-$745	Contact vendor	640
The MOM Corp. (800) 241-1170	PC/COM-FT	No	None	No	Yes	No	Yes	Optional	DIF, WKS, ASCII, Binary	64K	Irma, Forte, CXI, AST, Quadram, Microplus, Renex, ITT	DOS, MVS, VM	None	$395	$1,000-$2,000	641
	PC/COM-BL	No	None	Yes	Yes	No	Yes	Yes	DIF, ASCII, CSI	256K	IBM, Irma, CXI, Forte	DOS, MVS, VM	None	$195-$695	$2,995-$25,000	
Multi-Soft, Inc. (201) 549-7722	Super-Link	Yes	None	Yes	No	Yes	No	Yes	ASCII, Binary, DIF, PRN	384K	IBM 3270, Irma, PCOX	MVS, VM, DOS/VSE, VAX/VMS	IBM PL/1, Library	$50-$200	$48,000	642
Nastec Corp. (313) 353-3300	Design Aid/Host Link	Yes	NA	Yes	No	Yes	Yes	Optional	ASCII	640K	IBM PC and emulators	DOS, VMS	Tempus-Link	$6,900	NA	643
Network Software Associates, Inc. (714) 768-4013	Adapt SNA	No	VSAM	No	Yes	No	No	No	ASCII, Binary	256K	IBM SDLC	MVS, DOS/VS, DOS/VSE	None	$585	NA	644
On-Line Business Systems, Inc. (415) 391-9555	Excellink	Yes	NA	Yes	Yes: RACF 2, RACF, Top Secret	No	No	Yes	Sylk, WKS, CSV, DIF	128K	Irma, Forte, CXI, Asynchronous	VM, MVS	None	$75-$200	$7,500	645
	VDAM	Yes	NA	Yes	Yes: RACF 2, RACF, Top Secret	Yes	No	Yes	Sylk, WKS, CSV, DIF	128K	Irma, Forte, CXI	MVS	None	$45-$400	$8,500	
On-Line Software International, Inc. (800) 526-0272	Omnilink	No	ISAM, BDAM, VSAM, DL/1, IDMS	Yes	Yes	Yes	Yes	Yes	WKS, DIF, ASCII	256K	IBM 3270	DOS/VSE, MVS/OS, CICS	None	$495	$20,000-$30,000	646

COMPANY	PRODUCT	LAN COMPATIBLE	ACCESSIBLE MAINFRAME DATA BASES	MICRO SECURITY	MAINFRAME SECURITY	SUPPORTS VIRTUAL DISKS	SUPPORTS EXTENDED MEMORY	MENU DRIVEN	DOWNLOAD FORMATS	MICRO MEMORY REQUIRED	EMULATION HARDWARE SUPPORTED	MAINFRAME OPERATING SYSTEM SUPPORTED	SOFTWARE REQUIRED	MICRO PORTION PRICE (PER COPY)	MAINFRAME PORTION PRICE (PER MCU)	DIAL-ING READER SERVICE NUMBER
On-Line Software International, Inc. (800) 526-0272	Free-Link	No	ISAM, BDAM, VSAM	Yes	Yes	Yes	Yes	Yes	WKS, DIF, ASCII	256K	IBM 3270, Asynchronous	DOS/VSE, MVS/OS, CICS	None	$495	$6,000-$10,000	
	Ramlink	No	IMS, DL/1, DB2, SQL/DS, IDMS, Total	Yes	Yes	No	Yes	Yes	ASCII, DIF, Keeprt, Sequential	512K	Irma, Forte, IBM 3278/9, 3270/PC, PCOX	VM/CMS, MVS/TSO, CICS, MVS/OS, TCAM	Rams	$375	$49,000-$115,000	
Oracle Corp. (800) 345-DBMS	SQLstar	Yes	Oracle, DB2	Yes	Yes	NA	Yes	Optional	WKS	640K	Irma, IBM 3270, Decnet	MVS, VM, Unix, VMS, AOF, Primos, UTF, GCOS, VF	Application dependent	$695-$1,695	Contact vendor	647
The Orion Group, Inc. (415) 548-0947	SNA 62 Peer Communications Facility	No	NA	Yes	Yes	Yes	NA	Optional	NA	256K	NA	Any IBM	None	NA	NA	648
	DIA Source/Recipient Facility	No	NA	Yes	Yes	NA	NA	Yes	NA	256K	NA	Unix	None	NA	NA	
Package Solutions, Inc. (516) 752-1640	Bloom M-3700	No	NA	No	No	No	No	Yes	ASCII	64K	IBM 3780/2780	MFT, NVT	None	$895	NA	649
Pansophic Software Corp. (800) 323-7335	Panlink	Yes	None	Yes	Yes	Yes	Yes	Yes	ASCII	16K	Banyan Server, IBM 3278/9, PCOX, Irma, INS, AST-SNA, AST-BSC	CICS, CMS, TSO, IMS	None	NA	$9,900-$60,000	650
	The Corporate Tie	Yes	All	Yes	Yes	Yes	Yes	Optional	ASCII	16K	Irma, Forte, Macroplus	CICS	NA	NA	$18,000-$42,000	
Pathway Designs, Inc. (617) 237-7722	PC Path	NA	All	Yes	Yes	Yes	Yes	Optional	Any	256K	SNA 3270, Proprietary	All	None	$890	NA	651
	Netpath	Yes	All	Yes	No	Yes	Yes	Yes	Any	256K	Proprietary	All	None	$2,495-$4,495	NA	
Performance Software, Inc. (804) 794-1012	Masterlink	Yes	VSAM, Spooler files	Yes	Yes: Top Secret, RACF	No	No	Yes	CSV, DIF, ASCII, Binary	40K	Irma, CXI, AST, Hydra, ITT, Forte, Renex	DOS/VSE, MVS	CICS	NA	$6,500-$9,500	652
Persoft Inc. (608) 273-6000	Smarterm 240	Yes	NA	No	No	NA	NA	Yes	ASCII, Binary	512K	NA	Any DEC operating system	None	$295	NA	653
	Smarterm 400	Yes	NA	No	No	NA	NA	Yes	ASCII, Binary	192K	NA	Any Data General operating system	None	$149	NA	
Phaser Systems, Inc. (415) 434-3990	VDAM	Yes	IDMS, IMS, CICS	Yes	Yes: ACF 2, RACF, Top Secret	Yes	Yes	Yes	EBCDIC, ASCII, field translation	64K	IBM 3278/9, 3770, 3276, asynchronous	MVS	ACF, VTAM	Free	$9,000-$50,000	654
Polygon, Inc. (314) 576-7700	Poly-Star	Yes	Datatrieve	No	No	No	No	Yes	ASCII, Binary	400K	VT100, VT52, VT220, VT241	VAX/VMS	Poly-XFR/Host	$300	$585	655
Protocol Computers Inc. (818) 880-4900	Smartlink	Yes	VTAM	Yes	Yes	No	Yes	Yes	ASCII, Binary, EBCDIC	128K	NA	VMS	None	$195	NA	656
Quadram Corp. (404) 923-6666	Mainlink Plus Coax Connection	Yes	All	Yes	NA	No	No	Yes	ASCII, Binary	384K	IBM 3278/9, 3287	All SDLC-supported operating systems	Application dependent	$1,145	NA	657
	Mainlink Standard Coax Connection	Yes	All	Yes	NA	No	No	No	NA	96K	IBM 3287/9, 3287	All SDLC-supported operating systems	Application dependent	$895	NA	
	Quad3270 Gateway	Yes	All	Yes	NA	No	No	Yes	ASCII, Binary	128K	IBM 3278/9	All SDLC-supported operating systems	Application dependent	$3,290-$5,742	NA	
Relational Technology, Inc. (800) 4INGRES	Ingres/PCLink	Yes	Ingres	No	Yes	Yes	No	Yes	ASCII, Binary, WKS, DBF, DIF, Sylk, WK1, WRK, WR1, DBF II, DBF III, Ingres	256K	VT100, VT220	VAX/VMS, Unix, VM	No	$200	$22,000	658
Renex Corp. (703) 491-3300	RLink/RAP	Yes	All	Yes	NA	Yes	NA	Yes	Binary, ASCII	384K	Renex, CXI, IBM	All	Application dependent	$150	NA	659
The Santa Cruz Operation, Inc. (800) 626-UNIX	SCO Unipath SNA-3270	Yes	NA	Yes	No	No	No	Yes	ASCII, Binary	256K	UDS, Sync-UP, SCO, synchronous, Persyst	All IBM compatible	Xenix	$595 $1,995	NA	660

COMPANY	PRODUCT	LAN COMPATIBLE	ACCESSIBLE MAINFRAME DATA BASES	MICRO SECURITY	MAINFRAME SECURITY	SUPPORTS VIRTUAL DISKS	SUPPORTS EXTENDED MEMORY	MENU DRIVEN	DOWNLOAD FORMATS	MICRO MEMORY REQUIRED	EMULATION HARDWARE SUPPORTED	MAINFRAME OPERATING SYSTEM SUPPORTED	SOFTWARE REQUIRED	MICRO PORTION PRICE (PER COPY)	MAINFRAME PORTION PRICE (PER MCU)	DIAL-ING READER SERVICE NUMBER
SAS Institute, Inc. (919) 467-8000	Base SAS Software	Yes	SAS	No	No	No	No	Optional	DIF, ASCII	512K	Irma, CXI, Forte, IBM 3278/9	OS, MVS, CMS	None	NA	$5,000-$12,000	661
SCA Products and Services, Inc. (212) 532-2980	Gateway PC	Yes	Ramis, Focus	Yes	Yes	No	No	Yes	ASCII, Binary	512K	Irma, Forte, CXI, IBM 3278/9, VT100, VT52, Teletype X.PC, X. Modem	VM, MVS/TSO	None	$350	$18,000	662
Simware, Inc. (613) 727-1779	SIM 3278	NA	All IBM DBMS	Yes	Yes	Yes	NA	Yes	IBM 3270, ASCII	NA	NA	VM, MVS/VTAM	None	NA	$9,500-$20,000	663
	SIM 3278/PC	Yes	All IBM DBMS	Yes	Yes	Yes	Yes	Yes	IBM 3270, ASCII	256K	Irma, Forte, IBM 3270	VM, MVS/VTAM	None	$250	NA	
Sinper Corp. (201) 662-7990	TM/1 2.0	Yes	None	No	No	Yes	No	Yes	ASCII, WKS, Dbase III, DIF	256K	NA	NA	None	$795	NA	664
Softronics, Inc. (303) 593-9540	Softerm PC	Yes	All	No	Yes: Top Secret, RACF	Yes	No	Yes	Any	192K	IBM async. boards	VAX/VMS, Unix, AOS, CICS	Application dependent	$195	NA	665
Software AG of North America, Inc. [illegible]	Natural Connection	NA	Adabas, VSAM, DL/1	Yes	Yes	No	No	Optional	WKS, WK1, Dbase III, DIF, ASCII	256K	Irma, ITT, IBM 3278/79, PCOX, async. dial-up	OS, MVS, MVS/XA, DOS	None	$500-$1,000	$15,000-$35,000	666
SPSS, Inc. (312) 329-3500	SPSS/PC +	NA	Datatrieve, SQL/DS, Image	NA	NA	No	No	Yes	ASCII	348K	Heath 19	All	SPSS-X	$795	$3,000-$10,000	667
Sterling Software Systems Software Marketing Division (916) 635-5535	PC-Tracs	Yes	None	Yes	Yes: Top Secret, RACF, ACF 2	No	NA	Yes	ASCII, EBCDIC	64K	IBM 3780, 2770, 2780, 3274/3270	All	None	$500	NA	668
	Supertracs	NA	None	Yes	Yes: Top Secret, RACF, ACF 2	No	NA	NA	Any	NA	IBM 2780, 3780	DOS, OS/MVS	None	NA	$18,000-$26,000	
The Systems Center (800) 292-0104	NDM-PC	Yes	None	Yes	Yes	No	Yes	No	ASCII, Binary	300K	CXI, Pathway, PC Path, SNA 3270	MVS, VSE	Application dependent	$400	$22,000	669
Systems Strategies, Inc. (212) 279-8400	VAX-Link/SNA	Yes	All VAX	NA	NA	NA	NA	Yes	ASCII, EBCDIC	NA	KMV, KCT	MVS, OS, DOS/VM	C-Compiler	$3,500-$7,000	NA	670
	VAX-Link/BSC	Yes	All VAX	NA	NA	NA	NA	Yes	ASCII, EBCDIC	NA	KMV, KCT	MVS, OS, DOS/VM	C-Compiler	$3,500-$7,000	NA	
Sytek, Inc. (415) 966-7400	Sytek System 2000/System 6000	Yes	NA	No	Yes	Yes	No	Yes	ASCII	80K	VT100, VT52, KSI	Ultrix, VAX, VMS	NA	$78	$5,300	671
Tangram Systems Corp. (919) 481-4444	Arbiter	Yes	SAS data sets, flat files	Yes	Yes: ACF 2, RACF, Top Secret	Yes	NA	Optional	Any	32K	CXI, Irma, INS, IBM 3278, 3708, NCP, Datastream, APPC	MVS, MVS/XA	ACS/VTAM	NA	$12,500-$25,000	672
Techland Systems, Inc. (800) Techland	Bluelynx 3270R	Yes	Infogate, Goldengate, Arbiter, Micro Tempus	No	Yes: RACF, Top Secret	Yes	Yes	Optional	EBCDIC, ASCII	192K	IBM 3278/9	All	None	$795	NA	673
	Bluelynx 3270 Advanced Coax	Yes	Infogate, Goldengate, Arbiter, Micro Tempus	Yes	Yes. RACF, Top Secret	Yes	Yes	Optional	EBCDIC, ASCII, Binary, [illegible]	220K	IBM 3278/9	All	IBM HFT	$995	Contact vendor	
Tesseract Corp. (415) [illegible]	Intelligent Data Link	No	VSAM, IDMS, IMS	Yes	Yes	NA	NA	Optional	DIF, ASCII	256K	IBM 3270 SNA, Irma	MVS/DOS	CICS, IMS DC	$495	No charge	674
Tri-Data (415) 969-3700	Netway [illegible]	Yes	Yes	Yes	No	Yes	NA	Yes	EBCDIC, Avatar HFT	512K	Netway 1000A	CMS, TSO, VM, CICS, VS	None	No charge	$1,195	675
Trisystems Corp. (803) 883-0558	TC-Link	Yes	All	No	Yes	Yes	Yes	Yes	ASCII	128K	IBM 3270, 5250	VM, MVS/TSO	None	$799-$4,100	NA	676
TSI International (203) 846-2101	Key/Master XTA	Yes	VSAM	Yes	Yes	Yes	Yes	Optional	Proprietary	512K	Irma, RJE	All	None	$300-$1,000	$11,500-$35,000	677
VM Personal Computing, Inc. [illegible]	Relay Gold	Yes	All	Yes	Yes	No	No	Optional	Any	192K	Irma, Forte, IBM 3270	VM/CMS, MVS/TSO	None	$250	NA	678
	Relay/VM, Relay/TSO	Yes	All	Yes	Yes	No	No	Yes	Any	192K	Irma, Forte, IBM 3270	VM/CMS, MVS/TSO	None	NA	$6,500-$9,500	
Winterhalter & Associates (313) 662-2002	Data Talker 3270	No	All	Yes	NA	NA	NA	Yes	Any	128K	IBM 3270, 3278/9	All	None	$1,295-$2,395	NA	679
	Data Talker Cluster	No	All	Yes	NA	NA	NA	Yes	Any	128K	IBM 3270, 3278/9	All	None	$1,295-$2,395	NA	
	Data Sync	No	All	Yes	NA	NA	NA	Yes	Any	128K	IBM 3270, 3278/9	All	None	$1,295-$2,395	NA	

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Everywhere, MA 01701

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2. Identify those products/services for which you're requesting more information. Write their respective DIAL-INQ reader service numbers in the boxes provided in step 6.

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4. When prompted by the instructional recording, enter your DIAL-INQ subscriber number and symbols as recorded below.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ [#] [#]

5. When the recording says, "Enter magazine code and issue code," enter these numbers and symbols:

[1] [4] [5] [#] [7] [0] [7] [#] [#]

6. You will be prompted to enter the DIAL-INQ number, including the symbols, for the first product/service you've identified below. You will be prompted to repeat this step as needed to input additional DIAL-INQ numbers.

To key in more than 17 inquiries, simply make another telephone call once you've signed off from the first.

1. ☐ ☐ ☐ [#] [#]
2. ☐ ☐ ☐ [#] [#]
3. ☐ ☐ ☐ [#] [#]
4. ☐ ☐ ☐ [#] [#]
5. ☐ ☐ ☐ [#] [#]
6. ☐ ☐ ☐ [#] [#]
7. ☐ ☐ ☐ [#] [#]
8. ☐ ☐ ☐ [#] [#]
9. ☐ ☐ ☐ [#] [#]
10. ☐ ☐ ☐ [#] [#]
11. ☐ ☐ ☐ [#] [#]
12. ☐ ☐ ☐ [#] [#]
13. ☐ ☐ ☐ [#] [#]
14. ☐ ☐ ☐ [#] [#]
15. ☐ ☐ ☐ [#] [#]
16. ☐ ☐ ☐ [#] [#]
17. ☐ ☐ ☐ [#] [#]

7. Complete your phone call by entering the following symbols:

[#] [#]

You've now successfully completed your inquiry call to *Computerworld* DIAL-INQ. Remember . . . you can make as many phone calls as you wish — and request information about products/services in any SPOTLIGHT section up to three months from the issue date.

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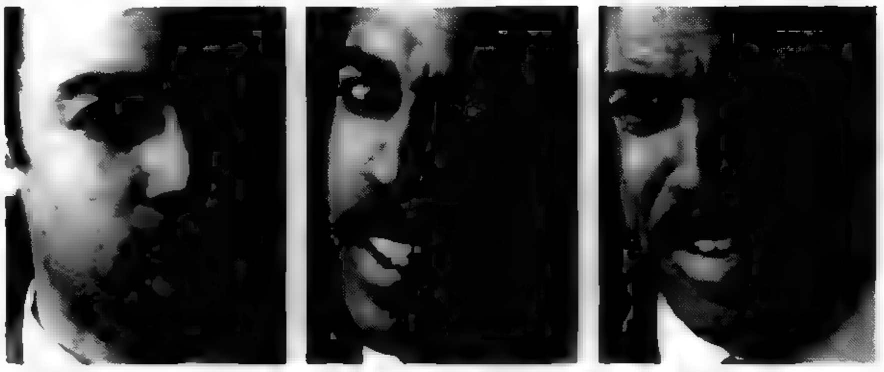

10:12: *"Talk to the mainframe with my PC? Who are they kidding?"*

10:18: *"Hey, it just answered back."*

10:29: *"I talked to the mainframe. Wait'll I tell my kid."*

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DIAL-INQ READER SERVICE NUMBER 18

IN DEPTH

How *not* to build an expert system shell

One firm's folly offers a lesson in choosing a development tool

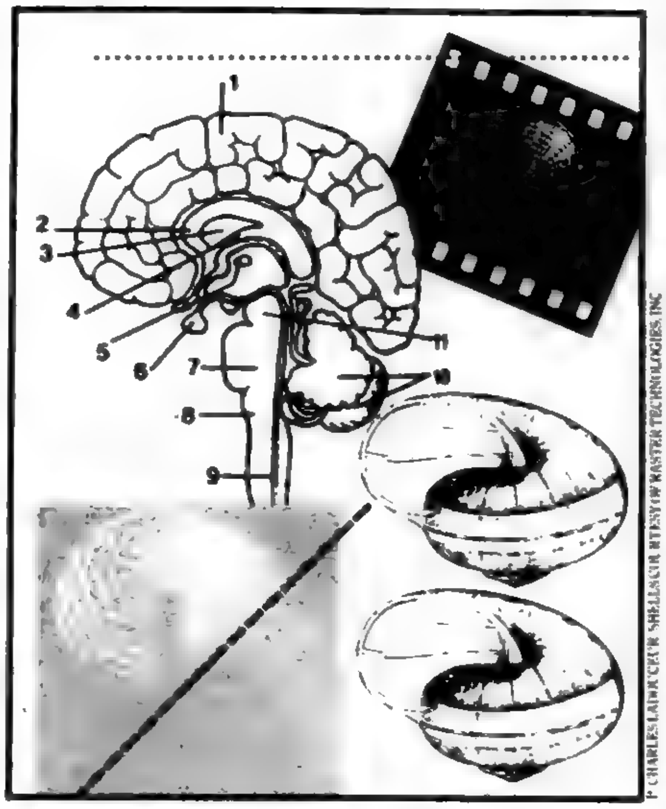
BY HENRY ERIC FIRDMAN

Consider the following situation: Victory Group, a venture capital firm, is funding Genesis Corp., an expert systems startup. (Both are real firms with fictional names.) Genesis's technical staff consists of experienced programmers, all accomplished in conventional software development.

As a demonstration model, Genesis presents a 20-rule expert system. More precisely, the system is a simple decision tree to which, Genesis emphasizes, additional functionality will be added at the project's next stage. According to the business plan, Genesis will develop a full-scale rule-based prototype of the system in the next six to nine months.

The final product must be an interactive system. While Genesis's demo shows an excellent response time, the end-user interface is not very effective. Genesis tells Victory that this will be fixed at later stages of the project.

In addition, the business plan calls for product sales to be high-volume and therefore relatively inexpensive. For this reason, a personal computer-like environment is virtually mandatory, and development under expensive expert system shells was not considered.



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Nine months later, Genesis comes up with a 500-rule prototype. This prototype is not just a decision tree; in some situations, a number of alternative rules can be applied so that a truly smart system could make a choice among the rules. Superficially, the prototype seems to be a genuine expert system.

But, what a system: It sometimes takes four to five minutes to respond to a relatively simple end-user query. As a result, Victory reasonably figures that the consequences of developing an efficient end-user-oriented interface on top of this prototype may be devastating to system performance.

The venture firm realizes that the product Genesis outlined in its business plan may never come to fruition unless radical measures — perhaps a total redesign — are taken immediately.

As a result, a lot of finger pointing goes on between Genesis and Victory. Some of Victory's partners even maintain that Genesis deliberately misrepresented its product. Some people from Genesis accuse Victory of ignorance, claiming that performance degradation is intrinsic to artificial intelligence technology.

Learning by mistake

The selection of a cost-effective expert system development tool or shell should be a cautious process. There are a number of subtle issues that need to be addressed and shell parameters to be considered to provide a reasonable fit between the application and the shell.

What really happened to Genesis's expert system? First of all, having previously dealt with structured, nested IF-THEN-ELSE statements such as decision tables or trees, Genesis's technical staff believed that the time required to find a relevant rule changes logarithmically with the total number of rules.

That belief was a mistaken one, resulting from lack of AI experience. In fact, because of the nature of forward- and backward-chaining control mechanisms and, of course, the pattern matching on which both are based, the time required to find a relevant rule changes in the following ways:

- Linearly with the total number of rules, if only one rule can be applied in each situation. In this case, the total set of rules can be thought of, at the conceptual level, as a linear array of rules, with the forward- or backward-chaining control mechanism including array lookup as its inner loop.
- Exponentially, if a number of alternative rules can be applied in some situations. In this case, the total set of rules can be regarded as a tree that must be exhaustively searched by the forward- or backward-chaining control mechanism to find a relevant rule.

With this understanding, it is not surprising that the Genesis prototype performed poorly. One can see in this case story a typical example of combinatorial explosion. Each time the prototype faces the problem of choosing among alternative rules, it solves the problem blindly by brute force, randomly picking out one rule and then trying another if the first does not succeed, resulting in performance degradation.

We can draw some important conclusions from this part of the story:

Lesson 1. *There are two*

Firdman is president of Henry Firdman & Associates, a Lexington, Mass.-based consulting firm specializing in artificial intelligence and expert systems. He is publisher of "AI Through the Looking Glass," a newsletter on the AI industry. Another version of this article first appeared in *AI Expert* magazine.

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equally important facets of expert system performance — the scope of its expertise and its running time. Neither of them can be ignored in expert system development.

Although it had an impressive running time, Genesis's 20-rule demo did not maintain sufficient scope of expertise. Conversely, the prototype, while it had some scope of expertise, had an excessive running time.

Lesson 2. *Special measures aimed at achieving an increasing scope of expertise in accordance with efficiency requirements should be taken; otherwise, scope of expertise and running time will be conversely related. Taking these measures — not just adding new rules — makes up the most difficult part of expert system development.*

Genesis did not take these measures — an obvious indication of its ignorance.

Control strategies

What could have been done? This question brings us to the well-known notion of a control strategy — a set of chunks of problem-specific heuristic knowledge that guides a problem-solving process and makes it more efficient.

A control mechanism — forward or backward chaining — and a control strategy cooperate in that the control mechanism provides the search while the control strategy makes the search reasonable in terms of running time.

Control strategies are represented in different ways. One popular approach is to attach so-called confidence measures to alternative rules. This strategy looks for the most relevant rule in a given situation. If successful, it eliminates rule application ambiguity and reduces the aforementioned exponential time dependency to a linear one.

Another widely used approach is to break down the total set of rules to a relatively large number of small separate rule subsets. The idea is that an expert system will select a relevant rule subset and then look for the most relevant rule within this subset. Selection of the relevant rule subset is usually guided by special control rules that are sometimes called metarules. If it is successful, this strategy reduces the linear time dependency to the logarithmic one.

No matter what control strategies are used in expert system development, the chances to have them built in an expert system shell are very slim. The reason is clear: The expert system shell is, by definition, application independent, whereas a control strategy is essentially application specific. Another very important lesson can be found here:

Lesson 3. *An expert system shell should provide end-user-oriented facilities for easy incorporation of control strategies. A shell having no such facilities makes developing an efficient commercial expert system impossible.*

What about shell price?

Going back to the case story, it turned out that the expert system shell that Genesis used did not allow the developer to incorporate any control strategies. The company selected the wrong development tool. Ignorance was not the only reason for this choice.

Another reason was the cost of expert system shells. Remember, Genesis was to develop a high-volume, relatively inexpensive expert system. Obviously, the expert system shell had to be even less expensive. With the final product targeted for the $200 to $300 range, Genesis had to find a shell for about $40 to $50 per copy. Therefore, the price of many, if not most, commercially available shells was prohibitive. It would seem that Genesis had two options:

- It could purchase a relatively inexpensive expert system shell with development and runtime environments available separately and negotiate the required price for the runtime environment at the time of purchase.
- It could develop a proprietary expert system shell in-house.

Unfortunately, Genesis chose a third option. It purchased a $39.95 expert system shell developed by an obscure hacker operating from a boat in Sausalito. The shell had no documentation, no support and, of course, no facilities for incorporating control strategies. Therefore, when the system's developers encountered the efficiency problem with the 500-rule prototype, they had nowhere to go.

Certainly, this choice was the worst possible, and the company learned its lesson.

Lesson 4. *Never use expert system shells that are not supported commercially. Deal only with vendors that are committed to providing high-quality service.*

Why not build your own?

One interesting question remains to be addressed. How much could Genesis have done if it had followed one of the first two options?

Let us first consider the second option — developing a proprietary expert

> SPECIAL measures aimed at achieving an increasing scope of expertise in accordance with efficiency requirements should be taken; otherwise, scope of expertise and running time will be conversely related.

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system shell. Generally, I am opposed to developing proprietary tools, especially simultaneously with applications. This is as bad as developing a larger Pascal program in parallel with developing the first Pascal compiler.

There is at least one excellent account of a commercial expert system that shows why developing a proprietary tool is not a good idea.

The system in question is the Dipmeter Advisor, a famous Schlumberger Ltd. expert system that processes measurements from a dipmeter tool to interpret signatures, or layers, of geological events. The history of its development has been described in Reid Smith's paper, "On the Development of Commercial Expert Systems."

In some respects, this history illustrates how *not* to develop commercial products. The Dipmeter Advisor project was run as a research venture; hence, it was driven by designers' interests rather than by the objective to build a cost-effective commercial product.

Not incidentally, the whole project cost Schlumberger about $21 million, and it required three generations of designers to develop it.

Of course, a number of reasonable excuses can be found. The Dipmeter Advisor was only later converted to a commercial project. It was begun in 1980, at a time when neither expert shells nor good runtime hardware existed. Not surprisingly, the Dipmeter Advisor developers jumped from Digital Equipment Corp. Decsystem-20 to VAX-11/780 to Xerox Corp. 1108 machines and from Interlisp to Franzlisp to Interlisp-D as implementation languages.

One thing I find hard to excuse is Smith's hypothesis of "oscillating focus of attention in commercial expert system development." According to this hypothesis, the application development stage should alternate with the stage of expert system tool development.

This may be a good idea for research into the next generation of expert system shells and knowledge-representation environments; however, it is absolutely wrong for commercial expert system development.

Not only are many companies developing expert systems, but few of them possess the experience to develop expert system shells. In the process of developing applications, these companies allow their development efforts and monies to get sidetracked by tool development — to the detriment of the application.

Oscillating application and tool development disrupts the whole project. It can make project management very difficult, significantly reducing chances of meeting established deadlines and developing a product in a cost-effective fashion. In fact, providing enough redundancy to develop a variety of diverse and evolving applications, instead of oscillating between application and shell development, is a single major justification for today's general-purpose expert system development environments.

Now we can expand on Lesson 4 as follows:

Lesson 5. *Never develop your own expert system shells if you can find a commercial one that is adequate for your application. It may be much easier to tailor an existing tool to your needs than to develop a new one from scratch.*

The time for proprietary tools

Some notable exceptions to this lesson do exist:

One exception is when there is no commercially available expert system shell adequate for an application. One example of this is the development of a proprietary expert system shell by Applied Expert Systems, Inc. (Apex) in Cambridge, Mass.

In 1983, when Apex's Planpower financial planner software project began, no commercial frame-based development tools were available on Xerox 1100 LISP machines, so Applied Expert Systems had to develop its own. At the time, Xerox's Loops, a hybrid knowledge-representation environment, was available only as a prototype.

Another exception would occur if a commercial expert system development environment is available, but a cost-effective runtime environment is not available. Again, Apex is a good example of this. Loops is excluded because it lacks not

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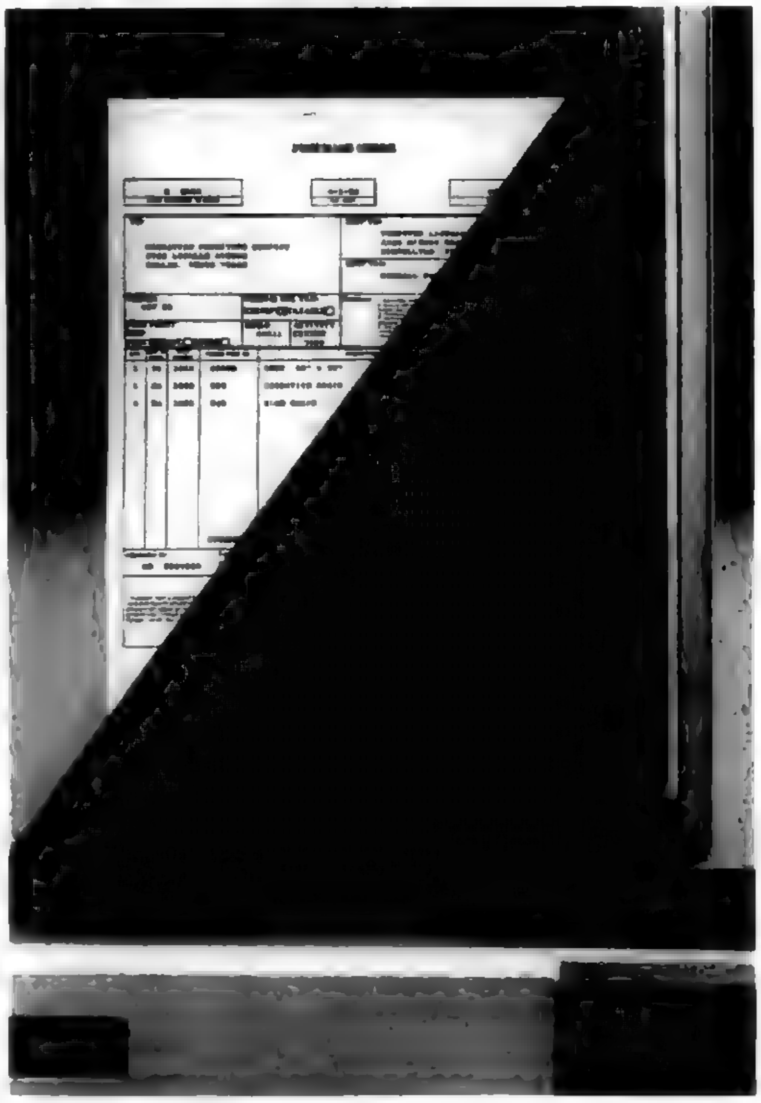

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only commercial support but also a runtime version.

A third exception is a case in which a proprietary expert system shell results from many years of previous research and development so that it actually appears as enhancement and commercialization of an existing tool. An example is Syntel, a proprietary expert system shell developed by Syntelligence, Inc.

Many Syntel features were derived from SRI International's research on Prospector, a computer-based consulting tool for mineral exploration. Most Syntelligence founders and Syntel developers came from SRI.

Lastly, an exception could be made when an application is targeted for high-volume sales and should be so inexpensive that there is no way to find an affordable expert system shell on the market.

COST-EFFECTIVE runtime environments are a problem for commercial expert system development. The problem becomes critical if you are to choose a high-level development tool: The price may be high, and it is paying for things that are hardly needed at execution time.

Although this can formally stand as a reason for developing a proprietary expert system shell, this situation is not one that occurs often. In any event, I would recommend trying a programming language, such as LISP or Prolog, before making any commitment to developing a new tool.

Employing a staff of AI professionals who are experienced in tool development is a must. Schlumberger, Apex and Syntelligence all have first-class expert system shell developers.

In my case story, I do not believe that Genesis could meet this requirement. Remember, the company staffed experienced conventional programmers rather than AI tool developers.

Although both Apex and Syntelligence have been successful in expert system shell development, I would recommend that all expert system developers avoid developing their own tools for as long as possible.

There is little to say about Genesis's first option: to purchase a relatively inexpensive expert system shell and negotiate a proper price for the runtime environment at the time of the tool's purchase. Genesis needed a cost-effective runtime environment, that's all.

The following lesson is one that is very important:

***Lesson 6.** A critical part of shopping for an appropriate expert system shell is finding out whether it has a separate runtime environment and how this environment can solve your runtime problems.*

The ideal solution to one's runtime problems would probably be a cross-compiler that could compile the expert system code written in an AI language, such as LISP, into a conventional programming language of one's choice. This choice could be dictated, for instance, by a specific conventional software to which one's expert system should be hooked up. Unfortunately, all expert system shells that I am aware of do not have such cross-compilers.

Indeed, many expert system shells have interfaces to one or more conventional programming languages so that the expert system can call programs written in those languages.

Although this feature is very important, it does not really help to execute the expert system cost-effectively and efficiently in runtime.

Cost-effective runtime environments are a big problem for commercial expert system development. The problem becomes critical if you are to choose a high-level expert system development tool: The price may be high, and it is paying for things that are used during development and are hardly needed at the execution time. Look for the solution of this problem *before* you buy the expert system shell, not after.

Lessons learned

Users interested in developing expert systems of their own should take heed of the following lessons:

- The scope of an expert system's expertise and its running time are equally important to the system's performance.
- Unless a system's scope of expertise is increased in accordance with efficiency requirements, its scope of expertise and its runtime will be conversely related.
- An expert system shell should provide end-user-oriented facilities for easy incorporation of control strategies and should be supported commercially.
- An expert system shell should never be developed if a commercial one can be found that is adequate for the application.
- A critical part of shopping for an appropriate expert system shell is finding out whether it has a separate runtime environment and how this environment can solve runtime problems.

The story of Genesis's struggle to develop an expert system shows that selection of a proper expert system shell can be critical to the success of an expert system development project. To handle this process properly, users should know much more than what they glean from vendor advertisements and promotional literature. •

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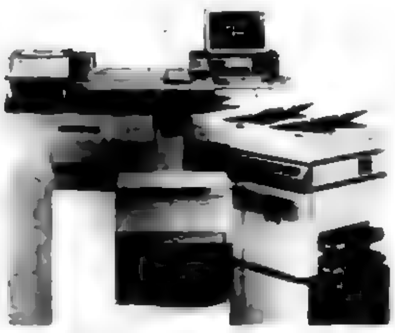

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They can be filled in faster. The computer can automatically fill in standard information like a customer's address. When the same information goes on several pages, you enter it once; the computer puts it in all the right places. (A title company went from six sets of documents per person per day to thirty-six.)

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Today, as the Information Age has begun, there is a new kind of isolation. People are awash in a mounting sea of information, yet unable to connect or work with information in an orderly, useful form; that is, with the world's knowledge. Often, information machines do little to help. They are difficult to use, rigid in their demands, generally unable to work with any but their own kind.

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We envision a vast global network of networks, the merging of communications and computers, linking devices so incredibly capable, they will bend to the will of human beings, rather than forcing humans to bend to theirs.

Obviously, no one company, no one nation, can universalize the Information Age. It will take the best minds of many companies and many nations. The needs of our customers are creating imperatives for our industry. We need common standards and compatibility. We need national and international policies that are open and encouraging. And we need to make information machines far easier to use.

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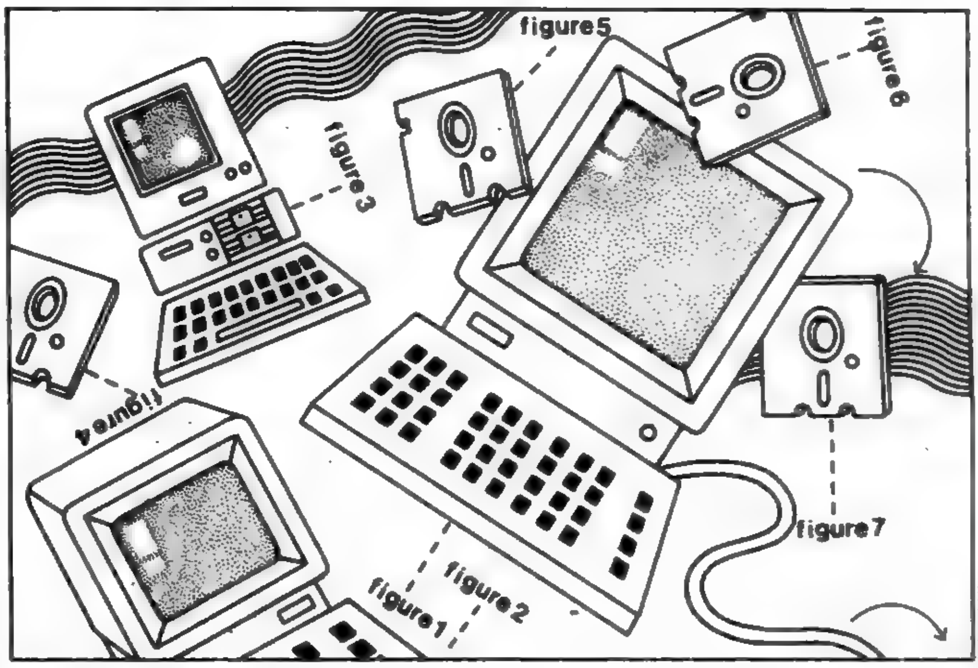
The politics of technical writing

BY PAULA BELL



Publications, especially those written in support of software, are most often reviewed as part of the products they describe. Good publications contribute not only to the product image but also to the company operations by decreasing the need for maintenance and hot-line calls.

Unfortunately, company efforts to improve publications often fail, because technical companies tend to take the technical view: They expect a writer to act as a straight line of communication from source — the development staff — to destination — the user.

Along the line somewhere, schedules are to be set and reset according to the performance of technical development, and when the product is ready to enter production, a set of glossy publications will accompany it.

The problem with the technical view is that the technological wonders of desktop publishing do not automatically produce good publications. Publications are produced by people, and where there are people, there are politics. To supply the best documentation in the time allotted, the company must rely on a top-down network of people — each group a constituency, each individual a political entity. At each level of this hierarchy, the principles of Murphy's law come into play.

Top dogs

At Leading Etch Corp., the vice-president of marketing, a self-made man who was proud of his handiwork, didn't think that writing was important to the success of his product until he received a letter from State of the Art, Inc.

"If you are so careless about the quality of your correspondence," the letter's author said, "then I am too concerned about the quality assurance checks throughout your company to agree to this contract." In the envelope, along with an unsigned contract, was a red-lined copy of the vice-president's letter to State of the Art.

Though many decision makers would not recognize a grammatical slip or sloppy punctuation — and those who do would not generally take the time to write about it — their judgments of another company, at all levels, can be influenced by the written word.

As is true of the success of most company projects, the impetus for good documentation must come from the top.

Executives must be convinced that professional publications are significant to the quality of the company's image and must transmit that conviction to the people who can contribute.

In order to bridge the credibility gap and pay more than just lip service to the need for effective communication, memos and announcements from the top must be well written.

A comma splice or dangling modifier might seem to be a fussy detail, but good engineers and programmers know the importance of detail in their own work; details are equally important at the top.

Because examples of poor executive prose abound, the prose is often parodied. Well-written documents, whether issued directly from the powers that be or filtered through a competent secretary, establish credibility. Executives who practice what they preach will be able to lead more disciples to the cause of good writing.

The governors

At the Salem Kindling Co., project postmortems often end up as witch hunts. Managers who have forgotten to take into account all the support needed — such as the inclusion of publications in the schedule — to turn out a quality product end up pointing fingers at each other for the oversights. Hard feelings from one project carry over to the next.

Management time spent defining the interactions between people is as important as time spent defining the interfaces of the product. Although no one would want to compromise the publications because of untested information or inadequate editing time, too many managers fail to see beyond the traditional party lines of product development

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Bell is manager of technical publications at Silicon Compilers, Inc. in San Jose, Calif.

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and support.

Of course, some people in the organization are more critical to the product than others, but resource rights need to be parceled out to all and renegotiated in times of conflicting goals. Ignoring all but the development staff leads to resentful employees who are less able to concentrate on the task at hand after losing face.

For publications to be accurate, timely and reflective of a professional company image, the people who directly and indirectly contribute to a product's success must negotiate at all stages of the product life cycle. Discussions about the kinds and numbers of documents that the product will require should start with the initial planning of the project.

Immediately thereafter, technical writing should begin, at least on a part-time basis. Although it is possible that having writers get close to a product design can sometimes compromise their view of what the users will need to know, the risk is negligible when compared with the benefits of their understanding how the product will work.

Publications that evolve with repetitions of design phases, sudden shifts because of technical difficulties, reworking of unworkable features, multiple reversals, large and small, are the better for being a part of the process.

Ditto for the writers who get a stronger grounding in their subject matter and the developers who are able to concentrate more on the design and less on its documentation. Mutual respect for one another's expertise very often results from this process and makes the next project easier to manage.

> **ALTHOUGH a few technical people are superb writers, most are not. Managers who assign development personnel to documentation tasks run the risk of second-rate publications at the expense of full-time development — a double bind.**

Few good products go out the door without a page of last-minute release notes, covering from the time the publication went into print until the tape is shipped or the last nail is pounded into the shipping crate. Project, program and departmental managers who consider all facets of product success should include publications in their schedules from beginning to end.

Conflict of interest

At Barnes and Fields, much of the writing is farmed out. This contract work is cheaper, in these times of shrinking budgets, than employing full-time writers. The quality of the writing is uneven, however, depending on the availability of competent contractors and the amount the company is willing to pay.

At Matrix Machines Corp., all writing is done in-house, with each major development project including one team member responsible for documentation. The quality of the writing among projects is uneven, especially when engineers who think they are writers are not and when engineers who do not want to write are forced to do so.

Whether managers in charge of technical writing decide that their writing staff will be predominantly contract or captive, distributed or consolidated, they must be sure that all writers have basic writing skills.

Some technical types have written not only technical articles but everything from poetry to science fiction. These people are to be encouraged, as their input generally needs only light editing and clarification. However, the scope of their contributions should not expand to the detriment of their technical tasks.

Just as an engineer must understand material properties or a systems programmer must understand console modes, a competent technical writer should understand how to use rhetorical devices to achieve the most elegant and proper solutions. Understanding grammar, its use and structure, is basic to all good writing. Since most technical writers are learning with each new assignment, there's no time to be learning the basics, too.

Although a few technical people are superb writers, most are not. Managers who assign development personnel to documentation tasks run the risk of second-rate publications at the expense of full-time development — a double bind.

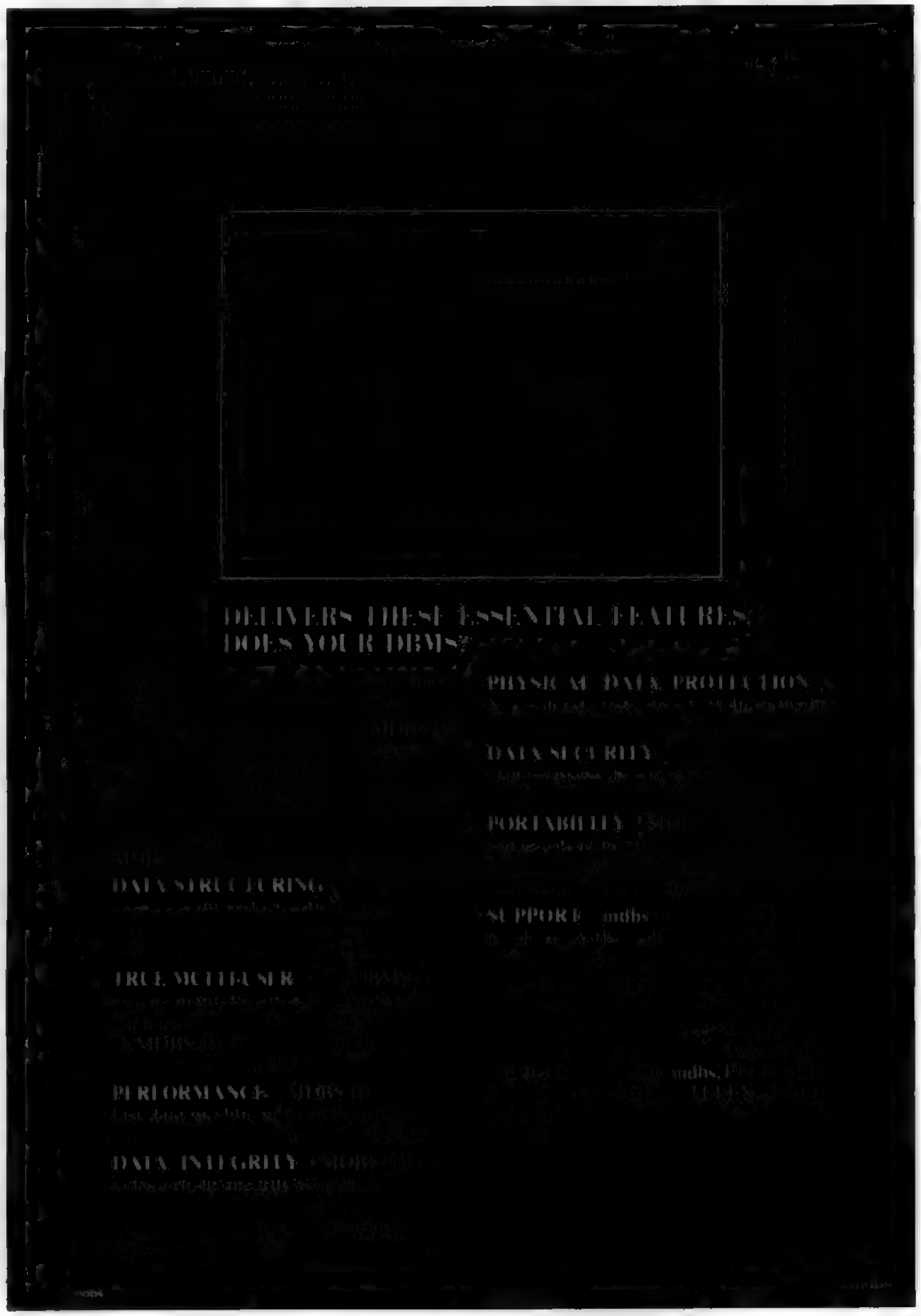
Rank and file

At Wild Blue Yonder Spacecraft, Ltd., the program developer sees no good reason to waste time with a tech writer when the way the product works is totally evident from comments in the code. The design engineer, meanwhile, has become immersed in the next project, which is much more interesting one and will give him better visibility. How is the writer to make contact?

In addition to rhetorical skills, technical writers need to interact effectively with many types of highly professional personnel: engineers, programmers, mathematicians, technicians and management throughout the company.

In ***The Psychology of Computer Programming***, (Van Nostrand Reinhold, 1971), Gerald Weinberg makes this observation:

"The users have a right to expect that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the documentation be done as professionally as the programming. And considering the matter coolly, there is no reason to believe that a professional programmer will be qualified as a professional documenter. . . . If documentation is elevated to a professional status all its own, so that the documenter can work side by side with the programmer without being made to feel inferior, we have the right to hope that documentation will improve."

Although WYSIWYG, windows and mice have certainly led to better looking publications, documentation content has not improved dramatically since 1971, when Weinberg wrote the above evaluation, fully realizing later that he was describing a political climate:

"And so, when we speak about computer program documentation, we are not speaking about the psychology of computer programming at all, except insofar as programmers have the illusion that anyone can do a good job of documentation, provided he is not smart enough to be a programmer."

The competition

But many developers and writers still do not realize the commonality inherent in their two disciplines. The most important techniques of designing quality products — that is, coherent logical structure and strict adherence to detail — apply equally to writing.

"How strange it is," Samuel Florman muses in *The Existential Pleasures of Engineering* (St. Martin's Press, 1975), "that the antitechnologists . . . who readily accept the behavior of leopards and vultures are repelled by the idea that man, for all his angelic qualities, is self-seeking and competitive."

On every development project, no matter how dedicated, everyone must compete for the most limited of resources: other people's time. One way to save time is to agree on common terminology early in the project.

Since no one has yet written *The Existential Psychology of Technical Writers,* it is primarily the writer's job to understand developers who run the gamut from polished presenters to those who can barely speak English.

Because most people on one project generally have not come from the same company, the writer cannot assume that a specific technical term is standard without checking with at least two other people in the same discipline, preferably from different companies. Their mother-company cultures, as well as their diverse disciplines, add spice to the political stew.

Everybody must agree on terms and use them in all documentation, from electronic mail memos through publication release. This is the only way to ensure consistency, a quality that is not only a sure gauge of the final publication but also a positive aid to internal communication.

The producers

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The production department is threatened and cajoled by marketing to get the glossies out, by technical pubs to get the manuals copied, by training to get the slides inked and by the president to get the latest version of his speech re-typeset.

Production issues must be talked out until responsibilities are assigned for setting quality standards, establishing priorities with enough flexibility to handle crunches and designing tracking systems to monitor both.

MIS-ing persons

At The Fast Lane Corp., the company system goes into gridlock when a manual is due. If the company had purchased independent desktop publishing of some form for its technical publications department, the problem would be minimal. However, this department uses a distributed system that is shared throughout the company, and MIS involvement in documentation application support is almost nonexistent.

When writers are part of a network of computer users, a good relationship between publications and MIS operations is critical. The systems administrator must understand what the system's editing and text formatting software does in order to help the writers tailor the system's writing tools to their needs and to troubleshoot the inherent or resultant bugs.

The writers must visit the operations facilities and get an idea of its equipment and complexity in order to help in the MIS bailiwick. By understanding how much of a strain a multivolume document puts on the system, the peripherals and especially

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on the other users, writers can learn to give advance warning to everyone concerned. MIS and publication managers who are aware of each other's needs and who meet regularly can keep automated and human systems running with fewer glitches.

WHEN THE draft appears on time but as clean as it went out — except maybe for a typo or two that the reviewer has spotted — the reason is most likely not a perfect manual but rather a reviewer whose manager has not made it clear that publications are important.

Training wheels

At Convergent Compilers Corp., the company training department and the technical publications department report to the same branch in the organization chart. They could benefit from each other's research; instead, they operate independently and redundantly — and their customers are confused.

Coordinating training materials with the documentation effort can only improve both, and there's nothing strange about the two departments becoming bedfellows. They share the common goal of teaching something that someone needs to know. They can share the work load, too, especially in development of concepts and illustrations. It's essential that they share a common dictionary of terminology.

Their constituencies do diverge in the formalisms of presentation. But the more the manuals support the training as reference material, the more the training can help users recall the information in the manuals.

Raving reviewers

At all companies, the politics of documentation can become especially heated during review cycles, when publication drafts must be critiqued by developers, marketing staff, customer service personnel, quality controllers and lawyers, any or all of whom won't agree with parts of the publication or with each other and few of whom will acknowledge limits to their critical ability.

Review drafts must be prepared, distributed, collected and incorporated into a single draft before final editing and production can begin.

The distribution list attached to the draft can also serve as a sign-off sheet. A sheet of instructions should be attached, telling the reviewers what is expected of them in terms of time and types of corrections and highlighting any parts of the publication that are still incomplete. Reviews should act as a check not only on what is there but also on what is missing.

To avoid anarchy, revolution and territorial imperatives, a strategy must be devised to mediate among the following:

- Reviewers who return copies late, untouched or not at all.
- Marketers who sometimes learn from the review draft that features they were touting didn't make it into the product after all.
- Managers who have published articles — generally very heavily edited — in trade journals and decide the tone of the manual is somehow wrong.
- The company lawyer, who has just discovered that the product name has already been registered by another company in the same industry.

The primary rule in this strategy is *allow no surprises.*

There is always time to give everyone responsible for signing off the final review draft a preliminary view of its contents.

The second rule is *review the review.*

When the critical draft has not been returned within the specified time, it is generally the writer's responsibility to track that draft down, often to the bottom of a pile of program listings or engineering drawings.

When the draft appears on time but as clean as it went out — except maybe for a typo or two that the reviewer has spotted — the reason is most likely not a perfect manual but rather a reviewer whose manager has not made it clear that publications are important by providing the perqs to prove it.

Previewing the final draft, fixing a firm date for its return, tracking it by reminders and rewards and applying quality assurance measures before it is cast in concrete are the ways to make a review culminate in a good publication.

Everybody wins

Good publications speak well for the companies that view the written word as a significant contributor to the company image. If a company's publications do not work well, then its customers may never find out how really well the product works.

Good publications can be produced only when everyone in the organization remembers that everyone else is subject to the same pressures.

Good publications are good common sense. They make the job easier for everyone — the prospective customer who needs data to make a buy decision, the marketer or salesman who needs every selling tool available, the developers and service personnel who must maintain the system, the writer who will be writing more about the same product or others like it and the end user who will spread the word, good or bad. ●

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MANAGEMENT

TAKING CHARGE

Mark Duncan

Glamorize maintenance

Since existing application software may be likened to company assets, when something goes wrong the whole company can be affected, not simply the data processing department that maintains the program code. Therefore, maintenance must be regarded as a business issue. The highest levels of both data processing and user department management should develop a keen awareness of the impact of maintenance activities, and they must do more than support it, they must plan for it.

Maintenance should no longer be regarded as something less significant than development. It must be elevated to share an equal position with development. An organization should certainly maintain commercial competitiveness through new and effective computer automation. But when new automation grows old, longevity and client credibility will only be achieved with an established and successful maintenance program.

Generally, an application spends more of its life being maintained than it does being developed, which suggests that perhaps maintenance should be considered more important than development. But this is

Continued on page 72

Firm taps Mac for strategy move

BY JEFFRY BEELER
CW STAFF

SANTA BARBARA, Calif. — When Kinko's Copies Corp. began equipping its outlets with microcomputers and using them to deliver desktop publishing services, the company did a lot more than simply diversify its business.

Without realizing it, the nationwide chain of walk-in photocopying shops was also providing a textbook example of how corporations systematically mature in their ability to recognize and exploit information technology as a competitive weapon.

In adopting systems, most organizations unwittingly follow a two-stage learning curve, according to Jack Nilles, information technology program director at the University of Southern California's Center for Futures Research.

During the first stage, companies typically apply high technology to existing procedures in the hope of brightening their profit picture by boosting productivity or slicing costs, Nilles said. In short, they initially limit their use of computing systems to tasks they already do.

As their experience in using the newfangled technology grows, however, firms gradually awaken to its other possibilities and begin adapting it to enterprises they have never before tried, Nilles continued. During this second phase of the learning curve, they use systems expertise not only to save money but also to make it, either through diversification or expansion to new geographical markets.

A striking illustration of how corporations can tap additional revenue sources by shrewdly using information technology is Kinko's Copies' move in 1985 into desktop publishing, Nilles said.

Founded in Santa Barbara in 1970, Kinko's Copies originally viewed itself strictly as a document-reproduction service for students and businessmen who needed fast, high-quality photocopiers but lacked immediate access to them. But with time, the company's definition of its corporate mission broadened as it felt a growing urge to enter an allied but substantially different line of business. By the early 1980s, Kinko's Copies resolved to continue duplicating documents but also begin creating them as well.

"At the time, no one was offering a low-end alternative to typesetting in the document-duplication market," according to Charley Williams, vice-president of marketing for Kinko's Service Corp., the photocopying chain's support arm.

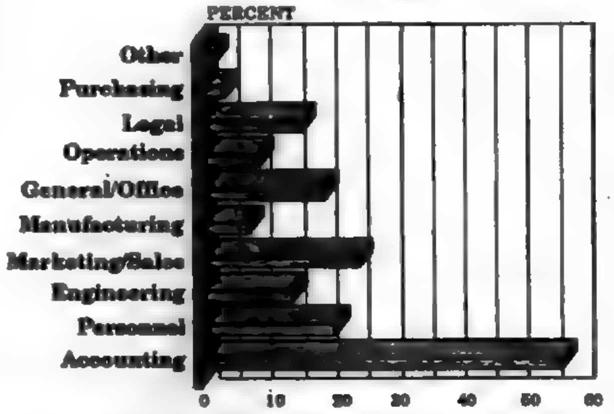
To capitalize on what it considered an emerging business opportunity, the firm began to install typewriters in its copy shops and flirted with a number

Continued on page 70

Data View

Corporate departments targeted for automation

1986 survey of Fortune 500 MIS directors



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CW CHART: MITCHELL J. HAYES

Telecom salaries jacked up

BY DAVID A. LUDLUM
CW STAFF

Starting salaries for telecommunications managers this year are growing more than twice as fast as those for other information systems positions, according to an annual survey.

Starting salaries for telecommunications managers in large data processing installations are rising 15.4% while those in medium-size shops are growing 17.1%, according to an annual survey by Robert Half International, Inc.

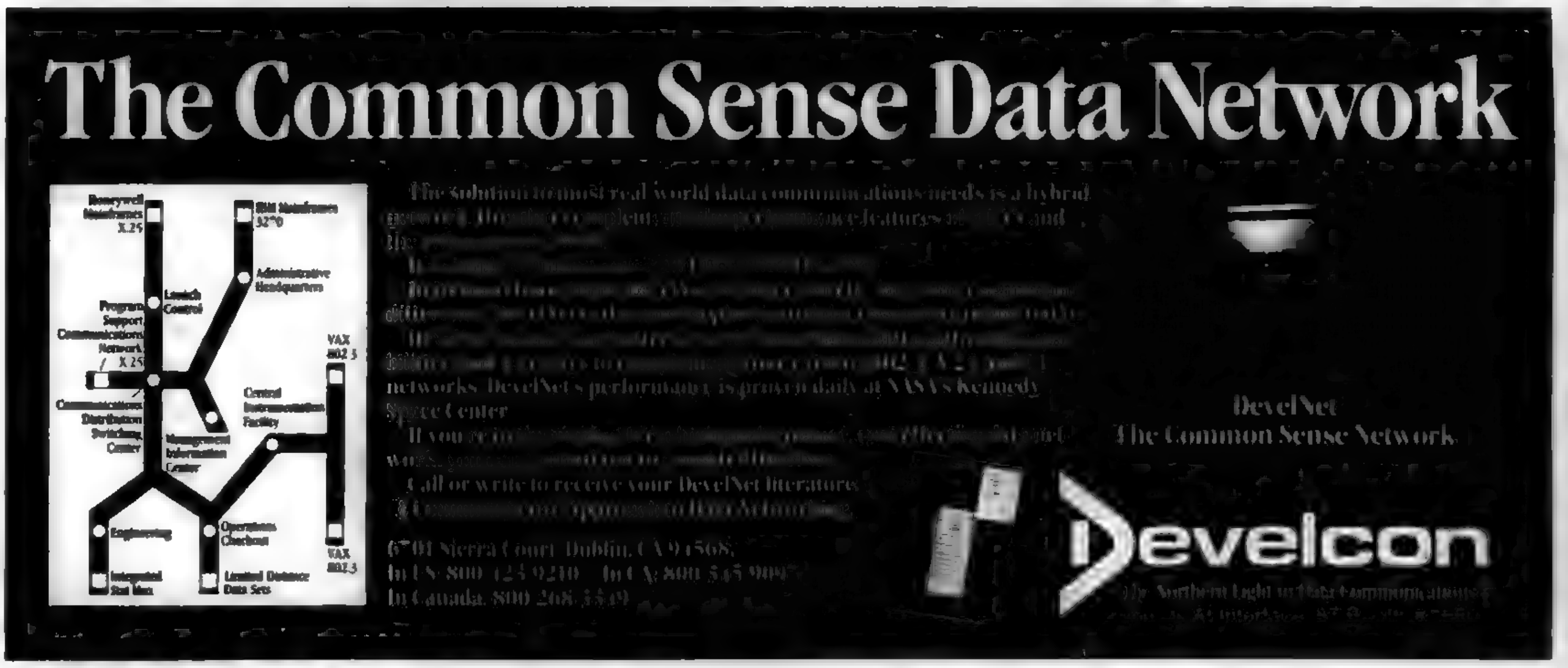
The survey is based on starting salaries for personnel sought through the nationwide offices of the recruiting firm, which has followed data processing pay levels since 1950.

Most jobs at large installations — characterized in part by a professional staff of 50 or more — show gains of 5% to 8%. The second-largest increase is 9.5% for systems and programming managers.

Most jobs at medium-size installations, those with 15 to 49 professionals, and small shops, with fewer than 15 professionals, show increases of 2% to 6%. The second-largest gain for positions in a medium-size shop is 8.5% for programmers.

The big premium in increases for telecommunications managers reflects their scarcity, in re-

Continued on page 74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Firm taps

CONTINUED FROM PAGE 69

KINKO'S Copies' desktop publishing services come in two flavors, including a do-it-yourself variety in which customers rent time on a Macintosh and create their own documents without help from the company's employees.

of other noncomputerized means of producing original documents. However, as personal computers increased steadily in acceptance and sophistication, Kinko's Copies abandoned its earlier choices and embraced desktop publishing as the prime vehicle for pursuing its planned expansion.

The idea for placing desktop publishing systems in its stores took shape collectively in the minds of a small team of Kinko's Copies managers that included Williams and Ed Togami, vice-president for technology at Kinko's Service.

At first, Kinko's Copies considered implementing its desktop publishing systems on IBM Personal Computer clones. But acting primarily on Togami's advice, the organization opted instead to build the service around the Apple Computer, Inc. Macintosh.

Having been a Macintosh user himself since 1984, Togami was especially smitten with the machine's user interface, which he found much easier to learn than its Microsoft Corp. MS-DOS counterpart and, therefore, more suitable for nontechnical customers. "Ease of use was a key consideration in our recommendation about what computer model to install out in the field," Togami recalled.

Kinko's Copies' desktop publishing services come in two flavors, including a do-it-yourself variety in which customers merely rent time on a Macintosh and create their own documents without help from the company's employees. In configuring its desktop publishing systems, the firm needed a microcomputer that required as little user training as possible, Togami said.

Another reason Togami, the support firm's chief MIS executive, favored the Macintosh over IBM-style PCs is that it allows customers to turn their finished documents into output that is high in quality — and thus readily reproducible — using Apple's Laserwriter printer.

During the nearly two years since it went into operation, Kinko's Copies' desktop publishing service has found its way into almost a third of the company's roughly 300 photocopying outlets, Togami said.

Although document creation currently accounts for only about 1% to 2% of the chain's total business, executives of the corporation expect the share to climb to as high as 10% within two years, Williams said.

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The National Local-Area Network Conference. Washington, D.C., Feb. 23-26 — Contact: Ken Burroughs, Capital Communications Group, Inc., 3825-I South George Mason Drive, Falls Church, Va. 22041.

Exchange Carriers Standards Association Technical Subcommittee T1Q1. Orlando, Fla., Feb. 23-27 — Contact: Radisson Plaza Hotel Orlando, 60 S. Ivanhoe Blvd., Orlando, Fla. 32804.

IBM: Mastering the Transition 1987-1992. New York, Feb. 24-25 — Contact: The Yankee Group, Seminar Division; 200 Portland St., Boston, Mass. 02114.

Competing With Computing. Dallas, Feb. 24 — Contact: Education Registrar, Nolan, Norton & Co., One Cranberry Hill, Lexington, Mass. 02173.

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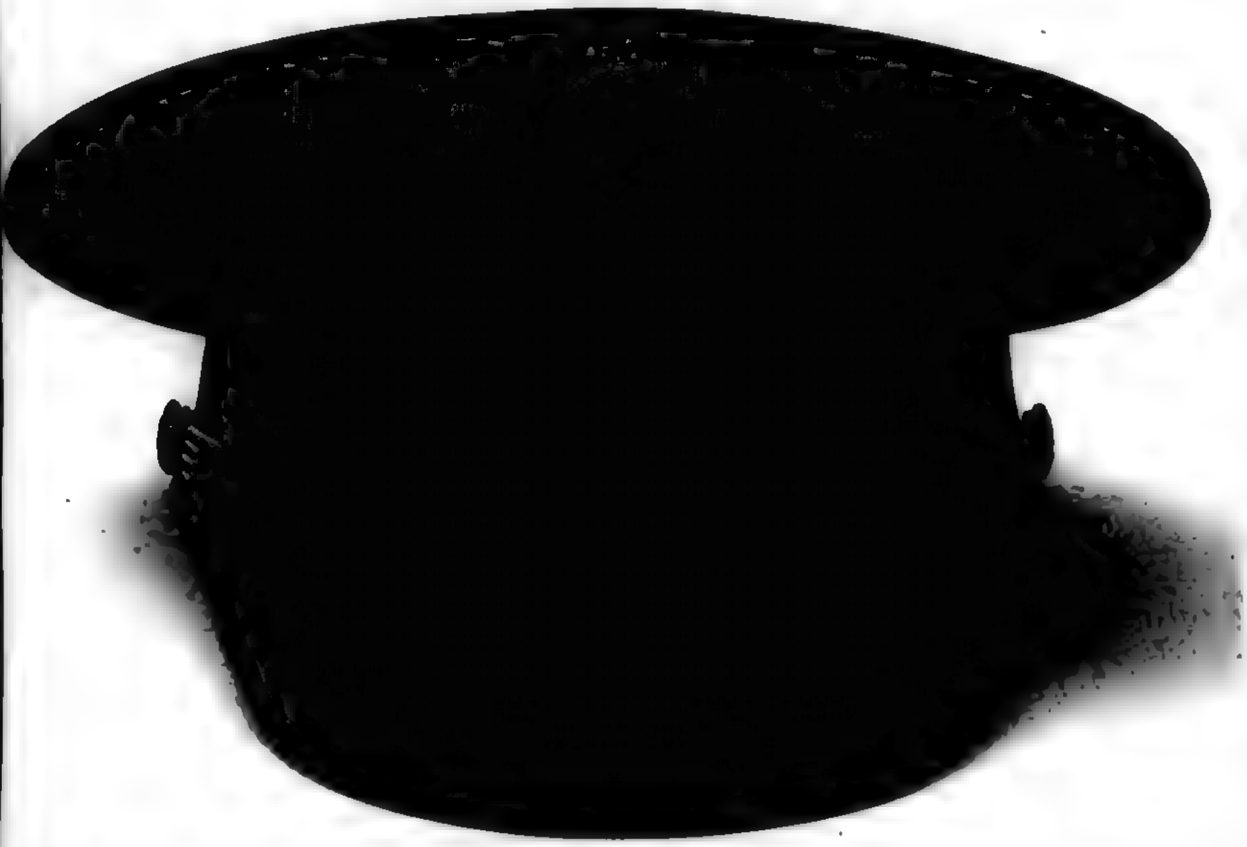

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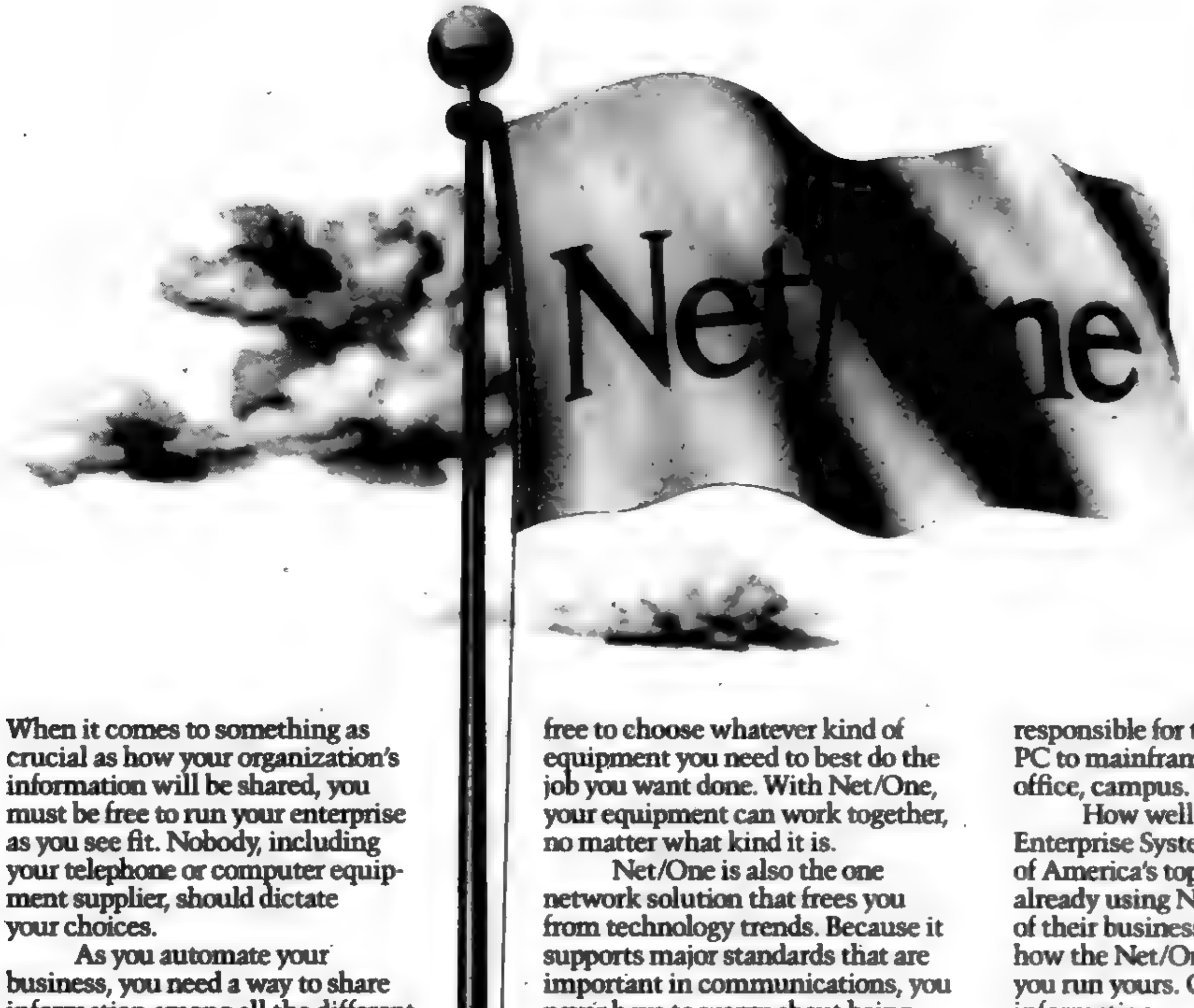

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Glamorize

FROM PAGE 69

not so — it is not a case of one being more important than the other. It is a case of both functions being given due attention at the proper time. A good maintenance program will improve the development life cycle, and a good development life cycle will reduce maintenance efforts.

Since maintenance demands a large portion of the data processing budget — and will probably demand even more in the future — management must recognize that it needs maintenance specialists.

These creatures are not the same as development programmers who occasionally perform maintenance. They are a breed apart; they have substantial knowledge of many applications and their interfaces as well as a greater awareness of the impact on users and the company's business if things go wrong.

In other words, maintenance programming is a career, and data processing management must acknowledge it as such. Maintenance programming should be offered as an equal alternative to development programming. An individual choosing it as a career should feel reassured that time, money and training will be expended on the maintenance staff with the same generosity as it is on development teams.

Data processing management must acknowledge that there are such things as maintenance skills and that these skills are not necessarily the same as development skills.

Acquiring skills

Furthermore, acquisition of the skills differs. Whereas funding for development education and training seems to be an automatic budget consideration, the same is not true with maintenance. There seems to be an inexplicable expectation that people magically become maintenance programmers simply by being assigned that title or responsibility.

Time must be formally allocated for mastering existing applications. Through this training, maintenance programmers will develop a confidence that prevents software corrections and modifications from being a hit-or-miss activity.

There is no denying that to be successful, both development and maintenance programmers must be technically competent. Furthermore, technical skills are common to both activities: development and maintenance programmers must have the ability to write, test and debug code, they must have analytical and documentation skills, they must be knowledgeable about their hardware and software and so on.

Development and maintenance programmers also require a number of nontechnical skills.

> MAINTENANCE programming is a career, and data processing management must acknowledge it as such.

However, the nature of maintenance tends to demand these nontechnical skills to a greater degree than does development.

These nontechnical skills and their importance to maintenance include:

- Initiative, due to time constraints and lack of procedures.
- Self-sufficiency, because work is often vaguely defined and done alone.
- Versatility, because in many cases several applications must be understood.
- Flexibility, because projects may have many aspects and grow in scope.
- Meticulousness, due to unfamiliar code and applications.

This is not meant to suggest that a particular skill is unique to either development or maintenance. In fact, the more overlap there is, the better, for it will draw the activities closer together, making maintenance more like extended development.

Despite a plethora of productivity aids and tools to make the development process faster and more streamlined, maintenance activities are going to claim the emphasis in data processing departments of the future. Whereas development is invariably optional, maintenance is mandatory.

The current obsession with quality in the context of application development is a clear indication of data processing management beginning to take maintenance seriously.

Fact of life

However, there will never be perfectly developed software, so maintenance will always be a fact of data processing life. And for that reason, maintenance programming needs to be accepted for the important function it is. The perception has been that a development project is somehow more visible than a maintenance project, yet it is maintenance work that interrupts development, not the reverse.

Data processing management needs to glamorize maintenance activity in order to attract programmers with genuine interest in, ambition for and dedication to the function. An easy first step would be to ban the word maintenance itself, as it carries with it connotations that stem mainly from what development is not, rather than from what maintenance is.

Instead of maintenance, why not say extended development or even complementary development. Instead of maintenance programmers, we could have system troubleshooters or a dynamic support group.

Cosmetic changes will help, but only when data processing management begins to concern itself less with the romance of development and more with the reality of maintenance will the latter receive the recognition and attention it legitimately deserves.

Duncan is a systems analyst in the Quality Assurance section of a major Dallas bank.

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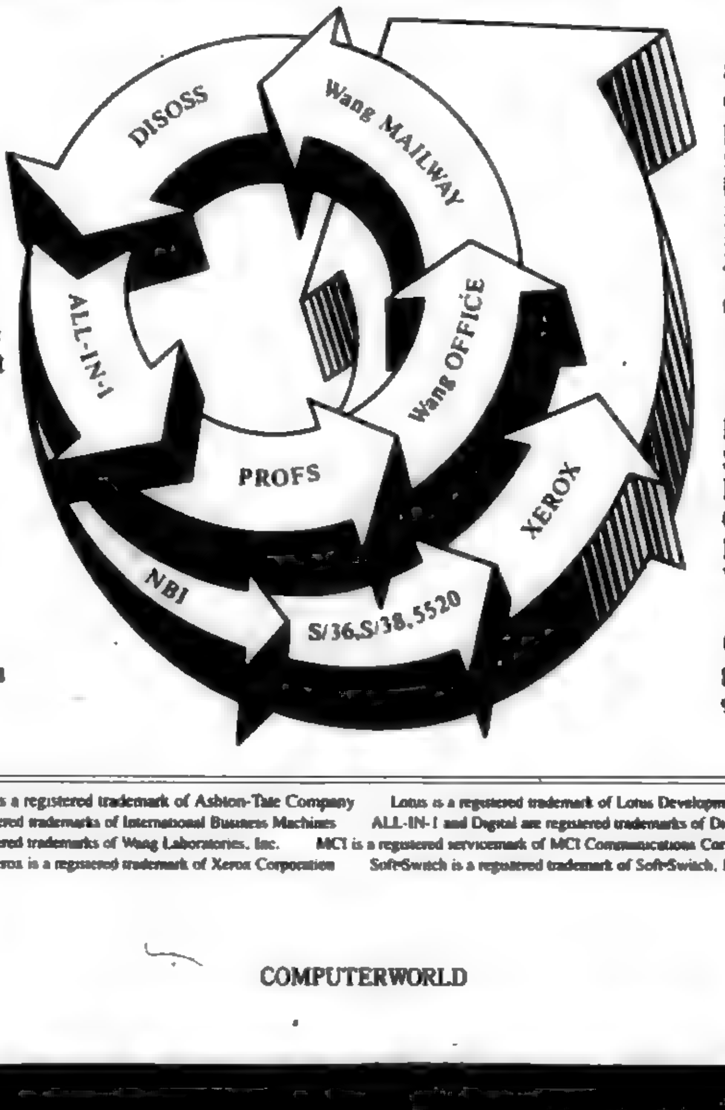

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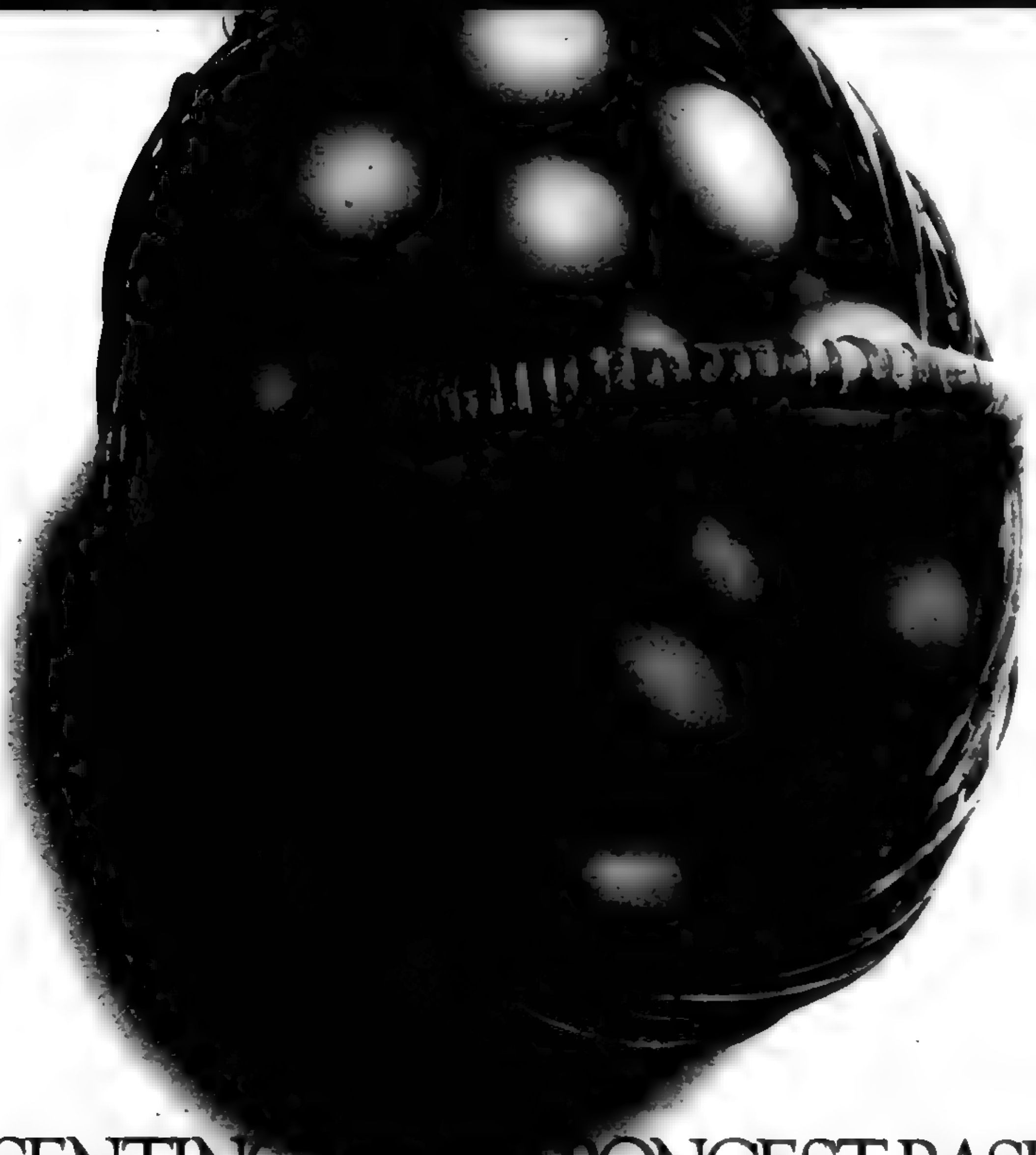

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Telecom

FROM PAGE 69

lation to demand, and an effort to raise the salaries to the level of other information systems managers, according to Joan Gable, manager of Robert Half's data processing placement department.

"There are not that many of them out there. It's a relatively new position," Gable said, adding that some companies are replacing telecommunciations consultants with full-time employees.

The average salary reported for large-shop telecommunications managers is $45,000. That compares with $60,000 for data base managers, $47,000 for technical services managers and $46,000 for systems and programming managers.

The average salary reported for telecommunications managers at medium-size shops is $41,000, which compares with $42,500 for technical services managers, $41,000 for systems and programming managers and $39,000 for data base managers.

New managers

New telecommunications managers tend to have at least a year of experience in that field, according to Gable.

While an MIS director who came up through the data processing ranks might be able to bring most of his new managers up to speed through his experience, he probably cannot do so for his new telecommunications manager, Gable said. Employers do not consider managers as transferable among technical areas as they once did, she added.

The demand for telecommunications experience extends to small, personal computer-oriented shops, Gable noted. "It's getting down to even the micro shops. People who have PCs are looking for someone who has modem experience," she said.

Filling jobs

College students increasingly specialize in telecommunications; in the long run those who have done so will fill many telecommunications jobs, Gable said.

Among large installations, starting salaries for 16 of the 23 data processing positions listed are up between 5% and 8%.

The others with larger gains are operators at 8.8% and operations managers at 8.6%. Positions with smaller increases are telecommunications specialists at 4.2%, programmer analysts at 3.3%, data entry operators at 1.6% and I/O clerks at 1.3%.

Among the 22 jobs listed for medium-size installations, all the others show gains of between 2% and 6%, except I/O clerks, which registered no change.

For small installations, the 11 positions listed show gains of 2% to 6%, except MIS directors', which rose 6.5%, operators', which rose 6.3%, and programmer analysts', which rose 1.8%. I/O clerks showed no change.

The survey notes that starting salaries can vary significantly on the basis of an individual's experience with specific technology and applications.

To compensate for geographical variations, the survey provides figures for adjusting average salaries by state. It also suggests adding 5% for jobs in cities of one million or more people. However, these variations do not apply to salaries of $50,000 or more.

Among the states for which salaries should be adjusted upward are California, Massachusetts and Connecticut (5%); New York (4%); Illinois and Michigan (3%); New Jersey and Washington (2%); and Minnesota (1%).

Among those for which they should be adjusted downward are Maryland, Ohio and Texas (1%); Virginia (2%); Colorado (3%); Georgia (4%); North Carolina (8%); and Arizona and Florida (9%). Pennsylvania is among states with average salaries.

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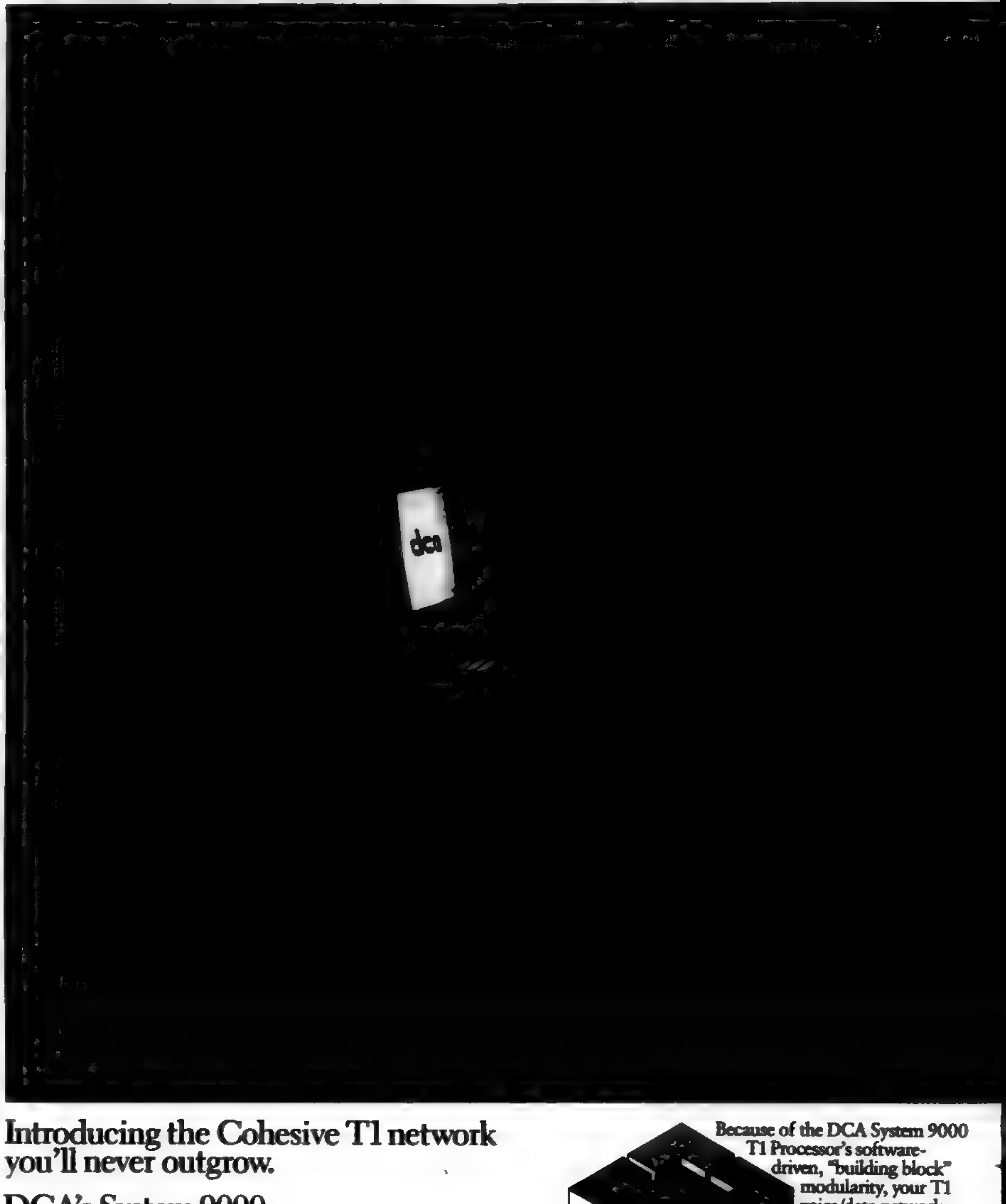

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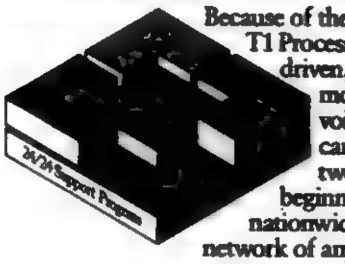

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Continued from page 70

Computer Aided Software Engineering Symposium. Atlanta, Feb. 24-26 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Third Annual Champs Users' Group Meeting. Crystal River, Fla., Feb. 25-27 — Contact: SCI Software, 1255 N. Vantage Point Drive, Crystal River, Fla. 32629.

Phoenix Conference on Computers and Communications. Scottsdale, Ariz., Feb. 25-27 — Contact: Arizona State University, College of Engineering and Applied Sciences, Tempe, Ariz. 85287.

Introduction to EDP Performance/Capacity Management. Phoenix, Feb. 25-27 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

ICIA '87/Commtex International. Atlanta, Feb. 25-28 — Contact: International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

X/Open Demonstration of Portability. Luxembourg, Feb. 26 — Contact: Christina Davis, X/Open Office, Sterling Public Relations, 1 Chelsea Manor Gardens, London, England SW3.

MARCH 1-7

Second International Conference on CD ROM. Seattle, March 2-3 — Contact: Microsoft Corp., Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

Seventh Annual Computer Operations Conference. New Orleans, March 2-5 — Contact: Association for Computer Operations Management, Suite 201, 11501 Brookhurst, Garden Grove, Calif. 92640.

Eighth Annual Conference on EDP Performance and Capacity Management. Phoenix, March 2-6 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

CICS/VS Command Level Programming Course. Edison, N.J., March 2-6 — Contact: Branch Manager, Suite 207, One Metroplaza, Edison, N.J. 08837.

Corporate Electronic Publishing Systems Show and Conference. Chicago, March 3-5 — Contact: Cahners Exposition Group, 999 Summer St., Stamford, Conn. 06905.

DEXPO Europe '87. London, March 3-5 — Contact: Expoconsul International, 3 Independence Way, Princeton, N.J. 08540.

Securicom '87 Congress on Computer and Communications Security and Protection. Paris, March 4-6 — Contact: Securicom-Sedep, 8 rue de la Michodiere, 75002 Paris, France.

Data Communications Network Management. Boston, March 5-6 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held April 30 to May 1 in Seattle.

Taxation of Intellectual Property. Chicago, March 5-6 — Contact: Deborah Gordon Public Relations, Inc., 320 N. Michigan Ave., Chicago, Ill. 60601.

MARCH 8-14

Cullinet Applications and End-User Computing Conference. Dallas, March 8-10 — Contact: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, Ma. 02090.

Continued on page 77

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Continued from page 75

Spring 1987 Conference of the North American Honeywell Users Association. Charleston, S.C., March 8-13 — Contact: NAHU, Inc., P.O. Box 2037, Willingboro, N.J. 08046.

CICS/VS Internal Structures & Control Flows. Atlanta, March 9 — Contact: American Data Group, Inc., 1770 Indian Trail Road, Norcross, Ga. 30093. Also being held May 11 in Philadelphia.

Automated Manufacturing: Computers, Communications and Controls in the Factory. St. Petersburg Beach, Fla., March 9-10 — Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

New Technologies. Beverly Hills, Calif., March 9-10 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

CAD/CAM, CAE Executive Workshops '87. Cambridge, Mass., March 9-10 — Contact: Cynthia Wolfram, Daratech, Inc., 16 Myrtle Ave., Cambridge, Mass. 02138.

Electronic Banking: The Challenges of Tomorrow's Bank Within Yesterday's Legal Framework. Brussels, March 9-10 — Contact: Alan Galaski, Conference Office Brussels, 19 rue de l'Orme, B-1040 Brussels.

11th Annual BRS User Meeting. Kansas City, Mo., March 9-10 — Contact: BRS Information Technologies, 1200 Route 7, Latham, N.Y. 12110.

Computer Technology and the Law: Protecting Your Rights. Arlington, Va., March 9-11 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Federal Office Systems Expo. Washington, D.C., March 9-12 — Contact: National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

Effective Management Skills for the MIS Manager. Cambridge, Mass., March 9-12 — Contact: American Management Association, 135 West 50th St., New York, N.Y. 10020.

Open Network Architecture: Computer III Status Report. Arlington, Va., March 10-11 — Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

Corpcon East. New York, March 10-12 — Contact: Linda Morris, Corpcon, P.O. Box 3727, Santa Monica, Calif. 90403.

Software Performance Engineering. Denver, March 10-13 — Contact: Performance Engineering Services, Dept. 120, P.O. Box 9802, Austin, Texas 78766. Also being held June 2-5 in Washington, D.C.

Optical Information Systems. Long Beach, Calif., March 11-13 — Contact: Meckler Publishing, 11 Ferry Lane W., Westport, Conn. 06880.

MARCH 15-21

The 1987 National Automated Clearing House Association Conference. San Diego, March 15-18 — Contact: NACHA, Suite 640, 1901 L St. N.W., Washington, D.C. 20036.

Fifth Annual Computer Based Training Conference and Exposition. Atlanta, March 15-18 — Contact: Julia Stasio, Conference Registrar, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

Guide International. Anaheim, Calif., March 15-20 — Contact: Guide Headquarters, 111 E. Wacker Drive, Chicago, Ill. 60601.

Software Quality Assurance. Los Angeles, March 16-17 — Contact: U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903.

1987 West Coast Manufacturing, Accounting and Production Information Control System Users Conference. San Diego, March 16-17 — Contact: Salem Corp., 1654 Poplar Lane, Annapolis, Md. 21401.

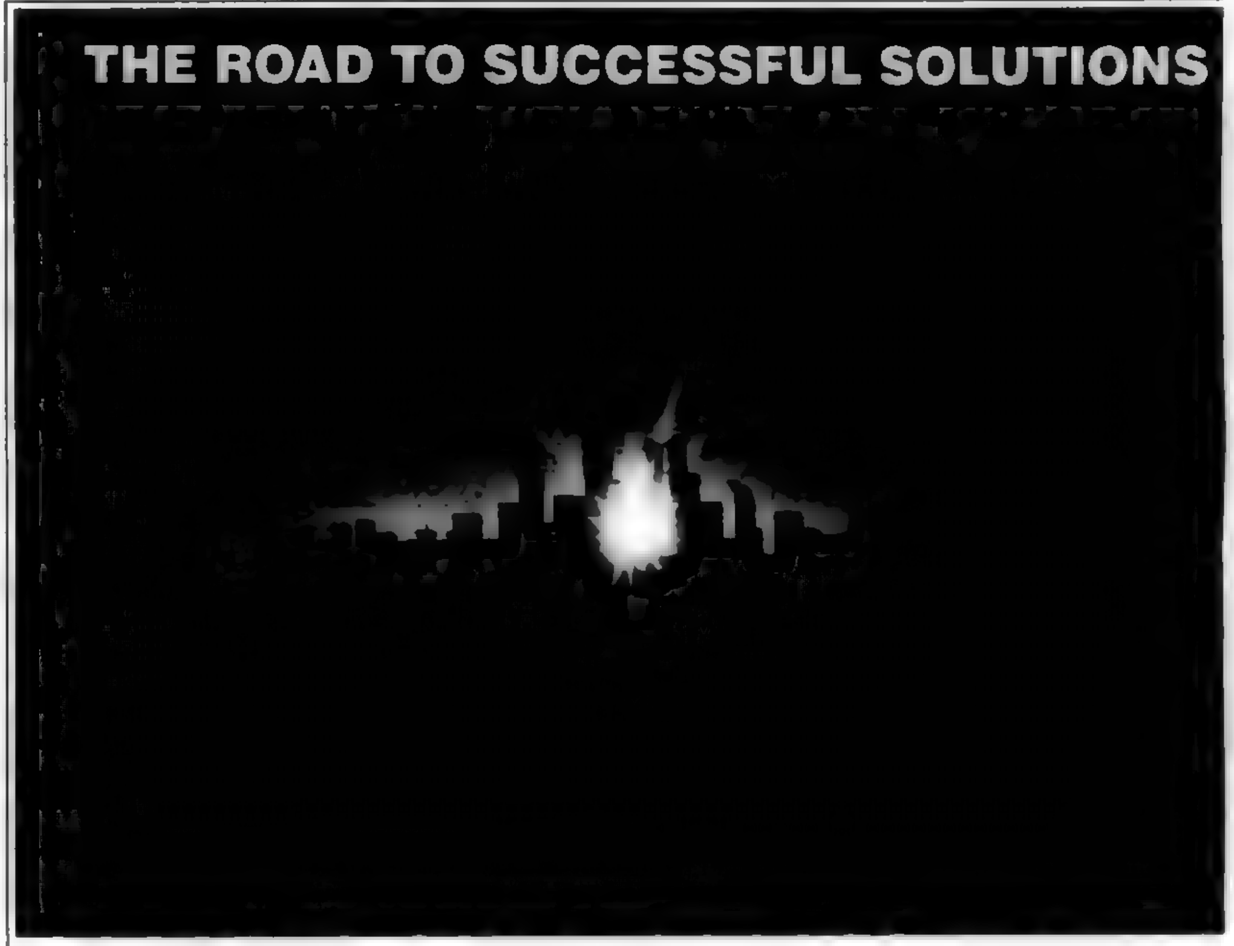
Artificial Intelligence and Expert Systems. Cleveland, March 16-17 — Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held in Louisville, Ky., Dayton, Ohio, Portland, Ore., Fort Worth, Texas, Baltimore, Richmond, Va., Concord, Calif., and Tulsa, Okla.

Fifth National Conference on Measuring Data Processing Quality and Productivity. Orlando, Fla., March 16-18 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Electronic Data Processing Audit Managers' Roundup III. Orlando, Fla., March 16-19 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

TCP/IP Interoperability Conference. Monterey, Calif., March 16-19 — Contact: Advanced Computing Environments, 21370 Vai Ave., Cupertino, Calif. 95014.

Continued on page 78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Continued from page 77

Tutorial Week. Kissimmee, Fla., March 16-20 — Contact: Computer Society of IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Open Systems Interconnection. Washington, D.C., March 16-20 — Contact: The Omnicom Institute, Omnicom, Inc., 501 Church St. NE, Vienna, Va. 22180. Also being held April 27-May 1 in Minneapolis.

Workshop on Factory Communications. Gaithersburg, Md., March 17-18 — Contact: Robert Rosenthal, B217 Technology Building, National Bureau of Standards, Gaithersburg, Md. 20899.

The Fifth Technology Opportunity Conference on Optical Storage of Documents and Images. Washington, D.C., March 17-19 — Contact: Rothchild Consultants, 256 Laguna Honda Blvd., San Francisco, Calif. 94116.

The National Association of Bank Servicers Semiannual Meeting. Tampa, Fla., March 17-20 — Contact: National Association of Bank Servicers, Suite B, 5008 Pine Creek Drive, Westerville, Ohio 43081.

The International Phoenix User Group Meeting. Atlanta, March 18-19 — Contact: Livingston and Associates, P.O. Box 30619, Cleveland, Ohio 44130.

Testing Computer Software. Los Angeles, March 18-20 — Contact: U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903.

1987 Template User Network (TUN) **Annual Conference.** Arlington, Va., March 18-20 — Contact: Template, 9645 Scranton Road, San Diego, Calif. 92121.

Innovative Systems 1987 User Group Conference. San Francisco, March 18-20 — Contact: Innovative Systems, Inc., 341 Fourth Ave., Pittsburgh, Pa. 15222.

MARCH 22-28

Electronic Computing Health Oriented (ECHO). Hot Springs, Va., March 22-25 — Contact: Electronic Computing Health Oriented, 10401 Fernwood Road, Bethesda, Md. 20034.

National Computer Graphics Association's Computer Graphics '87: Applications for Excellence. Philadelphia, March 22-26 — Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

Managing the Information Resource. Los Angeles, March 22-27 — Contact: Nolan, Norton & Co., One Cranberry Hill, Lexington, Mass. 02173.

Sixth Annual International Spectrum U.S.A. '87. Las Vegas, March 23-25 — Contact: International Data Base Management Association, Suite 104, 9740 Appaloosa Road, San Diego, Calif. 92131.

National Capacity Planning Conference. Washington, D.C., March 23-26 — Contact: National Capacity Plannin Conference, 3825-I South George Mason Drive, Falls Church, Va. 22041.

Walker Inter/Actions Users Conference. Denver, March 23-26 — Contact: Walker Interactive Products, 100 Spear St., San Francisco, Calif. 94105.

Seventeenth Conference on Computer Audit, Control and Security. Boston, March 23-27 — Contact: EDP Auditors Foundation, Inc., P.O. Box 88180, Carol Stream, Ill. 60188.

Datacon '87. St. Louis, March 24-25 — Contact: Datacon, P.O. Box 1401, St. Louis, Mo. 63188.

I/O Interface '87. Gaithersburg, Md., March 24-25 — Contact: William E. Burr, National Bureau of Standards, A216 Technology Building, Gaithersburg, Md. 20899.

Third International Conference on Computerization of Medical Records. Chicago, March 24-27 — Contact: Registrar, Institute for Medical Record Economics, 121 Mt. Vernon St., Boston, Mass. 02108.

1987 SIM Institutional Member Conference. Miami, March 25-27 — Contact: Society for Information Management, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Electronic Data Interchange. Arlington, Va., Feb. 19-20 — Contact: TDCC, Suite 712, 1101 17th St. N.W., Washington, D.C. 20036. Also being held March 26-27 in Washington, D.C.

12th West Coast Computer Faire. San Francisco, March 26-29 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

MARCH 29-APRIL 4

The Inevitable Partnership. Atlanta, March 29-April 1 — Contact: Life Office Management Association, 5770 Powers Ferry Road, Atlanta, Ga. 30327.

EFTA Expo. Las Vegas, March 29-April 1 — Contact: Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

Management Information Systems for Strategic Advantage. Philadelphia, March 29-April 3 — Contact: Office of Executive Education, The Wharton School, 200 Vance Hall, University of Pennsylvania, Philadelphia, Pa. 19104.

Applying the Records Management Technologies. New York, March 30-April 1 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held April 13-15 in Chicago.

Interface '87. Las Vegas. March 30-April 2 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

Reducing the Cost of Software. Washington, D.C., March 31-April 2 — Contact: Performance Engineering Services, P.O. Box 9802, Dept. 120, Austin, Texas 78766.

The 1987 National Conference on Data Processing Quality Assurance. Chicago, April 1-3 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

1987 Computer Dealers & Lessors Association Spring Meeting. Orlando, Fla., April 1-4 — Contact: Computer Dealers & Lessors Association, 1212 Potomac St. N.W., Washington, D.C. 20007.

Networking: The Large Organization Perspective. Melbourne, Fla., April 2-3 — Contact: Harris Briefing Center, 1025 W. Nasa Blvd., Melbourne, Fla. 32919.

APRIL 5-11

CHI & GI '87. Toronto, April 5-9 — Contact: Human Factors in Computing Systems & Graphics Interface 1987 Conference Office, Computer Systems Research Institute, University of Toronto, 2002 - 10 Kings College Road, Toronto, Ontario M5S 1A4.

The 1987 Eastern Simulation Conferences. Orlando, Fla., April 6-9 — Contact: The Society For Computer Simulation. P.O. Box 17900, San Diego, Calif. 92117.

The 1987 Facsimile and Image Communications Conference. Boston, April 6-8 — Contact: Cap International, One Snow Road, Marshfield, Mass. 02050.

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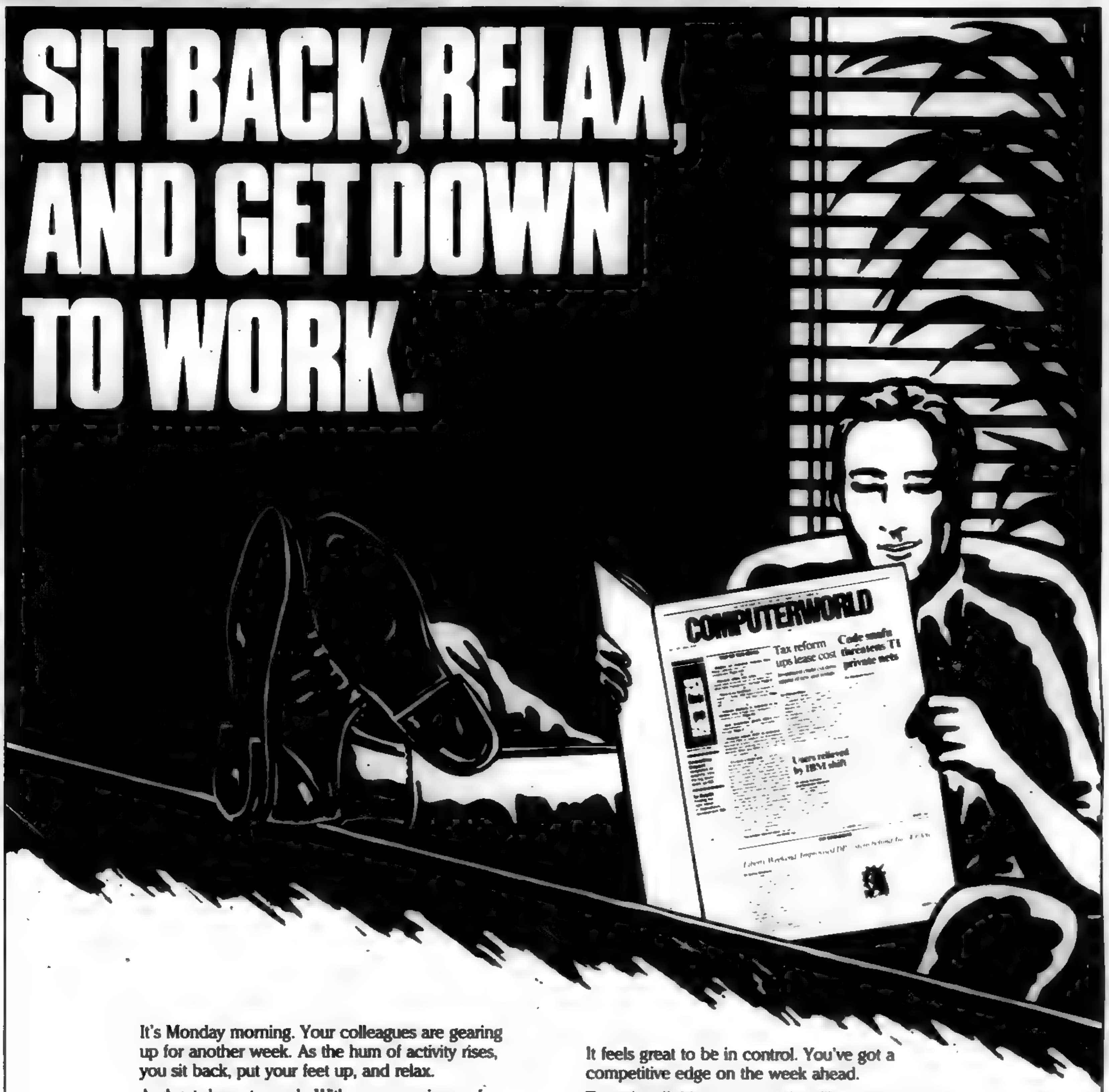
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- INSPEC
  - *High Technology Topics*
- Menu—The International Software Database
  - *International Software Listings*
- Microcomputer Index
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- ERIC
  - *Educational Topics*
- PTS PROMPT
  - *Business and Market Information*
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- DataTimes Information Network
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INDUSTRY INSIGHT

Clinton Wilder

Sun peeks out

The computer industry recently staged its own version of the climactic final scene of *The Graduate* when Sun Microsystems, Inc. drove up the California coast to snatch Centram Systems West, Inc. away from the altar and its imminent marriage to 3Com Corp. But unlike the wistful Dustin Hoffman riding off with his bride in the back of a public bus, Sun Microsystems appears to have a solid future ahead.

In its five-year history, Sun has always seemed to be eclipsed by someone else's shadow. Apollo Computer, Inc. pioneered the engineering workstation market, with Sun joining in later. And Sun's highly successful initial public offering last year hardly received the financial community's attention or a cover spot on *Fortune* as did Microsoft Corp.'s stock sale.

But Sun should be coming out of the shadows very soon — and with good reason. Chief Executive Officer Scott McNealy said at a recent investment conference that the firm has hitched its wagon to three significant industry trends.

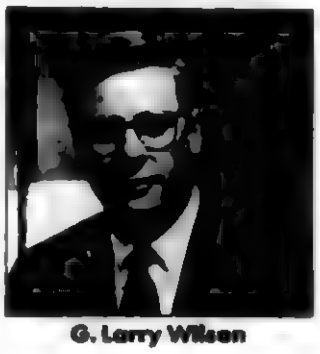
These movements are the rise of departmental computing, the move toward standards like Unix and Ethernet and the long-awaited momentum of Unix itself. The federal government's requirement that computer contract applicants must be able to run Unix has been well publicized, but many influential users — including Schlumberger Ltd. (a Sun OEM), General Motors Corp. and Ford Motor Co. — have adopted similar procurement requirements.

Many think of Sun primarily in the computer-aided design (CAD) arena, but in fact, CAD and computer-aided engineering applications accounted for just 24% of Sun's sales in the fiscal year ended June 1986. Computer-aided software engineering, a newer, faster growing and potentially more broad-based mar-

Continued on page 89

Policy Management deals from strength with IBM marketing pact

BY ALAN ALPER
CW STAFF



G. Larry Wilson

Since IBM became the exclusive U.S. distributor of banking software from Hogan Systems, Inc. in Dallas last year, analysts have looked for Big Blue to sign similar agreements with software developers that have successfully penetrated other strategically important vertical markets.

So when Policy Management Systems Corp., a developer of applications software for the insurance industry, recently disclosed that it had inked a cooperative marketing agreement with IBM under Big Blue's Industry Marketing Assistance Program (IMAP), some analysts were quick to draw parallels to the Hogan Systems deal.

Both Hogan and Policy Management are leading applications software suppliers to their respective industries, and both serve markets that are of vital significance to IBM. Banks and insurance companies are among the largest users of IBM equipment. Of Policy Management's approximately 500 customers in the property and casualty insurance industry, "only one or two have even looked at DEC equipment," says G. Larry Wilson, Policy Management president and chairman.

"The IBM alliance gives an

Continued on page 96

Unisys plans relocation; layoffs likely

BY JEAN S. BOZMAN
CW STAFF

DETROIT — Unisys Corp. ended 1986 by trimming its financial sails — selling major business units to offset the $4.3 billion cost of merging Burroughs Corp. and Sperry Corp. This year, with an emphasis on consolidation, Unisys is moving all in-house semiconductor operations to a single site in Rancho Bernardo, Calif., where the A 15 semiconductor components are made.

The move, announced recently, is expected to be complete by December. It may result in the dismissal of 800 of the 900 Unisys employees who worked at two Sperry semiconductor plants in Minnesota. It will also mean that further development of the Unisys 1100 mainframe's chips will have to take place at Rancho Bernardo. The plant is described as a state-of-the-art facility, where Burroughs and Motorola, Inc. participated in joint development related to the Burroughs A series.

"The decision to phase out the Minnesota operations was

Continued on page 96

EDS says case closed in Britain

BY JOHN LAMB
SPECIAL TO CW

LONDON — Electronic Data Systems Corp. (EDS) claims it has reached an agreement with British immigration authorities following investigations into allegations that EDS tried to skirt UK immigration laws.

The controversy had clouded EDS's bid to design and run a government data communications network worth an estimated 400 million pounds, or $609 million.

In 1985, a memo sent by an EDS manager to U.S. employees instructed them not to reveal, as required by immigration laws, that they were going to the UK to work. After discovering this, members of the British Parliament's opposition Labor party

Continued on page 93

Inside

- Computer terminal stocks hold their own. Page 85.
- High-tech execs greet the era of dispersed computing. Page 88.

MSA still high on mainframe sales potential

But Imlay broadens firm's base with vertical-market buying spree

BY JAMES A. MARTIN
CW STAFF

ATLANTA — Despite the apparent slowdown in mainframe sales in favor of high-end minicomputers and supermicros, Management Science America, Inc. (MSA) is confident that IBM mainframe applications software is leading the industry out of its two-year slump.

"Users are no longer focusing on hardware," declares John P. Imlay Jr., MSA chairman and chief executive officer. "They are now focusing on solving their business problems by developing a long-range information plan that complements their company strategies. As applications become implemented, machines are filled."

While not all would agree with that assessment, no one would disagree that MSA has weathered the recent slump well. The Atlanta-based company recently reported a 171% rise in 1986 net income, along with a 28% jump in revenue. Although MSA's 1985 net income was a modest $6.8 million, the company continued to report a profit through the last two turbulent years, while many other technology companies were not so lucky.

MSA plans to continue expanding in 1987 much as it did in 1986: by acquiring smaller companies with a strong presence in desired vertical markets and increasing overseas marketing and sales efforts. MSA will also emphasize adapting its mainframe application packages to market and technology changes through a combination of internally financed research and development and joint ventures.

Like other mainframe software vendors such as Computer Associates International, Inc., Uccel Corp. and Pansophic Systems, Inc., MSA went on a buying binge in 1986. First, MSA ventured into the IBM System/36 and System/38 minicomputer arena by acquiring RTS Ltd., a Dublin, Ireland-based manufacturing and financial software vendor.

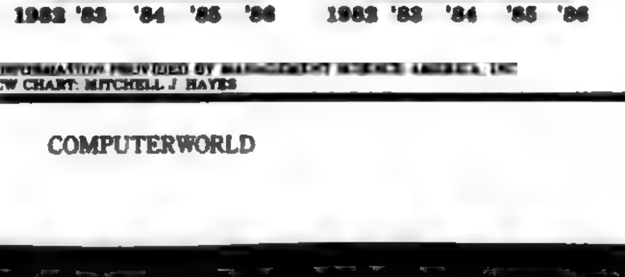
One month later, the company announced it would acquire Information Associates, Inc., with software offerings for IBM mainframe and Digital Equipment Corp. VAX minicomputers in the higher education market.

MSA saved its largest acquisition for last with Comserv, a manufacturing resource planning software vendor with pack-

Continued on page 89

MSA's 1986 rebound

Revenue and income for the last five years



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CW CHART: MITCHELL J. HAYES

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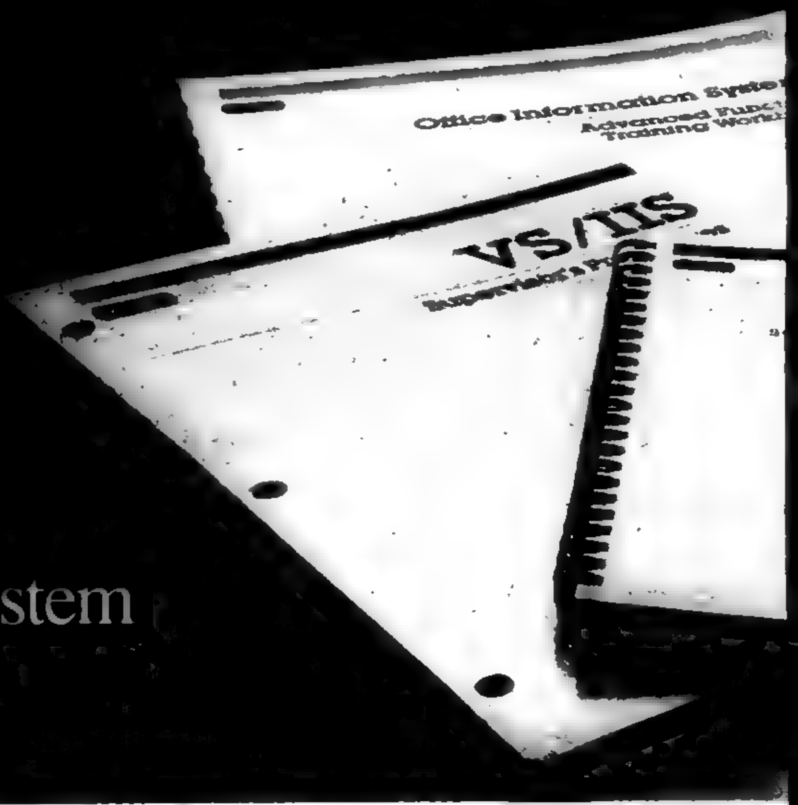

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ACTIVE ISSUES

Kathy Porteus

Terminal makers step up stock

As the stock market maintains its quick tempo, selected segments of techoology have not missed a beat. One such area has been computer terminal stocks. But analysts attribute much of the stock move for this group to diversification efforts by firms such as Wyse Technology, Inc. (WYSE — 24¾) and Telex Corp. (TC — 87¾) rather than improvement in terminal-market conditions.

Sluggish demand for mainframes and supermicrocomputers has hurt both IBM 3270-compatible and ASCII terminal businesses, according to Kenneth Leung of Smith Barney, Harris Upham & Co. Nevertheless, terminal companies are attempting to circumvent such flat growth by offering fuller product lines. The leading stock performers correspond with the companies that have most successfully diversified their traditional terminal business, namely Telex and Wyse.

Telex has scored with investors, Leung contends, because of its IBM 525X-compatible minicomputer terminal products and strong gains overseas with its 3270 systems. Leung says these factors assure Telex's growth for the next 15 months even without a resurgence in domestic demand for mainframes, and hence, 3270 terminals.

For these reasons, Leung continues to recommend the purchase of Telex, which he estimates will earn $5.30 per share in fiscal 1987, ending March 31, and $7.05 per share next year.

Similarly, Wyse has become a favorite among securities analysts because of its smooth shift into systems and display monitors. Joel Houseman, an analyst with Robertson, Colman & Stephens, says nonterminal business accounts for 50% of Wyse's revenue and most of the company's growth. Despite adverse industry conditions, "Wyse has continued to deliver the numbers," Houseman adds, "and the outlook continues to be good." He estimates the company will earn $1.50 for fiscal 1987, ending March 31, and $1.95 per fully diluted share in fiscal 1988.

Walter Winnitzki of L. F. Rothschild, Unterberg Towbin agrees that a major reason investors have become interested in Wyse is its participation in the microcomputer industry, which late last year attracted renewed enthusiasm from Wall Street. Yet Winnitzki maintains that Wyse's accelerated order and revenue momentum reflects strength in all areas of the company's business, including ASCII terminals.

Winnitzki estimates Wyse will earn $1.52 per share for the fiscal year ending March 31 and $2 per share next year. His 1988 estimates assume flat margins and revenue growth of 25% to 30%. However, he suspects his estimates might prove conservative, considering the company's recent quarterly growth of 57%. Both Winnitzki and Houseman of Robertson, Colman aggressively recommend Wyse. Winnitzki says Wyse still sells at a 30% discount to the Standard & Poor's 400, even after its recent 50% jump in price per share.

Behind Wyse, the big name in publicly traded ASCII terminal suppliers is Televideo Systems, Inc. (TELV — 2⅝). Yet Televideo's stock has stayed below $4, largely because of lost momentum in the terminal marketplace and unstable management. "Televideo's terminal products are now much more competitive, and the company continues to ship more units," Houseman says, "but this still represents a highly speculative situation."

Lee Data Corp. (LEDA — 8¼) is another stock with a troubled history, but it has recently benefited from Wall Street's notice of low-end hardware manufacturers. Lee Data's traditional business is IBM 3270-compatible terminals, but it has diversified.

Houseman says Lee Data's momentum should begin coming through in earnings. Houseman estimates Lee Data will earn 44 cents and 65 cents per share in fiscal 1987, ending March 31, and 1988, respectively.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Three Wang VPs quit; more may go

BY STANLEY GIBSON
CW STAFF

LOWELL, Mass. — Three Wang Laboratories, Inc. vice-presidents have departed recently, fueling speculation that the moves were in response to the new regime of Frederick Wang, the son of the company's founder and longtime chairman and chief executive officer, An Wang. Frederick Wang became president and CEO last fall.

Samuel Gagliano, vice-president of the strategic marketing program, resigned effective Feb. 6. Two weeks before, Richard Connaughton, vice-president of voice product marketing, resigned. Connaughton was in charge of Wang operations relating to its Intecom, Inc. subsidiary and Telenova, Inc., in which Wang owns a 42% interest.

Intecom, the Richardson, Texas maker of digital private branch exchange equipment, has been plagued by losses and may have been responsible for one third of Wang's $30 million loss in the second quarter of fiscal 1987.

Ralph Crusius, vice-president and assistant to Chairman An Wang, retired Jan. 30. "There are more changes coming as regions are combined. Some [more] vice-presidents will go," said John McCarthy, an industry analyst with Forrester Research, Inc. in Cambridge, Mass.

Gil Roeder and his team teach a whole staff C for less than one Seminar fee

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Students review lesson content with workbook exercises, and each module builds practical programming experience with sample programs provided on the C Video Workdisk. The package includes the acclaimed text "Learning to Program in C" by Dr. Thomas Plum, international authority on C and technical advisor to Hands On Learning.

The Secret: Roeder and his company have helped thousands to master computers and software. The secret of their system is its focus on people: using human experience to teach technical concepts. "It's like learning by osmosis" says one student, "I had no idea I was getting so much. When the tapes ended, I just started programming."

The All Hands On C Video Workshop is available in VHS or Beta at $995, and other formats at additional charge. We are sure you will find it an exceptional value. However, if you are not fully satisfied, return it for a full refund for up to 30 days. To order, or for more information, please call us or send this coupon with your business card or letterhead. Thank you.

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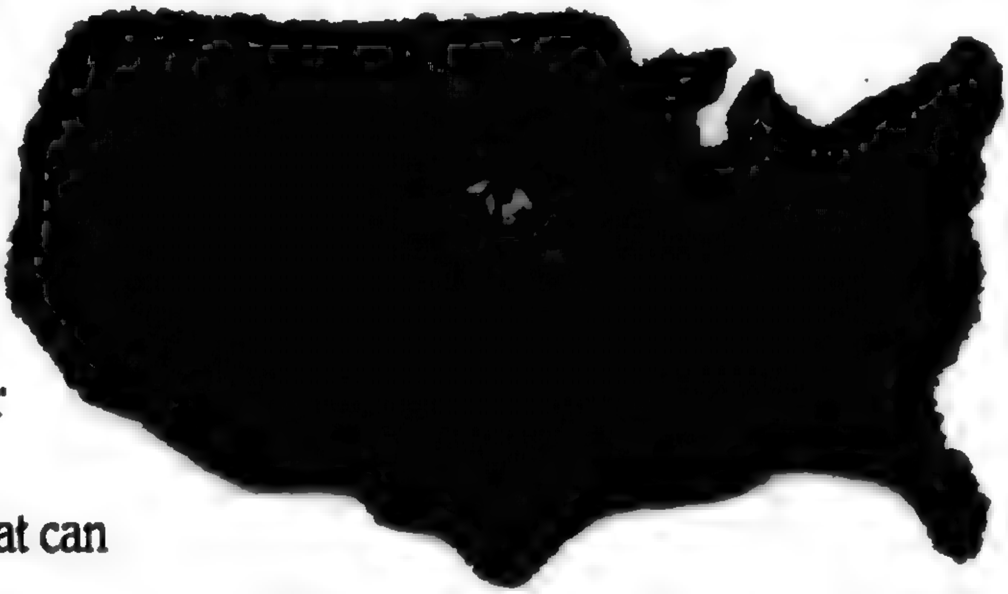

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CONFERENCE NOTEBOOK

Executives stress multivendor connectivity

BY ALAN ALPER
and CLINTON WILDER
CW STAFF

NEW YORK — The era of dispersed computing has arrived. That was the message delivered by executives of several leading computer and communications firms to investors at a recent Goldman, Sachs & Co. high-technology conference.

The paramount theme, according to the executives, is multivendor connectivity, whether within local-area networks (LAN), between minicomputers functioning as departmental processors or via gateways to IBM mainframes.

Computer users, within work groups or between departments, need to be able to exchange information in a timely and cost-effective manner, the executives said.

Among the vendors making presentations were:

3Com Corp. In outlining the Mountain View, Calif., firm's plans, President William Krause stressed that 3Com is not just a LAN vendor but also a supplier of work-group computing products.

In that vein, Krause said, the firm is investigating the development of an office network-station, a high-performance microcomputer that would use application-specific integrated circuits to provide built-in networking capability, integral enhanced graphics adapter cards and high-resolution monitors.

> "JUST as we learned in PCs . . . workstations are not isolated islands of office automation."
>
> WILLIAM KRAUSE
> 3COM CORP.

Such a system would be akin to engineering workstations offered by Apollo Computer, Inc. and Sun Microsystems, Inc. and would replace and/or co-exist with networked microcomputers.

Krause declined to say when 3Com would introduce an office network-station, or whether it would be produced internally or purchased from another vendor.

The need for such a product, he said, is obvious within work groups that make up the base level of many firms' three-tiered information structures. "Just as we learned in PCs, microcomputers are not stand-alone islands of office automation," he said, "so, too, workstations are not isolated islands of office automation."

Krause pointed out that there is still much opportunity within the existing base of personal computer users. Despite all the talk of LANs, 77% of all PCs still operate in a stand-alone fashion, he said.

Ungermann-Bass, Inc. In line with its goal to be "an information exchange company," Chief Executive Officer Ralph Ungermann said the Santa Clara, Calif., firm has begun to unbundle its software.

The Universal workstation product provides users with access to a multiplicity of computing environments including IBM 370 and Digital Equipment Corp. VAX as well as Microsoft Corp. MS-DOS microcomputers.

The goal is to facilitate universal file transfer between disparate systems, he said. "A hot key enables users to switch between the different computing worlds," Ungermann explained.

Ungermann foresees incremental revenue growth during the current quarter as a direct result of software unbundling, which began only a few weeks ago. "We should know more as the year goes on," he said.

National Semiconductor Corp. President Charles Sporck said the near-term prospects for a semiconductor industry recovery are still hampered by oversupply. "I don't believe we will see much relaxation of pricing pressure for some time," he said. "There is still too much overcapacity." He added that the overstocked inventory problem is more acute for the distributor channel than system OEMs.

Although Sporck said the U.S.-Japan semiconductor trade pact means little if the Japanese continue to dump products in third-country markets, he predicted the agreement will eventually benefit U.S. vendors. "It's going to work because it's in the best interests of Japan to make it work," he said. "The U.S. is serious about this issue, and the Japanese have much more to lose in a trade war than we do."

Sporck predicted IBM's recently announced 3090 Model 600E will actually help sales of National Advanced Systems' comparable AS/XL 100 because customers have delayed their purchases in anticipation of IBM's move. "It will spur the buying cycle again," he said.

Amdahl Corp. Chief Operating Officer Joseph Zemke called the 5890 CPU, announced last year, "the best product launch we've ever had." He said that within the past two months, Amdahl has signed four volume purchase agreements, ranging from five to 20 processors. He also noted that the Sunnyvale, Calif., firm sold three systems in 1986 to formerly all-IBM shops.

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Because of the familiar architecture, personnel trained in IBM mainframe use will be at home with 9370s. With new prepackaged software, novices will soon feel at home as well. And 9370s will likewise be at home in many roles: as host systems, departmental systems or remote extensions of existing mainframes.

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System/36 is IBM's simplest and least expensive entry point into mid-range computing. In addition to being IBM's most user-friendly mid-range system, System/36 also offers a broad spectrum of application software from specific industry solutions to office applications that suit any business.

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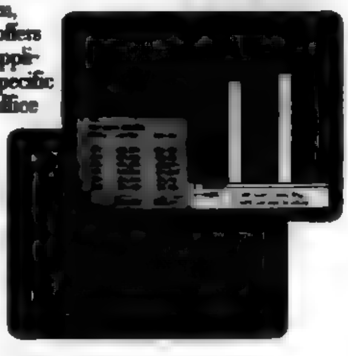
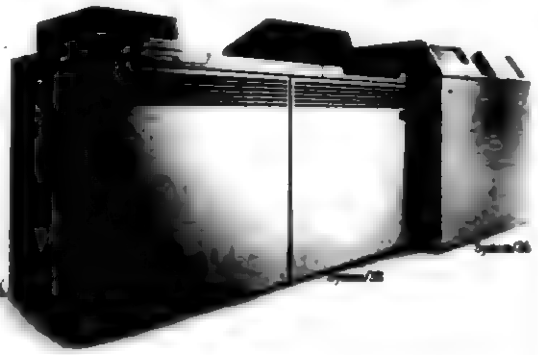


For growth, the System/38 provides a built-in relational data base (allowing you access to data on your own terms) as well as a toolbox of programming aids to help you, in a remarkably short time, custom-design applications that fit the job at hand.

The System/3X family members function equally well



System/3X

MSA sales

CONTINUED FROM PAGE 81

ages running on Hewlett-Packard Co.'s 3000 minicomputer. Comserv has been merged into a new MSA division, Advanced Manufacturing.

"MSA moved too slowly for too long," says Curt Monash, technology analyst with Paine Webber, Inc. "These acquisitions largely compensate for that. They now have two strong vertical markets — manufacturing and education. But they need to be stronger on the DEC VAX and in financial services applications."

MSA faced eroding market share several years ago, says Chris Mortenson, software analyst for Alex Brown & Sons, Inc.'s New York office, but "they've more than solved that problem now." Even as mainframes drop in popularity in favor of minicomputers, MSA is in a strong position, since most manufacturers, accounting for 42% of MSA customers, continue to use mainframes, Mortenson says.

MSA will be developing or acquiring vertical-market applications in retailing, banking and insurance, according to Imlay. "We have a wish list, and we have a lot of cash," he says, adding that the company currently has some $85 million in the bank.

MSA is also strongly interested in DEC's VAX minicomputer and IBM's recently announced 9370. "We've moved into the System/36 and 38 market with RTS, and with the VAX coming on strong, you'll certainly see us in that marketplace as well," Imlay says.

MSA's Imlay

In addition to future acquisitions, MSA is planning several joint ventures. The first is an agreement with Aion Corp. of Palo Alto, Calif., in which MSA will incorporate Aion's artificial intelligence technology into several of its own mainframe applications and will jointly market Aion expert systems software, according to Dennis Vohs, president of MSA Advanced Manufacturing.

In the future, every application package will have AI elements, Vohs says. "Software companies not doing anything in that area are going to have real problems in a few years," he maintains. MSA is positioned for adding AI capabilities as a result of the expert systems features of its Information Expert technology, he adds.

The company is currently negotiating joint ventures with several hardware vendors for manufacturing applications, Vohs says.

"We have some 3,200 manufacturing customers out of only 5,000 manufacturers that have mainframes, but there are hundreds of equipment suppliers. We're setting up some programs so those vendors looking for a large installed base can integrate with our software," he says.

IBM's DB2 relational data base and SQL have become mainframe standards, and MSA has been working to integrate its applications with them, according to Vohs. Beta tests of MSA's General Ledger and Information Expert systems under DB2 and SQL began in November, and development will be continuing this year.

Sun peeks

CONTINUED FROM PAGE 81

ket, accounted for 38%.

Sun appears to be serious about the markets of MIS applications development and office automation. It entered a joint marketing agreement with Wang Laboratories, Inc. — as did Apollo — late last year, and McNealy is proudly trumpeting Sun's 15 new customers in the Wall Street financial community. He also says Sun is about to "unhook a customer's $5 million mainframe order" by supplanting the box with a dozen of its 4 million instructions per second, high-end servers.

Forty percent of Sun's business is through OEMs, mainly traditional factory automation vendors like Computervision Corp. and Gould, Inc. But Sun claims that no one customer accounts for more than 10% of its sales, heeding a lesson learned the hard way by so many OEM suppliers.

In many ways, Sun is a throwback to the days when a Silicon Valley hardware company founded by a few whiz kids — McNealy is just 32 — could come along and dazzle the industry.

Sun is indeed growing fast — maybe too fast. In its most recent quarter, the opening of a new production plant fueled a 173% gain in sales to $115.3 million, while profits soared 405% to $8.5 million. Partly in an effort to staff the new plant, Sun is hiring new employees at the unheard-of rate of 200 to 250 a month. Talk about ramping up.

Despite such heady growth, Sun appears realistic about the increased competition it will face from vendors such as Hewlett-Packard Co., Digital Equipment Corp., Apple Computer, Inc. and IBM.

Apple's upcoming Open Macintosh has been dubbed the "Sun Killer," and McNealy freely admits that the new Mac will eat into Sun's computer-aided publishing market share. But that market was only 16% of Sun's business in the last fiscal year.

Clearly, all the big boys would like to gain some ground in the workstation arena. But as that market continues to heat up, it appears Sun will shine even hotter.

Wilder is *Computerworld's* senior editor, computer industry.

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A Fitting Conclusion

The reason IBM mid-range systems fit in so well is based on a simple piece of logic: they're built to fit your business, rather than vice versa.

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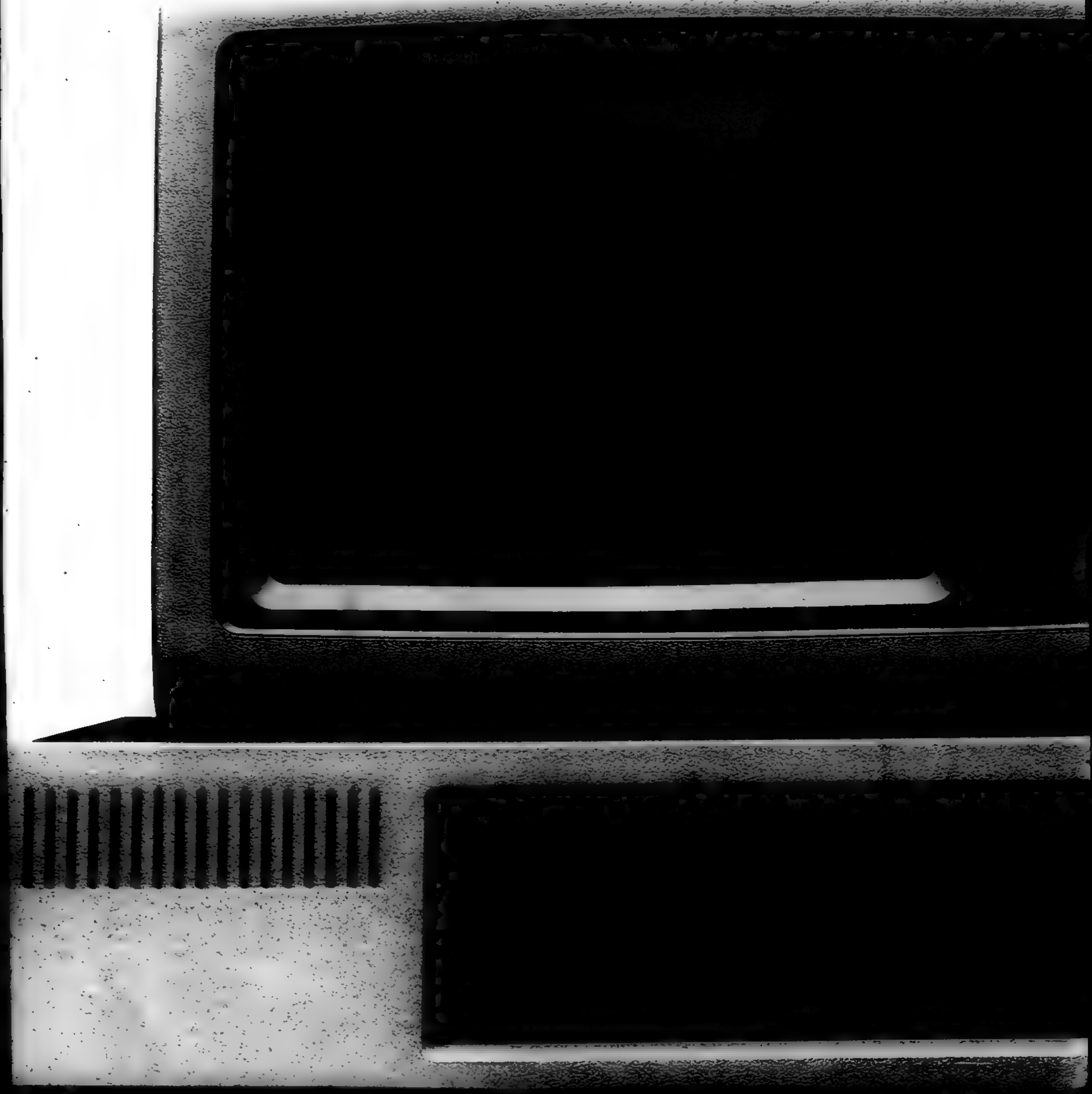

Using a PC merely as a stand-alone is rather like using a race car to fetch the groceries. A severe case of under-utilization.

But it's a widespread problem. And, since PCs are here to stay, a serious one. So we at Hewlett-Packard did some hard thinking—which resulted in the Personal Productivity Center (PPC). The PPC is an office information system based on the HP 3000 family of computers. It's designed to help you realize the full potential of your PCs, including IBM.

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The Personal Productivity Center, as you can see, is quite a remarkable achievement. Made more so because it can be integrated with IBM PROFS and DISOSS mainframe office systems. It lets your PC users share printers, discs and tape back-up devices. And it comes from the company with an unsurpassed record of service and support; the company that never stops asking "What if..." about how best to help you fully utilize your PCs.

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Case closed

FROM PAGE 81

called unsuccessfully for government ministers to reveal whether prosecution was likely.

Last week, EDS announced that the company had accepted recommendations made by the UK's Home Office — the department responsible for immigration affairs — and that the matter was closed.

"It was not a general EDS document," a company spokesman said. "It was put out by a single manager."

The revelation of the employee memo came just as government computer departments began initial stages of awarding a 10-year contract to integrate communications between four government departments and run a network supporting 85,000 terminals.

The Government Data Network, as the project is called, is the UK equivalent of the $4.5 billion U.S. Federal Telecommunications System 2000 project, for which EDS is also competing. EDS, in partnership with Northern Telecom, Inc., is on a list of five consortia bidding for the Government Data Network. A list of final bidders will be announced later this month. Work on the network is expected to begin in September.

Despite promised expansion in the UK, EDS has so far failed to buy its way into the UK software business after an abortive bid for London-based Logica, Inc. in 1985. EDS reported European revenue of approximately $250 million in 1986, with $100 million from the UK.

The firm has been trying to increase its European activities. Late last year, EDS successfully acquired SPI, the software and services arm of France's metals giant Pechiney S.A.

Lamb is a London-based correspondent for the CW Communications International News Service.

EDS boasts strong profits for quarter

BY ALAN ALPER
CW STAFF

DALLAS — Strong growth in its non-General Motors Corp. business helped Electronic Data Systems Corp. (EDS) register a 25% increase in fourth-quarter profits of $71.5 million, or 58 cents a share.

Revenue for the period ended Dec. 31 was $1.15 billion, up 7% from the previous year's level. The strong quarter contributed to a year-end profit of $260.9 million, or $2.13 a share, up 37% from 1985. Revenue for the year jumped 27% to $4.37 billion.

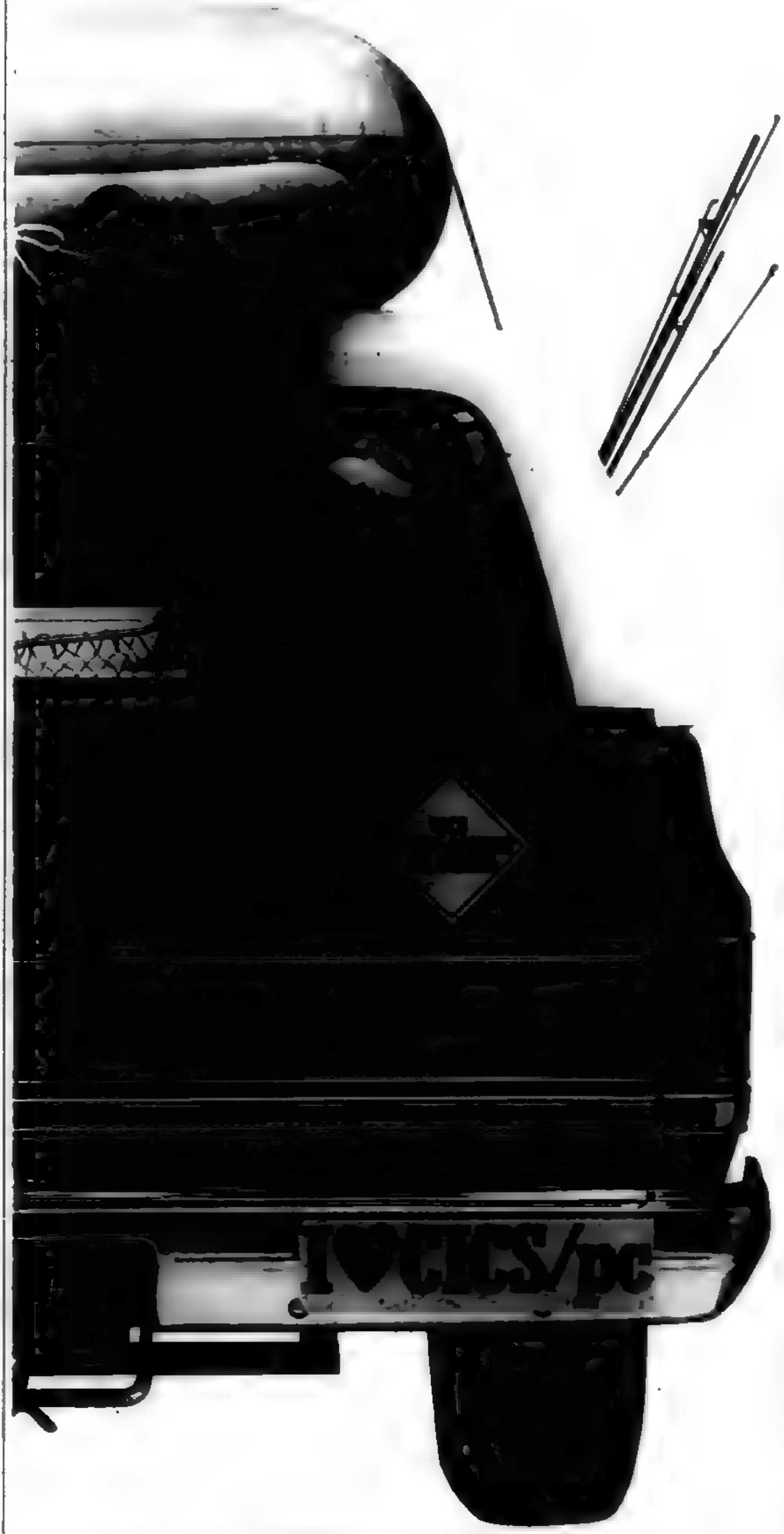
Analysts said EDS's strong fourth-quarter performance primarily resulted from growth in non-GM business, putting to rest concerns that the data processing and services firm had lost its competitive edge. Non-GM business was up approximately 25% in the fourth quarter from the corresponding period last year, while captive business grew only 1%.

Getting closer to AT&T

EDS benefited from a host of federal, state and local government contracts, as well as agreements signed with health care and insurance firms throughout 1986, the Dallas firm said. The firm also expanded its relationship with AT&T and signed contracts with a number of international communications concerns during the year, the firm added.

Major deals inked in 1986 included an eight-year U.S. Air Force contract, an eight-year contract to automate the office of the U.S. Secretary of Defense, a five-year agreement with Isuzu Motors Ltd. in Japan and a contract with Midland Bank PLC in the UK.

EDS is in the second year of updating and integrating all of GM's data processing systems and is developing manufacturing simulation systems for the auto maker. The firm is streamlining GM's benefits systems, consolidating its 50 data processing centers into an integrated network of 14 larger facilities and creating a single global communications network.



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It's Monday morning. Your

8:30 A.M. • TOKYO, JAPAN

IDG's International Data Corporation managing director **Yugi Ogino** is stopped in his tracks by a flash report on the company's International News Service. *Digital News* has just spotted a potential challenge to IBM's grip on the professional PC market: DEC has announced their Local Area VAX Cluster. Ogino sets up a conference call with *Computerworld Japan* editors to brief them on his analysis.

8:40 A.M. • SYDNEY, AUSTRALIA

At almost the same moment 4,300 miles to the south, *Computerworld Australia* publisher **Susan Coleman** sees the DEC story on her news wire. She calls in **Peter Scott**, her editor, to plan editorial coverage for their market.

11:00 A.M. • HELSINKI, FINLAND

Halfway around the world, **Timo Tolsa**, editor of IDG's Finnish computer newspaper *Tietoviikko Ky*, faxes his comments on the pending story to **Dieter Echbauer**, editor of *Computerwoche* in Germany, who appoints an editorial team to file a comprehensive story for use by all five IDG publications in Germany.

10:10 A.M. • BUENOS AIRES, ARGENTINA

Ruben Argento, the head of IDG's *Computerworld* newspaper in Argentina uncovers a new wrinkle in the rapidly unfolding story–and alerts Doane Perry, senior market consultant at IDC in Framingham, Massachusetts: a DEC competitor in South America is developing a similar cluster product.

world just changed again.

10:30 A.M. • BOSTON, MASSACHUSETTS

IDG reporter **Kathryn Esplin** files a VAX Cluster story for *Digital News*. Her back-up analysis is sent to all publication offices around the world on the company's news wire.

2:00 P.M. • FRAMINGHAM, MASSACHUSETTS

Perry meets with **Bill Ford**, IDC Information Industry Services Chief, to plan a global research report on computer clusters and their potential impact on business users.

4:45 P.M. • PALO ALTO, CALIFORNIA

IDC Research Director **Jean Yates** faxes detailed schedules of the report requirements to IDC research centers in 16 other countries. Deadline: 1 week. Overnight mail announcements of the pending report are mailed to IDC's top 1,000 customers around the world.

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Policy

FROM PAGE 81

aura around something a company has developed," notes Chris Mortenson, an analyst with Alex Brown & Sons, Inc. in Baltimore. "It's as if IBM has blessed something."

On closer inspection, however, the OEM agreeement IBM signed with Hogan last spring [CW, May 12] has many more differences than similarities to its IMAP arrangement with Columbia, S.C.-based Policy Management.

For one, Policy Management is not limited to an exclusive working relationship with IBM under the IMAP agreement, and it retains marketing rights to its products. Hogan gave up domestic marketing rights to its products to IBM in return for royalty payments, which analysts have estimated at 40% to 50% on each sale.

Policy Management, on the other hand, gave up its IBM value-added reseller status for its role as an IMAP partner. The firm will receive commissions of less than 10% for each joint sale the two companies make on IBM hardware, according to Wilson.

Policy Management will also get an unspecified commission on strategic software components licensed with hardware, such as DB2, SQL and library-control facilities, notes Don Coggiola, Policy Management executive vice-president of field operations.

Another difference between the two situations is the financial wherewithal of the two software developers. Hogan had suffered through a string of well-publicized financial problems before giving IBM the right to market its software. Although Policy Management's profits dipped 5% last year, the firm still earned $13.8 million on revenue that grew 46% to $150.6 million.

Both situations also reflect IBM's move to strengthen its financial performance by increasing its emphasis on software. Analysts expect IBM to build additional alliances with other software firms this year, dubbed its "Year of the Customer."

'IBM has not moved fast'

"IBM has to derive a larger percentage of its revenue stream from software and services, and they have not moved fast in that regard," notes Rick Sherlund, an analyst who follows the software business for Goldman, Sachs & Co. in New York.

IBM's glaring lack of strong insurance industry applications software could be the reason it has aligned itself with Policy Management. "At worst, this is a deal struck between equals. You could argue that IBM needed Policy Management more than vice versa," Alex Brown's Mortenson maintains.

Although an IBM spokesman refused to comment on the agreement, Charles Buchheit, director of the insurance industry for IBM, told Policy Management's company newsletter, "When we identify an opportunity, the IBM marketing representative can bring Policy Management into the marketing situation. Policy Management may also identify an opportunity and initiate IBM's involvement."

While not bundling Policy Management software, the cooperative marketing arrangement should help IBM sell more 9370s to the insurance business, Sherlund says. "It will give them instant help in the mid-range," he suggests. "There, you need a joint sales effort."

By working with Policy Management, IBM should be able to better understand the needs of the insurance industry. In that vein, IBM is said to be restructuring its field sales force on an industry-specific basis to foster a closer relationship with its customers.

Unisys

FROM PAGE 81

the result of a comprehensive evaluation of its existing semiconductor capability in relation to future product requirements and desired business methodology," according to a company statement.

Approximately 100 of the workers will probably be relocated to Rancho Bernardo, according to Unisys, while the rest will be offered the outplacement services of a national relocation company. "This is part of our continuing effort to consolidate operations and to downsize the company," a corporate spokesman said.

Unisys is now saying it is a $9 billion corporation with 98,000 employees worldwide.

The Minnesota employees had staffed two former Sperry semiconductor facilities: a defense-related facility in Eagan, Minn., and a Unisys 1100 mainframe facility in Roseville, Minn.

Plant to remain in use

Unisys intends to find another use for the Eagan plant, which houses about 240,000 square feet of working space.

It is nearly as large as the 280,000-square-foot Rancho Bernardo facility, which is where very large-scale integration chips are made for the company's A series mainframes, including the A 15.

The move follows several other initiatives to consolidate operations from the Sperry and Burroughs sides of the company. Two other examples are the recent consolidation of all artificial intelligence development activities and all Unix software development projects.

Merger steps incomplete

"Effectively, we completed the major reorganizational moves by Jan. 1," the Unisys spokesman said. But he added that some areas, such as redeployment of the U.S. marketing force and cross-training of maintenance engineers, will take months to complete.

In order to promote a unified image of the company, press spokesmen from Burroughs and Sperry held their first extended meeting together last week in Blue Bell, Pa.

But that will not be the last word in reorganization. "The final step will be the complete changeover of all Sperry and Burroughs signs," the Unisys spokesman stated, "and that may take up to three years to complete."

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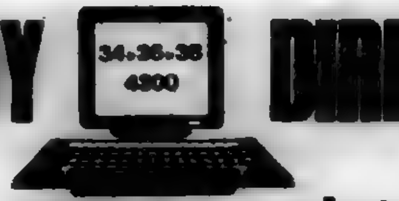
BUY 

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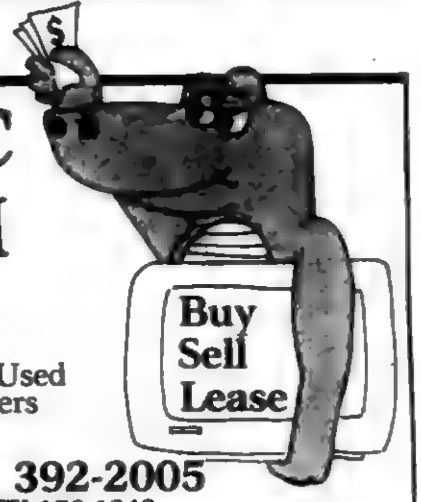

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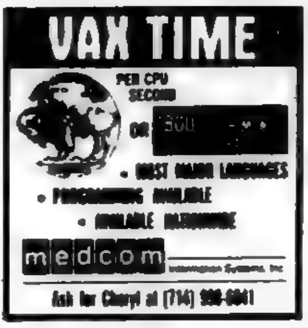

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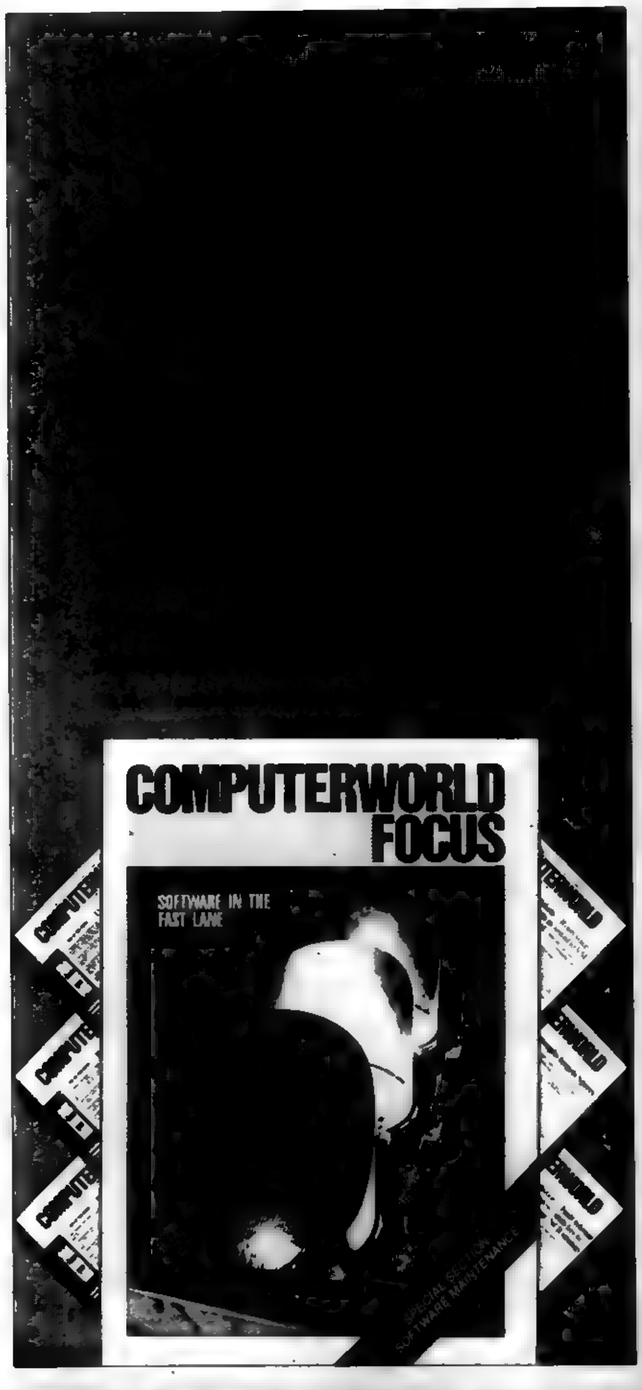
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Successful applicant should demonstrate a broad exposure relevant to computing services, with several years progressively responsible position, including two years supervising computer professionals. Communications skills (oral and written) are essential. Salary range is $38,000 to $44,000 depending on qualifications.

Interested persons should submit statement of interest and resume to **Doug Smith, Chairperson Search Committee, Computer Center, Indiana State University, Terre Haute, Indiana 47809 (812-237-4113)**. Applications received after March 31st cannot be guaranteed consideration.

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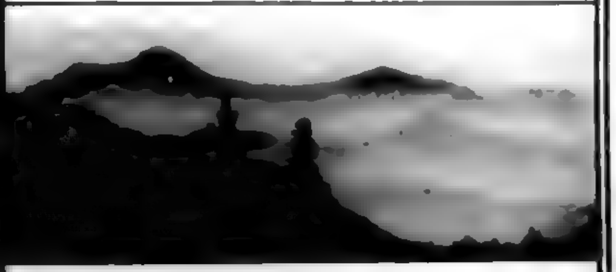

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Person will assist in coordination of software testing and migration and post-implementation review of new Integrated Savings Systems. This position requires knowledge of testing methods and requirements as well as experience in creating and executing test plans An excellent grasp of OS JCL is necessary and experience with HOGAN Integrated Banking Software strongly desired

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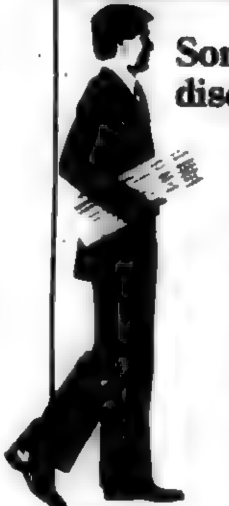

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Responsible for performing the duties of Associate Director of The Computing Center at a state-assisted university. Position is currently available, reports to the Director. The Computing Center, and organizationally is in the University's Division of Finance and Business Affairs. Specific responsibilities include assisting with the management and supervision of The Computing Center staff and activities, directing the computer security control program, developing, implementing and maintaining a computer resource and data disaster recovery plan, and assisting with technical space and environmental planning. Duties also include performing all aspects of personnel supervision, assuming responsibility for the department in the Director's absence and performing other assigned duties as requested.

Qualified candidates will have significant, progressively responsible administrative experience in a data processing environment. A bachelor's degree in a relevant field is preferred. Demonstrated administrative abilities and effective communication and supervisory skills are essential.

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Manage installation of ACP cargo reservation systems. Require Bachelor's or equivalent (9 months professional experience is equivalent to 1 year of education) in data processing or computer science and 5 years experience including ACP/TPF, CARGO and prior project management. Salary is $45,000 per annum. Job location: Los Angeles, CA. Resume to:

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to interface with all levels of end-user management and supervise three-five Programmer-Analysts in design and implementation of new systems. Determine hardware and software needs, develop release control procedures, oversee technical installation, statistical analysis, maintenance of systems, systems testing, debugging and code inspection. Must apply knowledge of IBM's Information Management System (IMS). High School grad plus five years experience or five years experience in systems analysis and design and references required. Mail resumes to NYS Job Service, 175 Remsen Street, Second Floor, Brooklyn, New York 11201. Job Order # NY8001406. DOT Code 012167066.

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Expertise in the design of CPU, memory and I/O subsystems. Experience in ECL is preferred.

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This is a new position, reporting to the Director of Administrative Services, and will be responsible for planning and operations of all administrative computing systems and training of user personnel. The person selected must be able to work and communicate effectively with senior management and staff and have strong interpersonal skills and leadership abilities. Desirable qualifications include: a college degree, preferably in information systems, business or management; at least five years of systems analysis and information systems management experience in an integrated data base environment; experience with DEC VAX equipment and networking personal computers and related software and the training of system users in the use of both hardware and software; and familiarity with higher education administrative procedures. The university provides an excellent benefits package including tuition remission and assistance. Salary will be competitive and commensurate with qualifications and experience.

Applicants should submit a letter of interest, resume and a list of five professional references (with both addresses and telephone numbers) to be received not later than March 2, 1987, at the following address:

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University of Redlands
1200 E. Colton Avenue
Redlands, CA 92373

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SYSTEMS ANALYST

Define requirements, perform analysis, design, construct and implement assigned application systems. Serve as senior technical project team member for development and systems implementation. Requires four (4) or more years of relevant experience including structured systems development methodology

PROGRAMMER/ANALYST

Design, construct, document and implement assigned application systems. Requires two (2) years knowledge of business systems using COBOL/CICS

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Alliance Health System
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We're searching for an individual with 2-5 years experience with systems programming, operations management or contingency planning/disaster recovery. Involvement in the development and execution of a plan requiring multi-organizational cooperation such as a data center move, a major software conversion or development of a disaster recovery plan is ideal. IBM familiarity and strong customer contact skills are essential.

Charter's MIS team is located one hour south of Atlanta in Macon, Georgia. We offer a highly competitive compensation and benefits package along with generous relocation assistance.

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CHARTER MEDICAL CORPORATION
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Computer Center Director

University of Wisconsin-Parkside

-Key position in formulating campus-wide policy on computing and information technology
-Responsible for executing policy and administering the operations of a combined academic administrative central computing facility
-Major resource in formulating strategic plan for computing across campus, which will guide acquisition of updated hardware and software and improve coordination and more effective setting of priorities affecting computing and information flow
-Center operates IBM 4341, Dec VAX-11/750 and PDP-11/70, and Data General S 280; develops systems and administrative applications, and provides assistance to all users of Center and of microcomputers
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Expected qualifications include successful experience in planning for computer services and in managing and operating an effective computer services organization, preferably in a university setting. Experience in both academic and administrative computing helpful, as would be advanced degree. Salary commensurate with qualifications.

Send letter explaining relevant experience, full resume, and names of at least four references (including addresses and telephone numbers) to **Associate Dean Ben Greenebaum, WLLC 343, UW-Parkside, Box 2000, Kenosha WI 53141**. Applications accepted until position is filled but screening begins late February. An Equal Opportunity/Affirmative Action employer; applications encouraged from women and minorities

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SYSTEMS ANALYST - analyze job flow of business, design program structure, file structure, input-output forms, assign fellow programmers with jobs and manage them, coordinate programmers & assist in debugging & testing, perform integrated tests of programs, perform commercial tests at customers' premises, prepare documentation & train customers. Computer language used: Assembly/MVS/JESII. Hardware used: IBM 4381 XA. 40 hr/wk. $35,500/yr. M.S. degree in computer science required. 1 yr direct exp. or 2 yrs. related exp. as computer system engineer. D.O.T. code 012167066. Mail resume to: NYS Job Service, JO #8010174, 485 Fifth Ave., NYC 10017

COMPUTERWORLD

COMPUTERWORLD's paid circulation climbed to over 126,252 this fall. Folio 400 (Folio Magazine's study of trade publication performance) placed us first in total revenue. As the industry grows, so will **COMPUTERWORLD.** It will continue to offer the high quality news coverage and editorial content that has attracted its readers. What does that mean to you, our advertisers? Good news...in the form of wide exposure.

The Classified section of the newspaper is laid out in an attractive format and is easy to read. It offers classifications to solve a variety of problems:

Position Announcements, Buy • Sell • Swap, Software For Sale, Software Wanted, Time & Services, Bids & Proposals, Business Opportunities, Real Estate, Auctions, Positions Wanted, Seminars & Conferences, Publications and The Bulletin Board

Our BULLETIN BOARD section is ideal for the smaller companies who want a low-cost way to sell pieces of equipment (hardware or software). The BULLETIN BOARD is laid out as a quick reference for potential buyers who know what they are after.

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A number of Product Spotlights are scheduled to run in **COMPUTERWORLD** during the first quarter of 1987. Each of these features will focus on one aspect of the computer industry and give our advertisers a chance to reach a more select audience. There will also be a number of issues distributed at shows **COMPUTERWORLD** will be participating in. We will also have bonus distribution of **COMPUTERWORLD** at these shows:

Bonus Distribution Issues

- March 23 - **NCGA Show**
- March 30 - **Interface Show**
- April 27 - **DEXPO Show**
- June 1 - **COMDEX Show**

Product Spotlights

- Mar 2 - **PC storage devices**
- Mar 16 - **Graphics**
- Mar 30 - **Modems**
- April 6 - **Desk Top Publishing**
- April 13 - **TI Equipment/Multiplexers**
- April 20 - **Workstations**
- April 27 - **DEC-Compatible Equipment**

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DATA ENGINEER

Office of Telecommunications
The Pennsylvania State University

The Pennsylvania State University invites applications for the position of Data Engineer. The position reports to the Director of Data Communication Services and is responsible for the analysis, design, selection, and installation of data communications networks and components to support academic and administrative units in the University. The office provides central support for communications services for 8,000 faculty and staff and over 60,000 students located at 22 state-wide locations. Supported networks include Ethernets, ProNETS, and IBM Token Rings, and a very large switched, asynchronous network that extends to 21 campus locations and every county in the state.

Applicants must have a Bachelor's degree, or equivalent, in electrical, electronic, or computer engineering or a discipline related to telecommunciations, plus two to four years of effective experience in data communications.

Salary is negotiable and competitive. Submit letter of application, current resume, and salary requirements to:

Employment Division
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Migration hard for users

Many choices, few tools to move from System/36

BY STANLEY GIBSON
[illegible]

Users of IBM's System/36 minicomputer seeking more power confront hard choices, ranging from converting to an IBM System/38, ordering an IBM 9370 or moving to another vendor's equipment.

No matter which option users decide on, each requires a complex conversion. And looming over the horizon is an as yet unannounced, but much discussed, future System/38 machine.

Despite IBM's efforts to market the System/36 and 38 as a mid-range continuum, System/36 users who convert to a System/38 seldom do so without major difficulty.

'Bloody' conversions

"In the past, all conversions have been described as bloody at best," said Rodger Peck, a System/36 consultant and president of Peck Systems Group in Bridgman, Mich.

Last June, IBM announced software that would convert System/36 code to run on the System/38. The bridge is viewed by some as a temporary patch and a prelude to a more complete machine that will amalgamate the two architectures, to be introduced next year.

One user was told directly of the machine when he was making a decision on converting to a System/38. Gerard DiStefano, MIS director for Standish, Ayer and Wood, Inc., an investment management firm in Boston, traveled to Rochester, Minn., for a briefing on the future of IBM's mid-range. DiStefano was told that the System/38 CPU will be further expanded and will be the foundation of the combined System/36 and 38 line through the 1990s. And the capabilities of the System/36 will be blended into the new box.

"They indicated the System/38 architecture was the wave of the future and a new box would be out in 18 to 24 months. It sounded like the System/36 Model D was the end of the line," he said. An IBM spokesman would not comment on what DiStefano was told.

The MIS director ultimately opted to move to a System/38, even though doing so will mean facing severe obstacles.

DiStefano is allowing approximately one year for his conversion from the System/36 to the 38. In the process he will rewrite some 1,500 programs. He will also continue to use a System/36 machine in conjunction with the 38. This will present some problems in that a System/36 user will be able to access documents on the System/38 but will not be able to update them, he said.

DiStefano said he has confidence in his decision, despite being told by IBM that it would be impossible to upgrade from the System/38 he will soon own to the coming machine.

Migration 'bugs me'

DiStefano termed the impossibility of a hardware migration "very unfortunate. It bugs me." Nonetheless, he was assured that CPF and RPT3 software will run on the new machine. "Our investment [in software] won't be wasted," he said.

Some consultants maintain that going to a 38 is the least painful option facing System/36 users who are running out of capacity. "While the System/36-to-38 conversion is difficult, it will be less traumatic than going to a 9370 or another vendor," said Charles Massoglia, president of Massoglia and Associates, Inc. in East Lansing, Mich. He said that he allows 90 days for a full conversion from a System/36 to a 38.

"It is not an automated conversion. There is manual work involved," he stressed, despite the fact that a user may employ IBM's code-conversion facility.

And despite speculation that the System/36 will be eclipsed by the new System/38-based machine and that the System/38 line may be overshadowed by the 9370 line, IBM is evidently making a large marketing push in trying to sell the System/36.

One industry analyst reported that IBM has assigned sales representatives to do nothing but sell System/36s in competitive situations. Another observer said IBM reps are being given System/36 quotas to meet, rather than a cumulative dollar figure that could be attained by selling a few large mainframes.

For users who buy the System/36 now, the ability of its software to run on the future System/38 machine would appear to be critically important. Users like DiStefano have been assured that will be the case. And consultants such as Massoglia, who work closely with IBM machines, are convinced that IBM will continue to foster three architectures — the current System/36 and 38, the 370 and the PC — assuring a hardware platform for software written for current System/36 and 38 machines.

However, John McCarthy, an industry analyst with Forrester Research, Inc. in Cambridge, Mass., offered a differing view. "I wouldn't migrate to the System/38 with the 9370 coming. I'd go to a DEC VAX or a Wang Laboratories, Inc. VS, because those are the strategic products of those companies."

Criminal past

FROM PAGE 1

ecutive Committee," said Tom Doeppner, chairman of the institute's Capitol-Area Executive Council. "I don't feel it's incumbent upon me or anyone else in the IEEE to notify our people about anything either good or bad in someone's personal history," Doeppner said during a recent phone interview.

Of the 30 or 40 members who were present at Rifkin's election, none has formally protested his candidacy before the association's Ethics Committee, although "probably at least half the voters knew the full story," Doeppner said.

What some of the local IEEE members do find objectionable, however, is the section leadership's suppression of possibly relevant information about a candidate's professional background. Much of the rank and file was unaware of Rifkin's former Security Pacific ties, even as he was running for office. Last May, he succeeded in his effort to win election as a section director — a post he is scheduled to hold until mid-1988 when his two-year term expires.

"I'm probably one of the few people in the local organization who did know about Rifkin's background," said Stuart Katzke, an IEEE member and National Bureau of Standards (NBS) security specialist.

'No reference'

Rifkin declined to respond directly to questions about his and the IEEE's failure to inform its members about his background.

Ray Pickholtz, vice-president of the IEEE's Communications Society and professor of electrical engineering at George Washington University in Washington, D.C., said he did not know about Rifkin's background. Although Pickholtz votes regularly in the association's elections, "no reference to Mr. Rifkin as an ex-convict ever came to my attention," he said.

Because most IEEE members interact only minimally with the association's sections, which are primarily administrative bodies, the vast bulk of Rifkin's constituents "probably have no idea who he is," Pickholtz added.

Nor is his relative anonymity confined just to his own backyard, where he heads McLean, Va.-based Master Systems, Inc., a systems consulting company. When reached recently by phone at the association's New York headquarters, IEEE President Bruno Weinschel denied any knowledge of Rifkin's previous scrape with the law.

For the most part, the local IEEE members who already know about Rifkin's criminal record have few qualms about his current position per se. "People who make amends for their past mistakes deserve a second chance and shouldn't be hounded for the rest of their lives," Katzke said. Among the most vocal critics is locally based IEEE fellow Carl Hammer, a retired Sperry Corp. luminary. The section's top leaders failed "to tell the whole truth and nothing but the truth," Hammer said.

> "I DON'T feel it's incumbent upon me or anyone else in the IEEE to notify our people about anything either good or bad in someone's personal history."
>
> TOM DOEPPNER
> IEEE'S CAPITOL-AREA
> EXECUTIVE COUNCIL

To support his contention, Hammer cited two omissions in the official printed announcement of Rifkin's candidacy.

In the April 1986 issue of its monthly publication, "Scanner," the section ran thumbnail biographies of Rifkin and eight other aspiring local officeholders.

Although Rifkin's material mentioned his 20 years of professional experience, it contained no references to his imprisonment. Moreover, of the nine announcements, only Rifkin's lacked a photograph, which "might have made him recognizable," Hammer said.

During a brief interview last week, Rifkin blamed the absence of his photo not on any attempt to avoid recognition but on technical problems beyond his control. "I sent them my picture in time to make their publication deadline, but they couldn't use it because of poor contrast or something like that," he said.

"Scanner" Editor Jim Strother, however, remembers the incident somewhat differently. "With the press of his other business, he just wasn't able to find a place to make a picture that he could get to me on time," Strother said.

Hammer's view that the section's officers erred in withholding information about Rifkin and the Security Pacific affair is shared by the NBS's Katzke. "Whenever an ex-convict runs for office in a professional association, it's incumbent on the appropriate officers to inform the membership of his full background," he said. "I'm willing to forgive someone who has truly reformed, but I'd like to make my own decision about whether he has, in fact, done so."

Rifkin himself, when asked to comment on the issue, referred the inquiry to others in the association.

Permissible under bylaws

IEEE's Doeppner said that Rifkin's election is permissible under the institute's bylaws, which contain no provisions expressly forbidding an ex-convict from holding an IEEE office.

Some of the local section's rank and file find Doeppner's point about the bylaws compelling. "If our own rules permit a felon to serve in an official capacity, I guess I don't have any problems with it," IEEE member Denny Bransted said.

According to the brief biography that accompanied the formal announcement of his candidacy, Rifkin has served successively as vice-chairman and chairman of the IEEE Computer Society's local chapter. In the latter role, he once shared an award for running the section's best chapter, "Scanner" Editor Strother said.

Paperback Software adds graphics package

BERKELEY, Calif. — Paperback Software International will announce in March an object-oriented business graphics program, VP Graphics, that will implement spreadsheet files in a variety of chart designs.

Unlike some other presentation graphics packages that run on the IBM Personal Computer and compatibles, VP Graphics is object-oriented rather than raster-based, said Steve Cook, project manager.

The user can manipulate or move portions of a drawing as whole segments, rather than as fragments of the picture that leave a hole when removed. Images are saved as whole objects rather than bit-mapped parts.

The $99.95 program reads PIC files from VP Planner, a paperback software spreadsheet, Lotus Development Corp.'s 1-2-3, and similar formats, Cook said. VP Graphics can also generate charts from DIF and ASCII files.

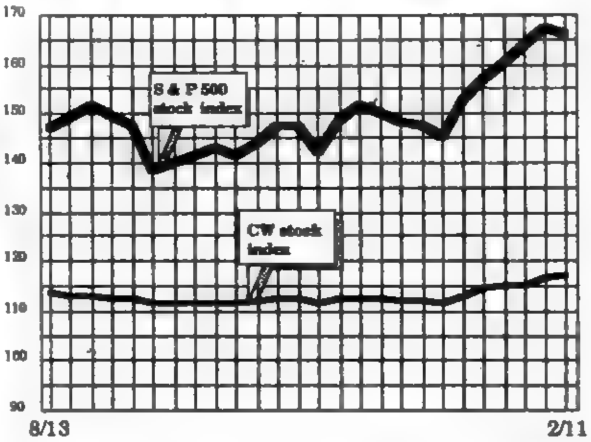
VP Graphics also offers what-you-see-is-what-you-get, so that screen images accurately reflect the printer or plotter output.

The program supports any Microsoft Corp.-compatible mouse, as well as IBM Enhanced Graphics Adapter, Color Graphics Adapter and Hercules Computer Technology, Inc. graphics formats.

VP Graphics will have a driver that can communicate with any printers or plotters that use Adobe Systems, Inc.'s Postscript page-description language.

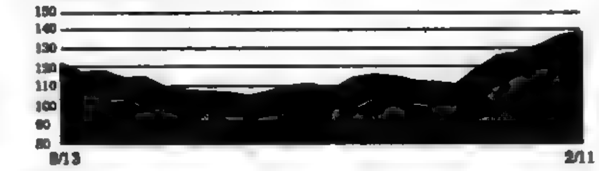
PEGGY WATT

STOCK TRADING INDEX

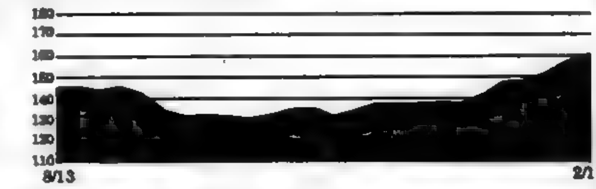


Indexes	*Last Week*	*This Week*
Computer Systems	136.1	**138.1**
Supplies & Accessories	157.8	**160.8**
Software & DP Services	126.6	**131.3**
Semiconductors	100.1	**106.3**
Peripherals & Subsystems	125.9	**127.6**
Leasing Companies	113.3	**117.2**
Composite Index	116.3	**116.8**
S&P 500 Index	167.2	**166.0**

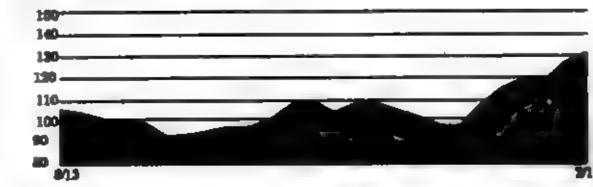
Computer Systems



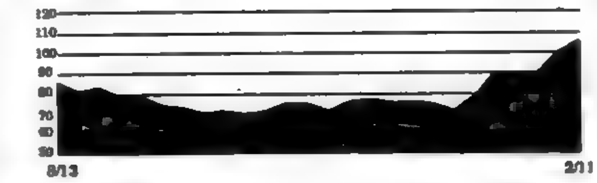
Supplies and Accessories



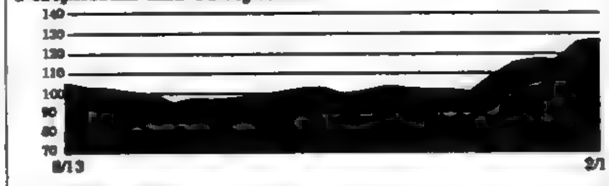
Software and DP Services



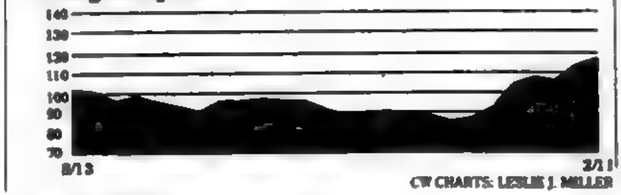
Semiconductors



Peripherals and Subsystems



Leasing Companies



CW CHARTS: LESLIE J. MILLER

Stock trading summary

CLOSING PRICES WEDNESDAY FEBRUARY 11, 1987

Computer Systems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 11 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4.38	+0.3	+6.1
O	ALTOS COMPUTER SYS	19	10	15.50	+0.6	+4.2
A	AMDAHL CORP	36	14	34.63	+0.1	+0.4
O	APOLLO COMPUTER INC	22	9	21.00	-0.6	2.9
O	APPLE COMPUTER INC	57	23	56.50	+1.5	+2.7
N	AT&T	28	21	23.88	+0.3	+1.1
O	CPT CORP	7	3	3.63	+0.1	+3.6
N	COMPAQ COMPUTER CORP	29	12	29.25	+1.5	+5.4
A	COMPUTER CONSOLES INC	12	6	11.25	+1.1	+11.1
O	CONCURRENT COMP CORP	25	11	14.88	-0.1	-0.8
N	CONTROL DATA CORP	30	20	29.50	+0.6	+2.2
O	CONVERGENT TECH	13	4	10.38	+0.1	+1.2
N	CRAY RESH INC	121	63	119.00	+5.8	+5.1
O	DAISY SYS CORP	20	8	12.00	+0.8	+6.7
N	DATA GEN CORP	48	25	36.00	+0.0	+0.0
N	DATAPOINT CORP	9	4	5.63	-0.3	-4.3
N	DIGITAL EQUIP CORP	153	76	150.38	+3.8	+2.6
N	FLOATING POINT SYS INC	46	11	15.00	+0.8	+5.3
N	GOULD INC	30	15	20.25	+1.3	+6.6
N	HARRIS CORP	40	27	37.38	-0.9	2.3
N	HEWLETT PACKARD CO	55	36	53.13	-0.1	-0.2
N	HONEYWELL INC	84	58	67.00	+1.1	+1.7
N	IBM	162	116	134.00	1.1	-0.8
O	IPL SYS INC	4	1	2.13	-0.1	-5.6
N	ITT CORP	62	41	61.38	+1.9	+3.2
N	M/A COM INC	19	12	14.13	-0.4	2.6
N	MATSUSHITA ELEC INDL LTD	138	84	122.88	2.1	1.7
O	MENTOR GRAPHICS CORP	27	11	24.38	1.5	-5.8
N	NBI INC	14	8	10.50	-0.3	-2.3
N	NCR CORP	61	40	56.63	-0.1	-0.2
N	PRIME COMPUTER INC	28	16	22.13	-0.1	-0.6
O	STRATUS COMPUTER	34	17	31.00	1.0	3.1
O	SYMBOLICS INC	15	4	4.75	+0.3	+5.6
O	TANDEM COMPUTERS INC	59	22	56.63	-0.5	-0.9
N	TANDY CORP	51	31	50.88	+2.8	+5.7
N	TEXAS INSTRS INC	180	103	159.00	+3.5	+2.3
A	ULTIMATE CORP	35	13	25.50	+1.6	+6.8
N	UNISYS	103	58	103.00	+6.9	+7.2
A	WANG LABS INC - B	22	11	14.88	-0.3	-1.7
A	WANG LABS INC - C	22	11	15.13	-0.3	1.6
N	XEROX CORP	72	49	69.00	+1.0	+1.5

Supplies & Accessories

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 11 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	29.63	+0.1	+0.4
N	BARRY WRIGHT CORP	25	14	20.25	+2.4	+13.3
A	DUPLEX PRODS INC	23	18	20.75	-0.4	-1.8
N	ENNIS BUSINESS FORMS INC	34	22	32.50	+0.8	+2.4
N	3M CO	140	95	131.00	+1.9	+1.5
N	MOORE LTD	28	20	24.38	+0.9	+3.7
O	STANDARD REGISTER CO	50	32	42.25	-1.8	-4.0
N	WALLACE COMPUTER SVCS	50	37	45.38	-0.3	-0.5

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE FEB 11 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	4.50	+0.3	+5.9
N	ADVANCED SYS INC	20	12	19.75	+0.3	+1.3
N	AGS COMPUTERS INC	37	17	34.38	1.6	-4.5
O	AMERICAN MGMT SYS INC	31	12	29.00	+0.5	+1.8
O	AMERICAN SOFTWARE INC	23	9	21.00	+0.0	+0.0
N	ANACOMP INC	7	3	6.38	+0.4	+6.3
O	ANALYSTS INTL CORP	10	4	10.00	+0.8	+8.1
O	ASHTON TATE	30	10	28.00	+0.3	+0.9
O	ASK COMPUTER SYS INC	16	9	16.13	+2.9	+21.7
O	ASTRADYNE COMP IND	3	1	1.91	+0.1	+5.2
N	AUTOMATIC DATA PROC	47	29	43.00	1.6	-3.6
O	BOOLE & BABBAGE INC	11	4	10.75	+2.8	+34.4
N	COMPUTER ASSOC INTL INC	44	17	42.25	-0.6	1.5
O	COMPUTER HORIZONS CORP	14	10	13.13	+0.5	+4.0
O	COMPUTER NETWORK TECH	10	4	5.38	+0.1	+1.2
N	COMPUTER SCIENCES CORP	53	30	50.75	-0.5	-1.0
O	COMPUTER TASK GROUP INC	19	11	17.00	+2.6	+18.3
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	16	10	14.13	+0.9	+6.6
N	CULLINET SOFTWARE INC	17	6	11.13	+1.1	+11.3
O	CYCARE SYS INC	17	7	9.00	+0.0	+0.0
O	DUQUESNE SYS INC	33	18	44.50	-3.0	-6.3
N	GENERAL ELEC CO	104	71	99.38	-0.9	-0.9
N	GENERAL MTRS CORP	90	24	35.75	+0.8	+2.1
O	HOGAN SYS INC	15	7	13.75	-0.1	-0.9
O	INFORMATION SCIENCES INC	4	1	1.13	+0.3	+28.6
O	INFOTRON SYS CORP	19	7	10.00	+0.5	+5.3
O	KEANE INC	16	5	8.75	+0.8	+9.4
N	LOGICON INC	38	22	27.00	+0.0	+0.0
O	LOTUS DEV CORP	74	21	73.50	+4.8	+6.8
O	MANAGEMENT SCI AMER	21	11	20.88	+0.6	+3.1
O	MCI COMM CORP	13	5	5.63	+0.4	+7.1
O	MICOM SYS INC	20	10	17.00	+0.5	+3.0
O	MICRO PRO INTL CORP	5	2	4.00	0.3	7.3
O	MICROSOFT CORP	78	26	71.75	-0.3	-0.3
O	NATIONAL DATA CORP	27	16	25.38	+1.0	+4.1
O	ON LINE SOFTWARE INT	19	10	18.50	-0.1	-0.7
O	ORACLE SYS CORP	32	13	31.25	+2.3	+7.8
N	PANSOPHIC SYS INC	42	25	38.75	1.8	4.3
O	POLICY MGMT SYS CORP	30	15	27.00	1.0	3.6
O	PROGRAMMING & SYS INC	11	8	9.25	+0.3	+2.8
O	REYNOLDS & REYNOLDS CO	42	27	35.25	+1.0	+2.9
O	SCIENTIFIC COMPUTERS INC	8	4	7.88	+0.4	+5.0
O	SEI CORP	28	15	23.25	1.5	-6.1
O	SHARED MED SYS CORP	51	30	49.25	1.3	2.5
O	SOFTWARE AG SYSTEMS INC	22	10	15.25	+0.1	+0.8
O	SOFTWARE PUBG CORP	11	5	11.38	+0.3	+2.2
A	STERLING SOFTWARE INC	21	10	12.63	-0.6	-4.7
N	SUNGUARD DATA SYSTEMS	20	10	19.63	+3.1	+18.9
N	UCCEL CORP	33	16	31.13	+0.8	+2.5
N	URS CORP	20	11	18.50	-0.4	7.0
O	VM SOFTWARE INC	37	12	37.13	+1.1	+3.1

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE FEB 11 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	34	13	22.50	+1.5	+7.1
N	ANALOG DEVICES INC	25	14	21.63	+0.3	+1.2
O	ANALOGIC CORP	15	10	12.00	-0.5	-4.0
N	APPLIED MAGNETICS CORP	24	13	23.00	+0.6	+2.8
O	AVANTEK INC	23	14	17.75	+1.4	+8.4
O	HADCO CORP	6	3	5.00	+1.3	+33.3
O	INTEL CORP	39	16	38.13	+3.5	+10.1
O	MICRO MASK INC	7	2	5.00	+0.3	+5.3
N	MOTOROLA INC	50	34	49.38	+1.1	+2.3
N	NATIONAL SEMICONDUCTOR	16	8	15.25	+0.5	+3.4
N	TERADYNE INC	30	16	23.38	-0.6	7.6

EXCH: N = NEW YORK, A = AMERICAN, P = PACIFIC, B = BOSTON
L = NATIONAL, M = MIDWEST, O = OVER THE-COUNTER, S = SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Peripherals & Subsystems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 11 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	7.63	-0.1	1.6
A	ANDERSON JACOBSON INC	3	1	2.19	+0.2	+9.4
O	AST RESH INC	27	11	18.63	+0.9	+4.9
O	AUTOTROL CORP	10	5	8.75	+0.3	+2.9
O	AVANT GARDE COMPUTING	7	3	4.00	0.4	8.6
O	BANCTEC INC	13	6	12.38	+0.0	+0.0
N	BOLT BERANEK & NEWMAN	53	36	53.13	+3.1	+6.3
A	CETEC CORP	9	5	5.75	+0.8	+15.0
A	COGNITRONICS CORP	6	2	3.13	+0.0	+0.0
N	COMPUGRAPHIC CORP	27	16	21.75	0.5	2.2
N	COMPUTERVISION CORP	23	10	22.00	-0.5	2.2
N	CONRAC CORP	18	12	15.50	0.4	2.4
A	DATAPRODUCTS CORP	18	11	14.50	-0.1	-0.9
A	DATARAM CORP	18	7	9.00	+0.4	+4.3
O	DATA SWITCH CORP	9	5	7.25	0.4	4.9
O	DATUM INC	7	4	6.25	+0.1	+2.0
N	DECISION INDS CORP	15	8	11.50	0.1	1.1
O	ENDATA INC	9	4	9.00	+0.4	+4.3
O	EMC CORP	28	11	28.00	+3.0	+12.0
O	EVANS & SUTHERLAND	33	20	31.75	0.3	-0.8
N	FLOATING POINT SYS INC	46	11	15.00	+0.8	+5.3
O	GANDALF TECHNOLOGIES	9	5	8.50	0.3	2.9
N	GENERAL DATACOMM IND	15	8	12.13	0.4	3.0
N	HAZELTINE CORP	30	18	29.75	+0.0	+0.0
O	ICOT CORP	13	6	10.38	0.1	1.2
O	INFORMATION INTL INC	18	13	14.25	+0.0	+0.0
O	INTECOM INC	7	3	3.00	+0.0	+0.0
O	INTERLEAF INC	15	8	11.38	+1.1	+11.0
O	MEGADATA CORP	7	2	6.50	+1.4	+28.8
A	MSI DATA CORP	15	10	14.25	+0.4	+2.7
N	NASHUA CORP	28	18	28.25	+1.5	+5.8
O	NETWORK SYS CORP	19	10	18.13	0.3	1.4
N	NORTH AMERN PHILIPS CORP	48	35	43.50	+1.3	+3.0
N	NORTHERN TELECOM LTD	43	27	41.00	1.4	3.2
O	NOVELL INC	40	14	36.00	3.8	9.4
N	PARADYNE CORP	11	4	5.63	+0.3	+6.7
A	PENRIL CORP	9	4	5.75	+0.4	+7.0
N	PLESSEY PLC	38	24	31.31	-0.4	1.4
O	PRINTRONIX INC	15	10	12.00	-0.1	1.0
O	QMS INC	16	10	10.13	+0.0	+0.0
O	RAMTEK CORP	7	3	5.25	-0.3	-4.5
N	RECOGNITION EQUIP INC	27	10	20.00	+1.1	+6.0
O	SCAN TRON CORP	19	11	11.75	-0.8	-6.0
N	SCIENTIFIC ATLANTA INC	15	9	14.25	-0.8	5.0
O	SEAGATE TECHNOLOGY	35	9	35.13	+2.6	+8.1
N	STORAGE TECHNOLOGY	7	2	4.25	+0.3	+6.3
O	SUN MICROSYSTEM INC	32	11	29.25	-0.6	2.1
A	T-BAR INC	8	5	8.00	+0.0	+0.0
A	TAB PRODS CO	18	12	17.25	+0.6	+3.8
O	TANDON CORP	8	2	3.63	+0.0	+0.0
A	TEC INC	7	3	3.75	-0.1	3.2
N	TEKTRONIX INC	42	27	37.38	3.6	8.8
O	TELEVIDEO SYS INC	4	2	2.63	+0.0	+0.0
N	TELEX CORP	90	52	88.25	+5.9	+7.1
N	TIMEPLEX INC	36	14	34.13	0.9	2.5
N	TITAN CORP	12	6	7.75	+0.0	+0.0
O	VISUAL TECHNOLOGY INC	1	0	0.44	+0.0	+0.0
O	WYSE TECH	26	12	25.13	+0.4	+1.5

Leasing Companies

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 11 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	25	15	24.50	+0.6	+2.6
N	CONTINENTAL INFO SYS	12	7	10.50	+0.0	+0.0
O	FINALCO GROUP INC	5	2	3.00	+0.0	+0.0
O	PHOENIX AMERN INC	8	3	7.38	+1.1	+18.0
O	SELECTERM INC	12	5	5.81	+0.0	+0.0
N	U.S. LEASING	49	38	48.75	+0.3	+0.5

Chip stocks seesaw

Semiconductor firms ride waves of investor perception

Semiconductor stocks last week provided a lesson in how industry perceptions affect market activity.

On Tuesday, the stocks took a beating after the Semiconductor Industry Association (SIA) urged stricter enforcement of last summer's trade pact with Japan; investors interpreted the SIA plea as a negative sign for industry prospects.

On Wednesday, however, stocks surged on the expectation of a strong January book-to-bill ratio to be announced by the SIA. But when the ratio was below expectations, the chip stock prices fell accordingly.

Giving the changes in price each day and Thursday's closing price, two examples of this phenomenon are Texas Instruments, Inc., down 6½, up 7, down 3⅞, close 155¼; and National Semiconductor Corp., down ⅛, up 1, down ⅜, close 14⅞.

Often, however, a stock is affected much more by overall market trends than by specific company or industry news. Cray Research, Inc. fell 1¼ on the day it introduced four supercomputers but rose 1¼ to 119 on Wednesday when the Dow Jones Industrial Average gained almost 14 points.

CLINTON WILDER

Ingres for PCs allows data base access

BY DOUGLAS BARNEY
CW STAFF

ALAMEDA, Calif. — In a move aimed at broadening its distributed data base strategy and offloading applications development to less expensive systems, Relational Technology, Inc. this week will formally announce Ingres for personal computers. Ingres is a line of data base products, based on IBM's SQL, that run on Digital Equipment Corp. VAXs, IBM mainframes and Unix-based systems.

With Ingres for PCs, the firm now hopes to provide data base access and development across many major computer architectures.

The product has been extensively beta-tested with more than 1,000 copies already in the field. A typical implementation of the PC product will sell for $1,200 to $2,000 and will be available next month, according to the firm.

Gary Morgenthaler, chairman of Relational Technology, said the product is aimed at Fortune 1,000 accounts and volume applications developers. The main thrust of the product is stand-alone use, and it is geared for sophisticated data analysis and applications development, as opposed to transaction processing, Morgenthaler added.

Compatible with mini

"One of the major areas where it will be useful is for development. RTI has worked hard to keep it compatible with the minicomputer version," said Joel A. Saks, a programmer and analyst for the data base development group of the San Diego Center of Computer Sciences Corp.

According to Saks, the development of applications on personal computers that are ported back up to minicomputers will help the firm save money. Saks has been beta-testing Ingres for PCs.

Another beta tester agreed. "One of the areas I see Ingres for PCs as really having a use in is a developmental area. People can develop entire applications away from the host machine.

"When that application is finished, they can put it up onto the VAX," said Steve Almond, chief, data base adminstration for Agriculture Canada, an agency of the Canadian government similar to the Department of Agriculture. The product also works in a distributed fashion, accessing Ingres running on larger systems.

The core of this strategy is the Ingres/Star, an open architecture distributed data base viroment, which allows for data to be shared between a variety of architectures and operating systems. "Ingres for PCs is a full participant in Ingres/Star through its asynchronous interface," said Ed Forman, product manager for RTI.

The firm said it believes it can sell some 500 copies of Ingres for PCs per month.

Senior Editor Charles Babcock contributed to this report.

Amdahl

FROM PAGE 1

dahl's E series provides a dimension of user friendliness that the rival IBM migration scheme lacks, according to Kimball Brown, an analyst with San Jose, Calif.-based Dataquest, Inc. Under the IBM method, users are prohibited from upgrading current 3090s to the corresponding E systems. Instead, customers are forced to graduate to the next highest model number.

Amdahl 5890 customers who want a modest increase in performance can upgrade to an equivalent E-series CPU without adding boxes. Larry Williams, operations manager at Southland Corp., the Dallas-based owner of the 7-Eleven convenience store chain, who manages an IBM 3090 Model 200 and an Amdahl 5890-300, said of the Amdahl arrangement, "If all you have to do to get 4% to 13% more performance is switch boards, your system will occupy less floor space, dissipate less heat and require less cooling than with an IBM enhancement."

Amdahl also bridged the performance gap between its 5890-300, which reportedly executes 41 million instructions per second (MIPS), and the 70-MIPS 5890-600. Previously, users of the 5890-300 lacked a clear upgrade path. The 5890-400E, rated at 58 MIPS, falls between the 5890-300E and 5890-600E, according to company sources.

In addition to plugging a hole in Amdahl's product line, the 5890-400E restores a competitive edge that suffered a blow with the arrival of IBM's 3090-300E. Previously, Amdahl boasted greater performance with the 5890-300 and less expense with the 5890-200 than IBM's 3090-200, according to Phoenix-based Annex Research, President Bob Djurdjevic.

But the three-CPU 3090-300E, which rivals the power of Amdahl's full-power dyadic offering, neutralized Amdahl's two-pronged strategy. Now, with a three-CPU system of its own, the firm's competitive position has been bolstered, Djurdjevic said.

Although a basic 5890-400E costs 15% more than its closest IBM equivalent, the Amdahl machine outperforms the 3090-300E by 24%, Amdahl claimed. The 5890-400E supports up to 512M bytes of main storage and 96 channels.

A basic configuration that includes 64 channels and 128M bytes of main memory, the 5890-400E costs $7.275 million. Field upgrades to E-series models cost $120,000.

Deliveries of the 5890-400E and 5890-600E are slated to begin during the fourth quarter, as opposed to a June starting date for the 5890-190E and 5890-300E. The first E-series machines to be available will be the 5890-200E, which begins shipments next month.

INSIDE LINES

Going down the line. Enhancements to the IBM RT PC and a low-end model of the IBM 9370 departmental system are expected among several products to be announced tomorrow. IBM also reportedly plans to speed up general delivery of several of the 9370 machines announced in October for delivery during the second half of this year. Analyst Richard Mikita of Framingham, Mass.-based market research firm International Data Corp. says the new 9370 is likely to be known as the 9370 Model 10. Marty Gruhn, vice-president of The Sierra Group, a Tempe, Ariz.-based market research firm, says she expects the 9370 technology to be moved to a desktop machine, although the upcoming low end may not be that small. She also speculates that IBM might announce office software for the 9370. However, Robert Simko, executive director of International Technology Group, a Palo Alto, Calif.-based market research firm, says tomorrow's announcement is likely to be a 32-bit bridge machine overlapping the low-end and high-end models of the 16-bit System/36 line.

Surfin' U.S.A. It goes by the name of Silver Surfer, and if one beta tester is right, it will become the dominant data base on Apple's Macintosh. Apple is bringing the product from France, sources said. One of the key advantages that Silver Surfer has over rivals is a sophisticated data base language that also has total control over Apple's Laserwriter. Printed data base reports can take advantage of the desktop publishing capabilities of the Macintosh and the laser printers.

Somebody didn't listen. In a report on the slew of 1986 espionage scandals, the U.S. House of Representatives' intelligence committee makes brief mention of the need for greater computer and communications security in government. The report says senior U.S. officials are careless about their use of car phones, which are easy targets for electronic eavesdropping, and they sometimes discuss sensitive matters over open and unsecure communications lines. "The final go-ahead request for Navy aircraft to force down the Egyptian airliner carrying the Achille Lauro terrorists was phoned in the open to Air Force One," the report said.

Who's on first? The first public sign of the NCR Tower 32/800 arrived recently when an NCR OEM customer, Reynolds and Reynolds, announced its ERA 9600 system for automobile dealers. That system reportedly is based on the 32/800, which is said to use multiple Motorola 68020 CPUs to achieve a processing speed of 2.4 million instructions per second. That makes the 32/800 slightly faster than the earlier high-end Tower 32/600. But the real gain is said to be in the number of users supported, as Reynolds and Reynolds claimed its 9600 supports 200 users, compared with the 48 users supported on 32/600-based systems.

A fifth columnist? Would-be high-tech union organizer Rand Wilson has gone over to the other side. Once a gadfly to Massachusetts' Route 128-belt companies, Wilson can now be considered one of them as a salesman for a local software firm. But by joining them, he may beat them yet. Wilson's software happens to be a system for automating unions. Despite his target market, Wilson is quick to point out that he has not given up on his earlier endeavors. In between sales calls, he's helping to organize a Communications Workers of America national press conference in which the labor group will air its complaints about health problems that have been associated with the semiconductor industry, Wilson says.

Last seen jilted at the altar. Bill Krause, president of 3Com — despite the disappointment of seeing his company's proposed merger partner Centram bed down instead with Sun Microsystems — has a few aces left up his sleeve. At a recent investor forum in New York, Krause said 3Com will release a version of Ethernet running at 10M bit/sec. over standard telephone wire sometime between the second quarter and year's end. Krause also confirmed 3Com's interest in the network station market, predicting that "one day, communications capabilities will come with the workstation."

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COMPUTERWORLD

INSIDE

In Depth — Is the laptop computer this generation's calculator? **Page 61**

Section Feature — Do small and mid-size systems really save money? Three professionals discuss pros and cons of downsizing. **Page 47**

Compatibility with MS-DOS and Unix is top issue amid flurry of Macintosh announcements expected next week. Page 2

AT&T is hard at work developing the capability to allow customers dynamic reallocation of network service bandwidth. Page 10.

Microsoft gets the nod to develop unified Unix for 80386-based micros. Page 114.

Former McCormack & Dodge whiz Landry sells expert systems firm to Cullinet. Page 12.

Third-party vendors rush to sign on with Vaxstation 2000. Page 19.

IRS tries to extend capacity life of overloaded mainframes. Page 47.

American Standard's vice-president of MIS, Gary Biddle, explains how to build a worldwide MIS organization. Page 77.

IBM charts dual mid-range course

Unveils Solutionpacs for System/36, VM-based machines

BY STANLEY GIBSON
CW STAFF

NEW YORK — IBM last week reaffirmed its intention to maintain two diverse architectures for general-purpose mid-range systems and said it will offer similar software packages for both hardware families.

In a move to establish its mid-range around both the System/36 and 9370 departmental systems, IBM rolled out packages of office software, called the IBM Solutionpac Office Series, for both machines.

Last week's wide-ranging announcement also included enhanced versions of the RT Personal Computer (see story page 4) and recovery features for CICS on MVS/XA systems (see story page 112). IBM also revealed that it will not offer its 4361 model after May 29 and will not offer upgrades to the 4361 for users of 4321 and 4331 machines after that date.

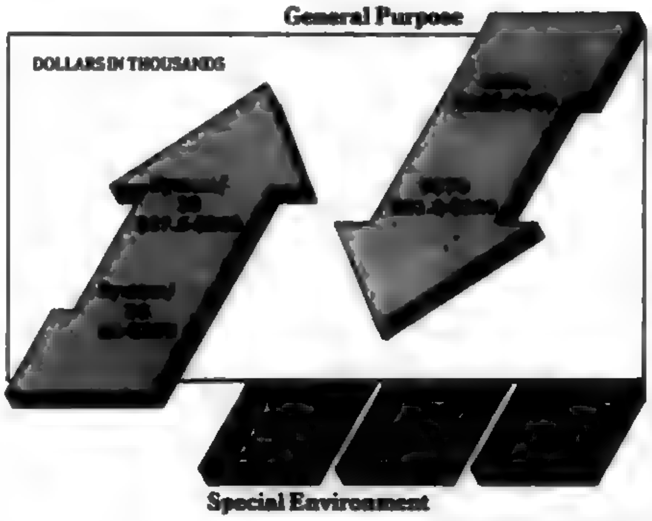
IBM Vice-President Larry Ford said the company will ship the 9370 ahead of schedule, moving up deliveries that were slated for the third quarter to the second. Ford said some 100 9370s are now installed and that at least another 100 will be installed by the second quarter.

In an apparent reference to mid-range rival Digital Equipment Corp., which pitches a single architecture with its VAX line, Ford said, "We are convinced that one architecture is not the answer. Customers want a choice and solutions tailored to their needs."

Anthony C. Mondello, IBM vice-president of office systems, asserted, "The user wants a common application on all systems. . . . Users want MVS, VM and System/36 and System/38 to look the same." But he added, "We have a ways to go before we

Continued on page 6

Converging lines
IBM says dual architectures can coexist in same performance range



CW CHART MITCHELL J. HAYES

286 DOS in doubt for '87

Microsoft cites problems of 'brain-damaged' chip

BY DOUGLAS BARNEY
CW STAFF

REDMOND, Wash. — Microsoft Corp. refused last week to commit to delivering a version of MS-DOS for the Intel Corp. 80286 processor this year, raising the possibility that major applications for the advanced operating system will not be available until mid-1988, or some six to nine months after the system is released.

"We are not going to make any commitment to this calendar year," said Microsoft Chairman Bill Gates, referring to the 80286 operating system in an interview last week. Gates did commit to delivering the system, now referred to as 286 DOS, within 12 months.

The sheer length of time it has taken to develop and test 286 DOS has prompted a rash of speculation about the operating system and related products that still have not been formally announced. The misconceptions surrounding Microsoft's plan prompted the firm to hold an educational seminar for the press and industry analysts last Friday.

Despite the continuing speculation, Microsoft is still unwilling or unable to fully disclose its

Continued on page 114

Trim Compaq targets laptop, desktop users

BY DOUGLAS BARNEY
CW STAFF

NEW YORK — A new breed of portable personal computer, designed for both the desktop and laptop markets, was announced last week by Compaq Computer Corp. The machine is lighter, smaller and faster than any of Compaq's existing portable computers.

The 12-MHz Portable III weighs 18 lbs in a standard configuration and uses a gas plasma display and a full-size 84-key keyboard. The machine comes with 640K bytes of random-access memory, expandable to 6.6M bytes, and uses the standard 5¼-in. floppy disk drive.

Continued on page 8

DDM holds distributed DBMS key

BY ELISABETH HORWITT
CW STAFF

RYE BROOK, N.Y. — The Distributed Data Management system, which IBM has been introducing piece by piece since June, will be the basis for a future distributed relational data base management system, IBM disclosed to *Computerworld* last week. IBM also unveiled the Personal Computer component of DDM.

Before IBM's distributed DBMS becomes a reality, though, DDM will need significant additions, such as a global data dictionary and applications software support — particularly on the PC side, analysts pointed out. Currently, programmers need to write an unspecified amount of code before IBM PC users can access files across multiple hosts, according to IBM spokesmen.

The company is currently working on enhancements that will make DDM a truly transparent distributed DBMS, according to Jan Fisher, senior architecture planner of IBM's Systems Products Division.

"DDM's architecture defines a distributed data set of record-oriented files across different systems and will be the basis for our distributed data base system," he claimed.

Lively speculation

One key area to be addressed by the vendor is migration of DDM from the current VSAM-based file system to a true relational DBMS. A subject of lively industry speculation is whether IBM will use its existing relational DBMS product, DB2, or a new system.

Frank Dzubeck, president of Communications Network Architects, Inc., asserted that DB2 will form the basis for the distributed system. However, an IBM spokeswoman said that IBM is "moving toward a DDM version of a relational DBMS, but not necessarily of DB2." She added that customers should not expect IBM to introduce any kind of DDM-based relational DBMS product in the immediate future.

Another important compo-

Continued on page 112

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IN THIS ISSUE

Downsizing debate. What type of relationship is the industry entering as it flirts with the small portable? Large firms and individuals approve of dual-purpose laptop/desktop units for decentralization and price/performance, but security, cost and practicality questions make some users hesitant to pursue the technology. **Pages 8, 47, 66**

Customer service In an attempt to divert telecommunications users away from private T1 equipment vendors, AT&T is speeding up its Customer Controlled Reconfiguration to provide a near-real-time dynamic bandwidth configuration. **Page 10**

NEWS

4 IBM's RT enhancements move PC up to snuff.

4 Price increases affect IBM equipment rental rates, Information Network service, software and magnetic tape purchases.

6 IBM releases details on fault-tolerant System/88 and additional models in System/36 and Series/1 lines.

7 Users back IBM's mid-range strategy.

8 HP reports weak U.S. sales market, but growth in Europe leads to revenue increase in first quarter.

12 Cullinet ups expert systems capabilities with acquisition of Distribution Management Systems.

12 Near-five million dollar loss reported in third quarter by Cullinet.

13 ADR plans to derive an SQL language for use with its mainframe DBMS.

13 AT&T rolls out PC AT clone to be manufactured by Olivetti.

14 Digital Research's UK-developed operating system bucks to become personal computer standard.

15 Phoenix Technologies launches assault on piracy in U.S. and Canada.

112 Novell announces developer's kit, low-cost Ethernet adapter card, acquisition of Softcraft, Inc.

112 Version 2.1 of IBM's CICS adds new flavor to previous releases.

114 AT&T, Microsoft join forces to create Unix standard for 80386-based micros.

Not for loners only: *Laptop computers are settling into major corporations and may become this generation's calculator. By Ashley Grayson. Page 61.*

SOFTWARE & SERVICES

19 Software vendors quick to respond to DEC 2000 announcements.

19 ADR redesigns Librarian for ISPF on-line environment.

MICROCOMPUTING

29 Computerland supplies franchises with publishers program demos.

29 Macropac's 101 Macros simplifies and expands Excel.

NETWORKING

41 Network firms mesh marketing, product development.

41 AT&T debuts primary rate for System 85.

41 System enables communication between incompatible products.

SYSTEMS & PERIPHERALS

47 High-speed VMEbus adapter for Butterfly processor out.

47 System Industries answers DEC with 4G-byte storage array.

47 IRS taxes mainframes, says replacements are years away.

MANAGEMENT

77 Gary Biddle: American Standards' MIS manager and catalyst.

77 Mergers, retirement lead execs into independent consulting.

77 Midwest bank expands remote data processing operations.

COMPUTER INDUSTRY

83 Uccel, VM and Sterling report strong year-end profits.

83 Japan ignores U.S. chip trade accord.

83 Memorex begins new life as a distributor.

IN DEPTH

75 Barred from the boardroom: Why is MIS always the last to be involved in executive decision making? By Bob Hilton.

OPINION & ANALYSIS

17 Newquist waits for a Japanese original.

31 Zachmann plays football on his PC.

43 Ulrich urges exercising opinions on unleashing Baby Bells.

49 Connolly says Amdahl has learned its lessons.

69 Eliot delineates strategic uses of expert systems.

81 Mallach discards fad as fiction.

DEPARTMENTS

16 Editorial

82 Calendar

DOS and Unix to join up with Macintosh

BY PATRICIA KEEFE
and PEGGY WATT
CW STAFF

Apple Computer, Inc. is slated on March 2 to announce versions of the Macintosh that will run the Unix and Microsoft Corp. MS-DOS operating systems with add-on boards developed by several vendors.

The two models of the Macintosh are the Macintosh SE, which is one level beyond the current high-end Macintosh Plus and uses the same Motorola, Inc. 68000 processor, and the Motorola 68020-based Macintosh II, which shares the boxy chassis and expandability of the Apple II line. Both systems include cooling fans, a new feature for the Macintosh.

Apple also plans to unveil updated Macintosh applications that take advantage of the color capabilities of the new Macintosh II and add-on boards that take advantage of the new Macintosh's expansion slots.

Apple and Unisoft Systems Corp. will jointly announce a Unix port for the Macintosh, sources said. "Unix will run in the Mac, totally transparent to the user," one source said of the system, which will reportedly be priced at about $5,000.

Unisoft was chosen over several competitors because it was the only Unix developer that could provide Apple with a full AT&T Unix System V implementation, including the University of California at Berkeley's Unix 4.2 enhancements, sources said. Unisoft President Robert Ackerman declined to confirm or deny the report.

Multiple MS-DOS boards

At least three vendors will announce MS-DOS boards, sources said. Phoenix Technologies, Inc., AST Research, Inc. and Radius, Inc. have all developed boards to run MS-DOS applications under Intel Corp. 8086 or 80286 coprocessors on the new machines.

The Macintosh SE resembles the Macintosh Plus chassis, has a single expansion slot and will be available with an optional 40M-byte, small computer systems interface-based internal hard disk drive. The slot on the SE can be used for a 68020 or 68881 processor or an Ethernet network controller, a beta-test user said. The SE's motherboard can provide 1M to 4M bytes of random-access memory. The SE is expected to ship shortly after introduction.

The Macintosh II is two to four times faster than a Macintosh Plus, according to a beta-test user, has six expansion slots and can run several operating systems, including the Apple DOS used by the Apple II family. A video card takes up one slot. The system can provide two floppy disk drives and a hard disk drive.

The Macintosh II is not expected to be available for several month after introduction.

Because the computer has three hardware components, the user has the option of several monitors, including color, and an Apple keyboard or one similiar to that of the IBM Personal Computer.

Apple is also scheduled to announce a line of hard disk drives and tape backup systems ranging from 20M to 160M bytes in capacity.

Supermac Technology plans to introduce a high-resolution color video card for the Macintosh II, which is comparable to IBM's PGA standard, according to sources who have seen the product. Also designed for the Macintosh II is a new presentation graphics package from Forethought, Inc. The graphics program can produce slides and overhead transparencies with output to Adobe Systems, Inc. Postscript-compatible printers and plotters.

Joint introduction

Also scheduled for introduction is Desktop Express, a jointly developed product from Dow Jones & Co., MCI Communications Corp., Solutions, Inc. and Apple. Desktop Express combines the features of Straight Talk, a Dow Jones retrieval package, and Glue, a package from Solutions that allows file sharing among dissimilar applications, sources said.

Other vendors scheduled to announce new products at Apple World include Kurta Corp., with a Macintosh version of its input tablet and templates; General Computer Co., with a tape backup for its Hyper Drive hard-disk systems; Microsoft, with a color version of the spreadsheet Excel; and Living Videotext, with a color version of More, the company's outline processor.

A number of other vendors will show previously announced products, some with enhancements to run on the Macintsoh II, according to sources close to Apple and Apple World.

Many observers reported that they were optimistic about the advances in Macintosh technology, which give the system some of the capabilities that prospective corporate users have requested.

Senior Editor Douglas Barney contributed to this report.

“Until now I was an MIS Director. In 1987 I have a new job. Magician.”

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Performance boosts blunt RT PC barbs

BY NINAMARY
BUBA MAGINNIS
CW STAFF

NEW YORK — One year after it was unveiled to generally poor reviews, the IBM RT Personal Computer was enhanced last week with the announcement of three models that observers say move the workstation to a competitive level with other vendors.

The latest versions greatly improve on the RT's weakness in price/performance, communications, floating-point performance, memory and graphics capability.

The RT PC Models 115, 125 and B25 include a 20-MHz floating-point processor, 16M bytes of maximum memory and 5,810M bytes of maximum disk storage. The 19-in. color graphics display terminal offers a resolution of one million pixels.

X-Windows support

The RT PCs run the AIX operating system, an IBM-modified version of AT&T's Unix System V, and support X-Windows, an industry-standard multiwindowing capability.

The RT series machines can support up to 16 users but should be configured as single-user systems for demanding engineering applications, according to industry analysts.

The RT PC enhancements will spur users to re-evaluate the machine as a general-purpose Unix engine, said Frank Gens, an analyst with Framingham, Mass.-based International Data Corp. (IDC). "The irony here is that IBM is trying to position the RT as a single-user system, and our IDC survey shows that about 80% of all installed RTs are being used as multiuser systems," Gens observed.

RT developers from IBM's Austin, Texas, facility reportedly told consultants that the RT is really a Unix mini capable of running System V software — with a few modifications made for memory management and networking. The RT's AIX operating system comes close enough to standard Unix that users can consider running existing Unix applications on it.

IBM was unsuccessful with its workstation debut last year, with about 8,000 RT systems installed to date, reported Dale Kutnick, executive vice-president of research at the Stamford, Conn.-based Gartner Group, Inc. Mountain View, Calif.-based Sun Microsystems, Inc., Apollo Computer, Inc., based in Chelmsford, Mass., and Digital Equipment Corp., based in Maynard, Mass., won larger market shares than Big Blue, according to Robert Herwick, a senior analyst at Hambrecht & Quist, Inc.'s New York office.

Although IBM claimed a single architecture such as DEC's VAX/VMS environment is not the way to go (see story page 1), Herwick said users are demanding connectivity and compatibility. "That's why DEC is eating IBM's lunch — and dinner too," Herwick observed. "DEC is right, and IBM is wrong. That's why Apollo and Sun are killing themselves to enhance connectivity to the installed DEC and IBM base.

"This is IBM's second attempt to fix those [workstation] problems, and price/performance is still a problem," Herwick continued. "Some enhancements have attempted to increase networking capabilities of the workstation, but they are inadequate to anything you can get from Apollo, Sun or DEC. IBM has the ability to access files on other systems, but it's not as transparent and not as easy as with the other systems," Herwick explained.

The firm's workstations are also weak in application software offerings. "Software sells systems. IBM has only 200 packages, by their own admittance," said John McCarthy, research manager at Cambridge, Mass.-based Forrester Research, Inc.

Yet many of those applications are general-purpose ones, noted Omri Serlin, of Itom International, a Los Altos, Calif.-based consulting firm. "They probably concluded that the basic design is not improvable enough to pose a serious threat to Sun and DEC," Serlin said.

The RT PC announcement puts IBM on an even keel with DEC, according to the Gartner Group's Kutnick. "If you do a side-by-side comparison of the RT and Vaxstation II, you will find them very comparable," Kutnick claimed.

The new RT workstation has some industry watchers convinced of its strength. "I'm on record as putting down the first RT, but I'm a convert now," said Charles Foundyller, president of Daratech, Inc. in Cambridge, Mass. Future RT models will prod OEMs to switch to the RT, he added.

While IBM is pricing the RT as a $10,000 to $18,000 machine, the actual price for a useful Model 115 system is $30,000, reported Richard Shaffer, a principal with Technologic Partners, a New York-based financial consulting firm.

"IBM has low-balled a la carte pricing, and for $10,000 you don't get a useful machine," Shaffer said, adding that a useful RT Model 125 costs about twice the base price.

"As usual, IBM doesn't include in the press release that things like the operating system are separate," Shaffer noted. For example, the monitor costs an extra $2,300 and is inoperable without the accompanying $4,500 adapter card, he said.

"DEC has a similar problem. The Microvax 2000 is much less expensive than the RT but also only offers half the performance," Shaffer said.

Noted Hambrecht & Quist's Herwick, "The original RT was terrible. IBM's first attempt to fix some errors raised it to mediocrity. The last announcement raised it to a level of adequacy, but there is no performance-related area where this system is superior to the three other competitors."

CW staff writers James Connolly and Jean S. Bozman contributed to this report.

RT PC: Then and now

IBM's engineering system when introduced and with latest enhancements

RT PC Capability	*January 1986*	*February 1987*
Performance Dhrystones	1,780	6,900
Floating-point performance Whetstones (single-precision)		
Standard	20K	810K
Optional	200K	1,600K
Linpack KFLOPS (double-precision)		
Standard	--	80
Optional	37	300
Direct-Access Storage Device		
Maximum capacity	210M bytes	5810M bytes
Data rate	0.260M byte/sec.	1.08M byte/sec
Random-access memory (maximum)	4M bytes	16M bytes
Number of users (maximum)	8	16
Display size/Pixels (maximum)	15 in./75M	19 in./1M

INFORMATION PROVIDED BY IBM
CW CHART

IBM hikes rental, maintenance fees

BY CHARLES BABCOCK
CW STAFF

RYE BROOK, N.Y. — IBM announced a round of price increases Friday for most of its equipment rental rates, selected software products and Information Network service as well as purchase-price increases for selected magnetic-tape products.

The equipment rental rates and selected purchase prices will be increased by about 10%, effective immediately. Selected software prices will also be increased by 10%, effective immediately; Information Network products will be increased by about 6%, effective April 1. Per-call maintenance rates are being increased by 15% immediately.

"It appears that IBM is raising prices on its most labor-intensive products; maintenance is very expensive to provide, and software is very expensive to provide. It looks like a standard business review of pricing structure," said Tom Henkel, an analyst with The Yankee Group in Boston.

A typical product that could be affected is an older product line such as the IBM 3420 Models 6 and 8 tape drives.

There were no contract maintenance increases on the IBM 3090, 3080, 4300 or 9370 mainframe lines, company spokesmen said.

A week ago IBM announced contract maintenance decreases for selected models of the System/34, 36 and 38.

IBM made a similar announcement almost a year ago to the day when it notified customers on Feb. 21 of price increases in rental and maintenance agreements ranging from 8% to 15%.

That set of price increases concentrated on older, peripheral products, such as the Displaywriter Model B10. The monthly rental fee increased 8% from $510 to $550.

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CW Communications International News Service
Susan Blakeney, Director

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
617/879-0700

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IBM charts

CONTINUED FROM PAGE 1

do that."

Explained Ford, "We don't think it's inconsistent to have different architectures with the same application interface."

Meanwhile, Ford said IBM will keep three specialized mid-range processors — the System/88 fault-tolerant system, the Series/1 and the RT Personal Computer engineering workstation.

The Solutionpac Office Series was announced in two editions, one for the System/36 and another for VM machines. Both are collections of existing office software including word processing, electronic mail and calendar and optional features such as decision support and data base query. Optional services include user customization and education. By dialing an 800 number, users of both versions are offered assistance 24 hours a day, seven days a week.

The packages are similar in concept to DEC's All-In-1, Wang Laboratories, Inc.'s Wang Office and Data General Corp.'s CEO packages.

IBM said the System/36 Solutionpac will be available in April, and the VM Solutionpac is scheduled to be available in August. The pair of software groupings were just two of some 50 new products announced by Big Blue last week.

More System/36 storage on tap

Other offerings include more direct-access storage for the System/36, a more powerful entry-level System/36 D model, an enhanced Series/1 machine, additional communications servers and terminals and new System/88 processors.

The System/36 Solutionpac runs on the System/36 Models 5360 and 5362 with a minimum of 1M byte of memory and 260M bytes of direct-access storage. Solutionpac software that connects micros to the System/36 host requires an IBM Personal Computer XT or PC AT.

The text software is IBM Displaywrite/36 and IBM Language Dictionary. Communications and administrative support is provided by Personal Services/36. PC support is provided by IBM PC Support/36. PCS/36 Organizer provides a common menu for the end user to select functions that reside either on the PC or on the System/36.

The PC application for the System/36 Solutionpac is IBM Displaywrite 4. PC-to-host communications are provided by IBM Enhanced 5250 Emulation. Charges range from $35,000 to $66,000, depending on the options selected.

The VM Solutionpac runs on the IBM 4300-, 9370- and 3000-series machines. The PC software component requires an IBM PC AT, IBM 3270 PC or IBM 3270 PC AT.

Running on the IBM VM/IS operating system, the package's communications and administrative support is provided by IBM's Professional Office System (Profs). The new Profs Applications Support feature provides the interface between host and dependent displays and PCs, producing consistent displays for both.

The host word processing software is Displaywrite/370. Intelligent workstation support is provided by the 3270 file-transfer program. Networking support is the IBM remote spooling capability and IBM Pass-Through Facility.

The PC word processing software is Displaywrite 4, and host communications are handled by the IBM 3270 PC Emulation Program or the IBM 3270 PC Control Program.

IBM's Mondello, whose position as vice-president of office systems was created in the summer of 1986 to unify IBM's mid-range offerings, was careful to say that IBM does, in fact, have many additional pieces to add to its mid-range puzzle. "Solutionpac is a step toward fuller integration," he said.

Acknowledging that there are inconsistencies between the System/36 and VM versions, Mondello said, "In the Solutionpac, we are going to solve the problems of the seams between the products. We have varying degrees of ease of use. We're going to fix that."

The packages for the VM and System/36 environments are different in several respects. There are some differences in the menus, but the menus could be customized either by the user or by IBM, according to John McCarthy, an IBM program manager.

Decision Support Software (DSS) can be installed on both the VM host and an attached PC. In the System/36 version, however, the DSS can be installed on the attached PC only. However, a data base query function is available for PCs attached to a System/36 host as well as for the System/36 host.

Keyboard mapping is not the same on both systems, but a user may obtain a keyboard that is the same for all equipment, McCarthy said.

Documents can be sent between the two systems using IBM's Distributed Office Support System (Disoss), but the VM edition uses a Profs-Disoss bridge that is included in the version of Profs used in the package.

While praising IBM's general statement of direction, several industry observers were unimpressed with the Solutionpacs in comparison with the office packages sold by competing vendors. They also said it would be at least two years before IBM realizes its goal of mid-range uniformity and connectivity across two different architectures.

"These are primitive announcements, in my opinion. But they are significant in pointing to a direction," said Christine Hughes, vice-president of office technologies for the Gartner Group, Inc., a Stamford, Conn.-based research firm.

'Great concept — not complete'

"Solutionpacs are a great concept, although they are not complete yet," said George Colony of Forrester Research, Inc. in Cambridge, Mass. "There is incompatibility between menus, functions and keyboard mapping."

Colony pointed out that a key to closely coupling the two mid-range family branches is making Advanced Peer-to-Peer Networking, a peer-to-peer facility for the System/36 and 38, and TSAF, a VM-to-VM communications function announced with the 9370, work together. Essential to this is implementing LU6.2 on TSAF, which IBM's McCarthy called "a known requirement that we intend to address."

Colony estimated that creating peer-to-peer communications between the two architectures would take at least another 18 months.

Hardware additions roll out

IBM last week released details on new models of its fault-tolerant System/88, quietly introduced two weeks ago, and additional models in its System/36 and Series/1 lines.

The System/88 Models 50, 81, 82, 83 and 84 are based on the Stratus Computer, Inc. XA2000 series of transaction processors, announced earlier this month. The models, like the previous System/88 products, were designed for use as stand-alone mid-range processors or as fault-tolerant hosts or communication processors in an IBM Systems Network Architecture network.

IBM reportedly adds controllers and software to the Stratus processors before releasing the products as the System/88. One software package introduced with the new models was the System/88 Distributed System Services program, which allows a System/88 to communicate with an IBM Distributed Systems Executive (DSX) program running on an IBM 370-architecture host. DSX provides scheduling and tracking of central libraries.

The System/88 Model 50 is available now for $73,000. Models 81 through 84 will reportedly be available during the second quarter at base prices ranging from $81,200 to $342,000.

IBM's System/36 announcement included four low-end Model 5364s. Existing 5364s can be upgraded to the new models by swapping the original 40M-byte disk drive for a new 65M-byte storage unit, an IBM spokesman said. Upgrading the drive costs $3,095 for the first unit and $2,395 for a second unit, he said, noting that the old drive remains the property of the customer. In addition, the System/36 5362 Model C can now support increased storage of up to 600M bytes.

"This is a mid-life or an end-of-the-road kicker. I don't think there's any question that the 36 will be replaced in 1988," said Mark Webb, editor of "Scope/36," a user publication in Orlando, Fla.

IBM also announced two high-performance models of its Series/1 computer, the 4956 Model J and 4956 Model K. The Model J, priced at $23,000, and the Model K, priced at $17,000, are scheduled to be available this May. Field upgrades from existing models are scheduled to be available in July.

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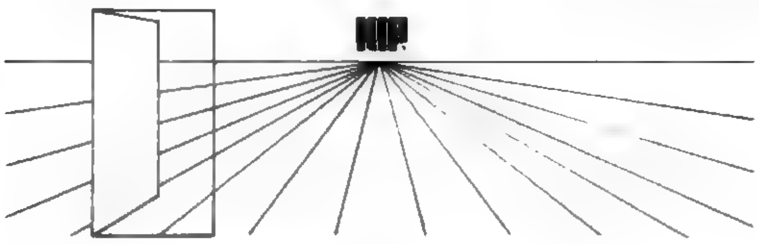

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Users back IBM mid-range strategy

BY ALAN ALPER
and JEAN S. BOZMAN
CW STAFF

NEW YORK — IBM equipment users polled last week gave hands-down support to Big Blue's mid-range strategy of offering a variety of computing architectures to serve a spectrum of applications.

Yet, while most users backed IBM's positioning of the System/36 and 38 and the 9370 as general-purpose computers, and the System/88 fault-tolerant processor, Series/1 minicomputer and RT Personal Computer as specialized systems, many conceded they had little choice but to go along with the company's strategy.

Many viewed Digital Equipment Corp., with its single-architecture approach to computing, as delivering a superior means of distributed data processing. Few said they would switch soon to DEC.

'A lot of resistance'

"If I was to take a DEC recommendation — or any other non-Blue proposal — upstairs, it would meet with a lot of resistance," observed Don Rems, data processing operations manager at Allen Products Co., a pet foods manufacturer in Allentown, Pa. "It's not that it is DEC or anyone else for that matter. It's just that it's not IBM."

Rems said at Allen Products, which uses an IBM 4361 Model 5 and a 4381, many DP professionals stick with IBM for the comfort of knowing that if a disaster strikes, they can shift production to a compatible system.

"People are willing to make a lot of concessions, even if in dollars and cents it costs more to stay with IBM," he said.

Many DP managers said connectivity, software and disk-storage enhancements made on IBM's mid-range systems were part of Big Blue's continuing effort to stave off inroads made by DEC and other minicomputer vendors into its customer base.

David Griffith, DP manager at Standard Chartered Bank in New York, said that while his corporation still leans toward IBM, it has installed DEC hardware to run a funds-transfer system. DEC salesmen, he added, have pushed harder of late to persuade him of the virtues of a VAX. "We've had to tell them, though, that it's bank gospel to stick with IBM," Griffith said.

Standard Chartered runs several large configurations of the System/36, Griffith reported. Although he is happy with IBM's moves to upgrade main memory and disk storage, Griffith said he believes the System/36 will be phased out soon.

"I look at the upgrades as a short-term fix, but eventually we'll have to consider going with the System/38," he observed.

"Ignoring the political decision to stick with IBM, if we upgrade to a System/38, it would require a full rewrite," he said. "If you're doing all the rewriting, you might as well consider looking at a VAX. It would appear to be a better option."

Other System/36 users polled last week approved of IBM's decision to equip the workhorse minicomputer with increased disk storage featuring faster data-access times. Many said the enhancements were another indication that IBM intends to maintain the minicomputer, at least in the short term.

"I feel safer than a year ago that IBM will continue to support the System/36," said Robert Ryan, DP manager at Dexter Corp.'s Hysol division in Olean, N.Y. "They are providing a path to make sure users don't lose their software investment."

Mike Frogratt, MIS manager at SL Industries, Inc. in Marlton, N.J., expressed satisfaction with the upgrades. Frogratt, who has witnessed the 17-year progression of the computer family from the System/3 through the System/38, said the System/36 has surpassed his expectations in terms of capacity and ease of use.

Frogratt is sticking with the System/36 despite the other hardware platforms IBM is offering. He expressed interest, though, in reports that IBM is readying a version of the 9370 that would run the System/36 operating system, SSP.

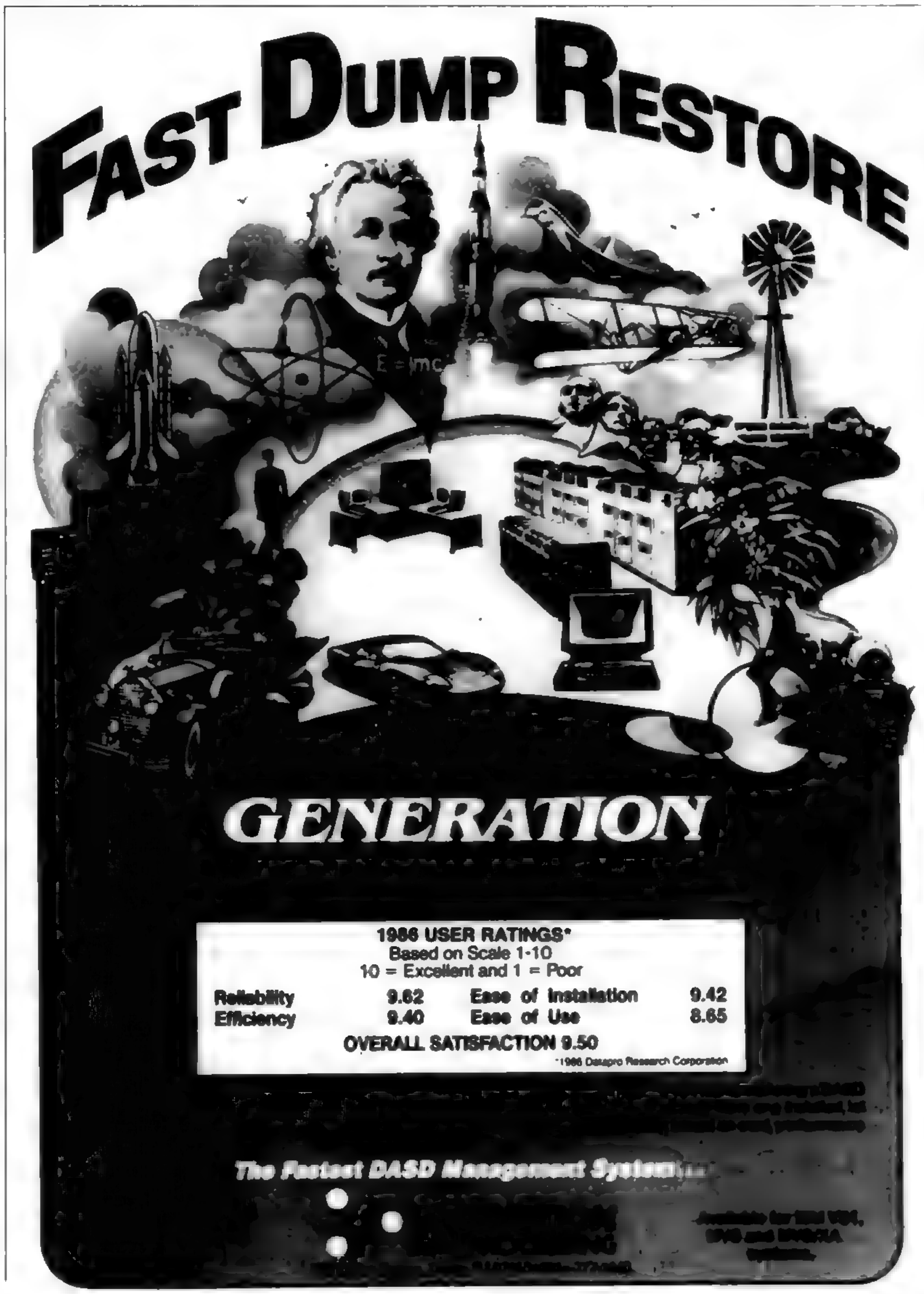
"If that happens, it would make a nice migration path to the 9370," Frogratt said.

Users of IBM's 4361 expressed little concern about the decision to discontinue that processor. "My basic feeling is that something is not obsolete unless it can't be used anymore," said Joe Denneen, DP manager at Fuji Photo Film U.S.A., Inc. in Elmsford, N.Y.

Jim Barber, information services manager of United Telephone Co. of Indiana, Inc. in Warsaw, Ind., added, "I don't see where IBM's announcement is going to change our plan. We expect that they'll continue to support the 4361 in the coming years."

United Telephone, a subsidiary of U.S. Sprint Communications Co., has two IBM 4361s. One will be swapped for an IBM 4381 in a few weeks, Barber said, while the other remains dedicated to a repair system.

Denneen said that when it comes time to upgrade his 4361 in the next year or two, Fuji is going to take a hard look at the 9370. "The price/performance on that machine seems better than the 4381," he concluded.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*1986 Datapro Research Corporation

Trim Compaq

FROM PAGE 1

Prices start at $4,000. A fully configured model with a 40M-byte hard disk drive and an expansion unit with two full-size slots is slated to cost more than $6,000 and weigh more than 20 lbs.

Compaq said it plans to sell the machine to users interested in lighter portables, including many users considering laptop computers and those who need a full-featured desktop that can be carried easily. "We are making the weight and size penalty for carrying a computer around substantially lower," said Rod Canion, Compaq president. "We really have crossed the barrier where any man or woman can carry one of these around easily.

"This little bitty portable, which is smaller than the monitor on the IBM Personal Computer AT, can have a 40M-byte Winchester disk, vs. the AT's 30M-byte drive, and its speed is under 30 msec, vs. the AT's at under 40 msec," he added.

A light lunch

Few machines' designs resemble that of the new Compaq, which could pave the way for a family of Compaq portables. It uses the "lunch-box" approach, with a small footprint, a depth of 8 in., an 11-in. monitor and disk drives mounted on the side. It is not designed for use on a lap.

Of the machine's design, Canion said, "I think this form factor is an important one for the future. But it certainly is not the end of the road. We will have smaller, lighter and more powerful portables in the future."

Analysts called the machine an improvement over existing Compaq portables. "The screen has always been the problem with Compaq portables. This one has excellent resolution, better than on the Compaq Portable Computer," said Bill Kirwin, program director of personal computing policies and strategies at the Gartner Group, Inc. in Stamford, Conn.

"It changes the whole concept of portable computing. I don't have to make trade-offs any more," said Aaron Goldberg, vice-president of microcomputer services at Framingham, Mass.-based market research firm International Data Corp.

Word from the noncarriers

But not everybody believes the Compaq machine is a good buy. "It weighs 20 or so pounds without the expansion box, and it is not battery-operated at all. It is really a desktop, although slightly lighter, and you have got to wonder what the big deal is," said one source who saw the product before its announcement. The source, who asked not to be identified, was also concerned with the pricing of the Portable III, which ranges from $3,999 to $5,799 without the expansion box. "Why would you pay that for a desktop?" he asked.

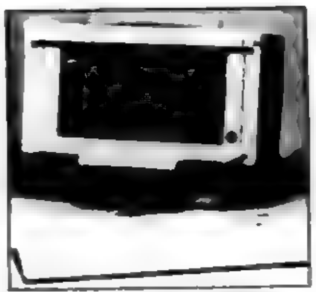
In conjunction with the Portable III announcement, Compaq also consolidated its portable line by discontinuing production of the Compaq Plus, a hard-disk version of its original Intel Corp. 8088-based system, and the Portable 286, the firm's first portable, based on Intel's 80286 chip.

Canion said the product consolidation is driven by the market and by the urgings of dealers who want to carry fewer products. "People who are buying hard-disk portables now are tending to go to 286 machines," he said.

"We felt we could serve the market two ways. One, by letting the dealers plug a hard disk on a card into the dual unit, or have them buy the lower priced Portable II."

The Compaq executive further explained that "the Portable 286 is completely overlapped now by the Portable II and III. The only other thing it really had was tape backup capability, and while the Portable II doesn't have that, we are working on offering something like tape backup capability on the Portable III."

Compaq Portable III specifications



Processor: Intel Corp. 80286, socket for 80287 math coprocessor

Processor Speed: 8 or 12 MHz

Keyboard: 84 keys

Display: Dual-mode gas plasma, 640 by 400 graphics and text modes

Memory: 640K-byte random-access memory

Weight: 18 to 20 lbs without expansion box

Price: $3,999 to $5,799

Disk Drives: One 5¼-in., 1.2M-byte floppy disk drive

Operating System: Microsoft Corp.'s MS-DOS 3.2

Options: 300/1,200 bit/sec. internal Hayes Microcomputer Products, Inc.-compatible modem, choice of 20M- or 40M-byte shock-mounted 3½-in. hard disk drive, 360K-byte, 5¼-in. floppy disk drive, plug-in expansion unit with two full-size slots, 2M-byte random-access memory board, 80287 math coprocessor.

CW CHART

Managers see portable on desks

BY DAVID BRIGHT
CW STAFF

While a few managers are balking at the price of the Portable III system announced last week by Compaq Computer Corp., a significant share may be attracted by the machine's high level of functionality.

In fact, some managers surveyed by *Computerworld* last week suggested that the 18-lb IBM Personal Computer AT-compatible machine will see extensive use as a desktop system as well as a portable one.

With its fast microprocessor, high-speed, high-capacity optional hard disk drive, industry standard 5¼-in. floppy disk drive, easy-to-read gas plasma display and optional capacity to accept two add-on boards, the system will at least warrant close inspection, managers said.

Not surprisingly, beta users were particularly enthusiastic. "This is the first lightweight portable I have seen that I would be happy to use as a desktop machine," said Walter Kennamer, a senior manager at Ernst & Whinney's national computer audit group at the company's Cleveland headquarters. "In fact, the portable that I had as a beta-test unit seems considerably more powerful than the Deskpro 286 that I was using," he said, noting that he had tested the unit only for two weeks.

"It's extremely fast, extremely quiet, and the keyboard is a standard layout that we're very comfortable with," added beta-test user John Seebach, head of national microcomputer functions at the Minneapolis office of accounting firm McGladrey, Hendricksen & Pullen. "It's much faster than the other 286 models that we have," he said, referring to machines based on Intel Corp.'s 80286 chip.

Another manager, who had been looking forward to the Portable III debut, held off from purchasing a competitive model — Toshiba Corp.'s popular T3100. "Even though we liked the Toshiba an awful lot, we held off, waiting to see what Compaq had to offer," said Hilarius Fuchs, information center director at Continental Grain Co. in New York. Echoing many managers, Fuchs noted that the only drawback to Toshiba's 15-lb system is its nonstandard 3½-in. floppy disk drive. Although it is heavier than the Toshiba T3100, Portable III's standard-size floppy disk drive could cause him to choose the Compaq machine, Fuchs admitted.

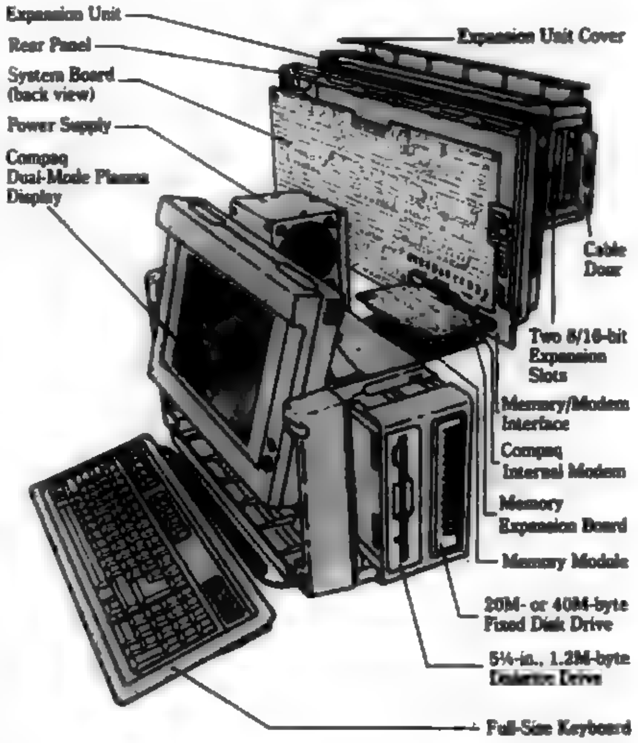
Because Fuchs would be linking the systems into a local-area network, he would have to buy the optional $199 expansion unit that attaches to the back of the machine. He stressed that, with Portable III prices beginning at $3,999, the machine is not for "the average Joe."

As far as Jeff Ehrlich is concerned, however, the Portable III is much too expensive. "It's for somebody who wants high speed in a portable and who has a lot of money," said Ehrlich, who is in charge of microcomputer evaluations at General Electric Co. in Bridgeport, Conn. "It's a high-end, premium, Mercedes kind of market."

Ehrlich claimed the visibility on some of the new supertwist LCD displays are as good as the gas plasma displays and can be better for long-term viewing. Other managers disagreed. Seebach said that the Portable III's gas plasma display is much better than supertwist LCDs and almost as good as a regular CRT. Kennamer added that the gas plasma display is "good enough" and should not be a serious drawback to long-term use.

Considering the machine's price and the limitation of two expansion slots, Cynthia MacLeod, a senior consultant with Deloitte, Haskins & Sells in New York, said that the Portable III will become a niche machine. "If I were looking for a desktop computer, I would buy a desktop computer," MacLeod stated.

Compaq Portable III



CW CHART: MITCHELL J. HAYES

HP posts slight increase in revenue, earnings

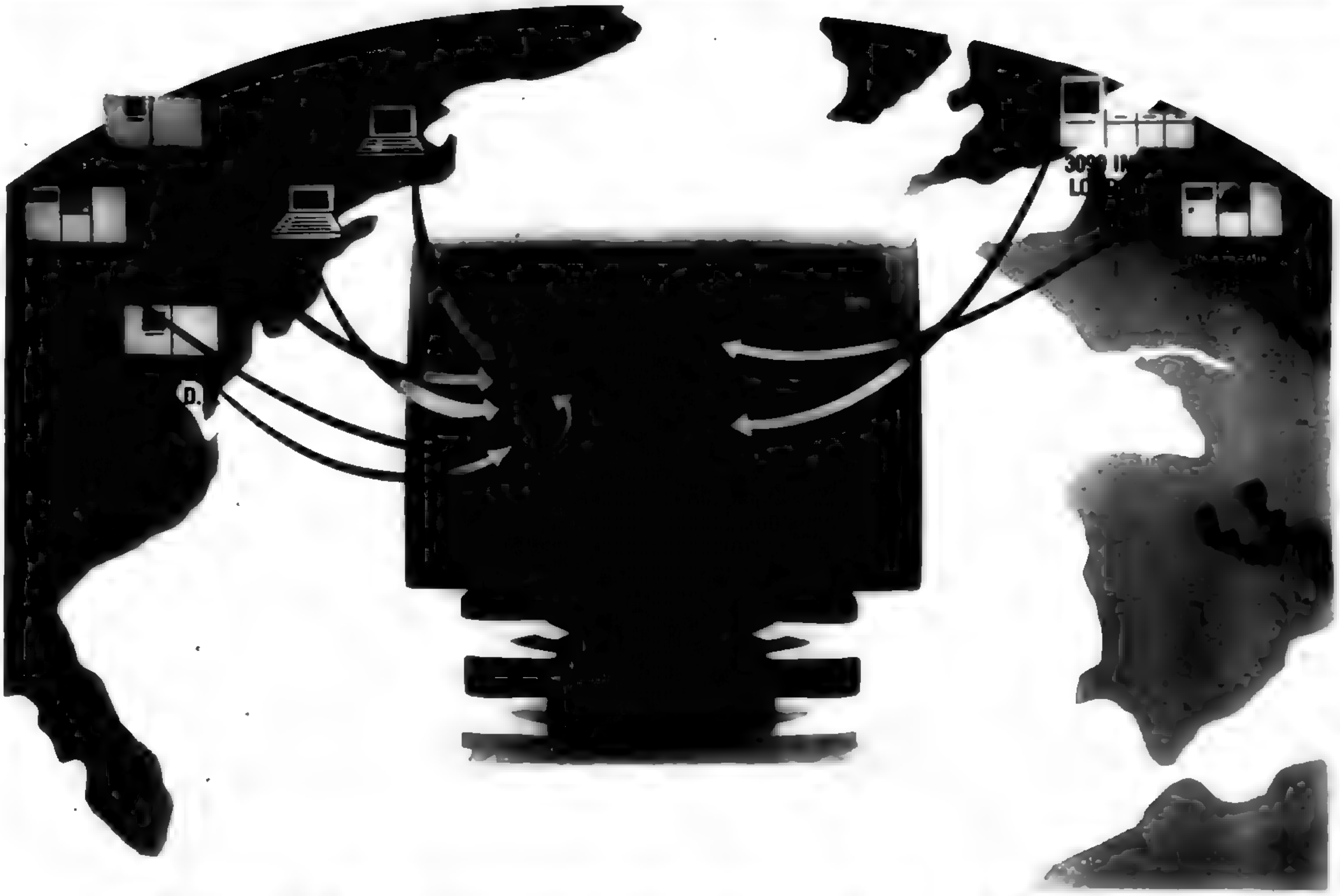
BY JAMES A. MARTIN
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. last week reported a slight increase in revenue and earnings for its first 1987 quarter ended Jan. 31.

Sales totaled $1.74 billion, compared with $1.6 billion for the same quarter last year. Net income was $116 million, or 45 cents per share, compared with $109 million, or 43 cents per share, a year ago.

The quarter was somewhat disappointing to HP as well as to several analysts. The company said its U.S. market was weakened from slow capital spending. But orders in Western Europe continued to show good growth due to strengthening markets and competitive pricing, according to HP President John Young.

But European revenues were disappointing as well, according to Peter Heymann, a technology analyst with Drexel Burnham Lambert, Inc. Overall, however, analysts say future quarters will be more positive. "They've made substantial headway in cost control, and they should be doing better in the next quarter after these one-time factors," Heymann said.



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AT&T works on flexible configuration

Tries to divert telecom users away from private T1 systems

BY ELISABETH HORWITT
CW STAFF

BASKING RIDGE, N.J. — Attempting to divert users from private T1 network systems, AT&T is expected within 12 months to provide dynamic bandwidth reconfiguration for its telecommunications services.

In the very near term, the company will reportedly announce a customer-premise T1 network switch that is compatible with its existing central-office Digital Access and Cross-Connect System (DACS) yet provides intelligent routing and bandwidth reallocation capabilities that Dacslacks.

A Tellabs, Inc. spokesman said that AT&T has agreed to act as OEM for Tellabs' intelligent customer-premise multiple T1 networking switch, which was recently released commercially by Tellabs as Crossnet. AT&T would neither confirm nor deny this.

The new capability for AT&T services is likely to be offered on an upgraded version of DACS, which will be installed in AT&T central offices by year's end, according to Richard Snowden, director of AT&T's Concept Development Center.

Snowden describes the future service as a "near real-time, speeded-up version of Customer Controlled Reconfiguration (CCR)." An existing feature of AT&T's Accunet family of wideband digital network services, CCR enables customers to reallocate bandwidth within their Accunet-based networks at preset times. "For example, you might want to rearrange your network to focus on your data centers at 5 p.m., when they'll be receiving a lot of batch transmissions," Snowden says.

Officially introduced by AT&T several years ago, CCR turned out to meet the needs of a small range of customers who "knew in advance what their networking bandwidth needs would be," but it failed to address a larger population of "customers that wanted to use the service for Systems Network Architecture [SNA] disaster recovery," Snowden explains. "If a line comes down on an SNA link, you have to reroute the bandwidth in seconds, not minutes, or else the system has to reboot, I'm told."

Saw needs 'after the fact'

AT&T only realized "after the fact" of CCR implementation on customer sites that a large percentage of users really needed "dynamic, near real-time configuration of bandwidth," Snowden says. "Providing that service is obviously among our high priorities right now."

Merrill Lynch & Co. is one disappointed CCR customer that is evaluating the private T1 equipment vendors' solutions in the absence of a real-time reconfiguration service from AT&T.

Approximately two and a half years ago, the financial service company decided to become a test site for CCR and a user of AT&T's Accunet T1.5 service, envisioning "a broadband network feeding into this dynamically switchable configuration," says Michael Loring, Merrill Lynch vice-president and group manager of telecommunications.

Merrill Lynch set up multiple Accunet T1.5 lines to carry voice and data between sites in six major cities and planned a two-pronged disaster-recovery system around CCR. First, if a link went down, voice traffic could be reallocated to an ordinary direct-distance dialing system, leaving more room for "critical data traffic," Loring explains. Secondly, triangular configurations would provide redundant linkages. For example, New York, Chicago and Philadelphia would all be linked directly to one another, so that if the New York-to-Chicago link went down, transmissions could be routed through the Philadelphia connection.

'More time and energy'

Then the company discovered that "CCR did not provide dynamic bandwidth reallocation, as we had first thought," Loring reports. "It takes more time and energy than we expected to re-engineer bandwidth on the fly."

Merrill Lynch is currently shopping for alternatives to Accunet and CCR, including private T1 networking equipment solutions.

Joaquin Gonzalez, a vice-president of the enterprise networking strategies group at Stamford, Conn., research firm Gartner Group, Inc., attributes AT&T's delays in offering dynamic reconfiguration partially to the basic design of DACS, the system that handles routing of T1 channels and 64K bit/sec. subchannels from AT&T central offices. "With DACS, you have to reconfigure bandwidth manually, which takes minutes; with a T1 switch from Network Equipment Technologies Co. or Cohesive Network Corp., it takes seconds," he explains.

"The current DACS architecture makes it difficult to reconfigure bandwidth in seconds," Snowden concedes, adding that AT&T is converting the DACS architecture this year. "That is just one of the real-time reconfiguration solutions we're currently considering," he says.

AT&T is currently doing "cheap and dirty trials" of different dynamic reconfiguration solutions installed on customer premises, Snowden says.

Tellabs' Crossnet, which will form the basis of AT&T's expected Acculink 740 introduction, was developed with technical support AT&T's Data Systems Division. The intelligent T1 switch supports up to 16 T1 links and features integral diagnostics, dynamic reconfiguration and automatic rerouting of 64K bit/sec. DSO channels around failed network nodes and links, Tellabs claimed.

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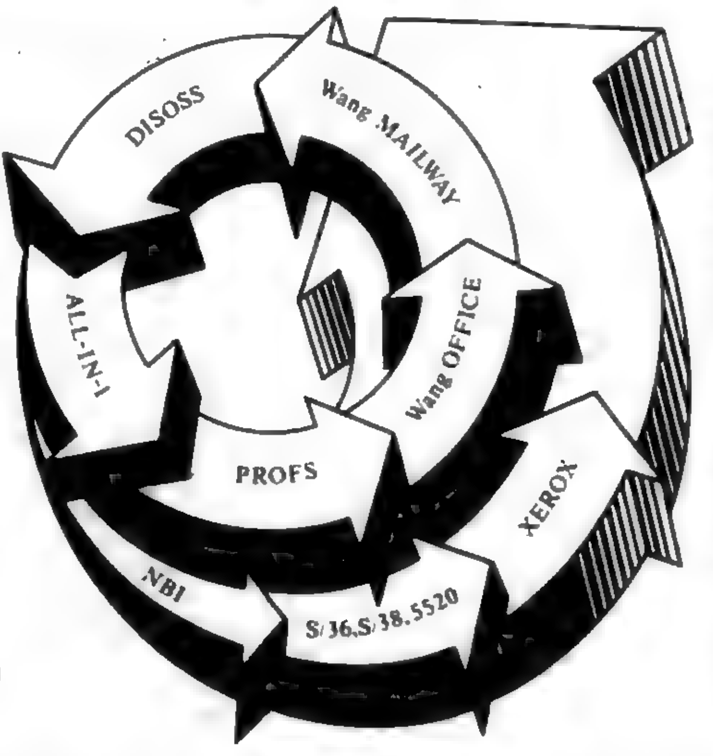

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* Washington University Center for the Study of Data Processing as reported in the 11/15/86 DATAMATION, pp 79-86.

Cullinet gains expertise, acquires Landry's firm

BY CHARLES BABCOCK
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. is expected to attempt to add expert system capabilities to its line of applications as a result of the acquisition of Distribution Management Systems, Inc. (DMS), the firm chaired by noted software developer John Landry.

Cullinet announced last week it was acquiring the small Lexington, Mass.-based company for more than 1.6 million new shares of Cullinet stock, which closed last Wednesday at $10.63. The market value of the shares indicates the deal is worth $18 million. The deal will not be executed until after a 60- to 90-day period to meet Securities and Exchange Commission registration requirements.

The acquisition comes 18 months after Landry, DMS President Bob Weiler and a group of software developers left McCormack & Dodge Corp. to take over DMS with the backing of a venture capital group.

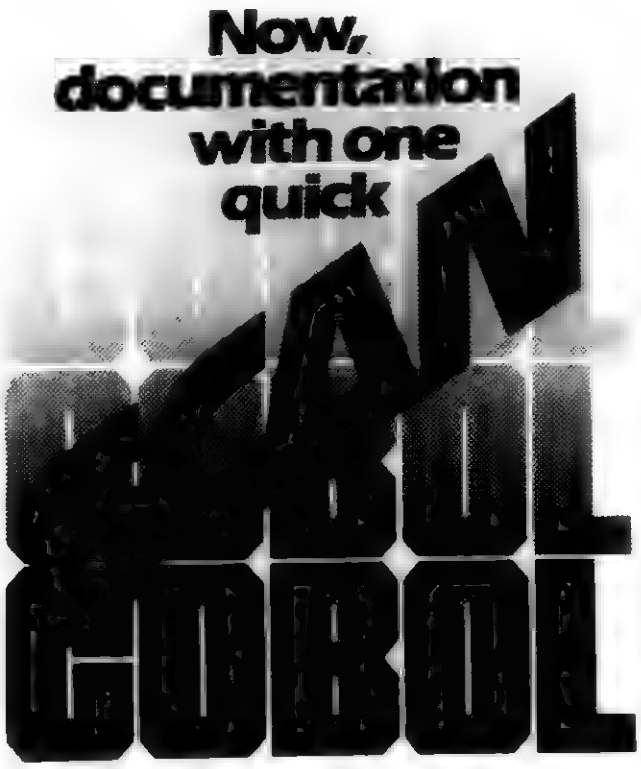
At the time, DMS was a sleepy inventory-control and logistics-management software vendor that garnered $6 million in sales in fiscal 1985.

Under the Landry-Weiler regime, DMS expanded its distribution product line and added a Cobol-based expert system development product called Impact/Application Expert. This product was used to add expert system capability to the DMS product line and was put on the market as a development system capable of creating systems that could be tied to mainframe data bases or embedded in existing Cobol applications.

Cullinet, which has been establishing itself as an applications vendor, will be able to produce "a different kind of application, one embedding expert systems," according to Esther Dyson, publisher of the "Release 1.0" newsletter in New York.

Jeff Papows, vice-president of marketing at Cullinet, was unable to comment on what the acquisition might do for Cullinet's product line due to a silent period imposed by SEC regulations. But he noted that applications constituted 18% of Cullinet's business last year and are expected to grow to 25% to 30% of this year's revenue.

Although some observers speculated that Landry is unlikely to stay within the confines of a large organization for very long, Landry commented, "I've worked in a large software company and I've run a small software company. I prefer being in a large company."



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Firm reports third straight losing quarter

BY CLINTON WILDER
CW STAFF

WESTWOOD, Mass. — Although it continues to build for the future with acquisitions, Cullinet Software, Inc. last week reported its third straight losing quarter.

For its third quarter ended Jan. 31, the mainframe data base management vendor posted a loss of $4.9 million, or 16 cents per share, on revenue that dropped 4% from year-earlier levels to $43 million. One year earlier, Cullinet reported a profit of $3.8 million, or 13 cents per share.

Cullinet had announced earlier that it expects to post another loss in the current quarter ending April 30.

Cullinet Chief Executive Officer David Chapman said sales of applications software grew to 27% of the firm's revenue in the third quarter, compared with 19% a year earlier.

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TITLE/FUNCTION (Circle one)
IS/MIS/DP MGT
19 Vice President, Asst. VP
21 Dir., Mgr., Suprv. IS/MIS/DP Services
22 Dir., Mgr., Suprv. of Operations, Planning, Adm. Services
23 Dir., Mgr., Suprv., Analyst, of Systems
31 Dir., Mgr., Suprv. of Programming
32 Programmer, Methods Analyst
35 Dir., Mgr., Suprv. OA/WP
38 Data Comm. Network/Systems Mgt
OTHER COMPANY MANAGEMENT
11 President, Owner/Partner, General Mgr
12 Vice President/Asst. VP
13 Treasurer, Controller, Financial Officer
ENGINEERING
41 Engineering, Scientific, R & D, Tech. Mgt
SALES
51 Manufacturing Sales Reps., Sales/Mktg. Mgt
OTHER PROFESSIONALS
60 Consulting Mgt
70 Medical, Legal, Accounting Mgt
80 Educators, Journalist, Librarians, Students
90 Others ______________
(Please specify)

COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as a user, vendor, or consultant
A Mainframes/Superminis
B Minicomputers/Small Business Computers
C Microcomputers/Desktops
D Communications Systems
E Office Automation Systems
F No Computer Involvement

3317-6788

ADR to link SQL, DBMS

Buys PC-based relational technology, plans end-user tools

BY CHARLES BABCOCK
CW STAFF

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) has acquired a personal computer-based relational data base management system from which it plans to derive an SQL language for use with its mainframe DBMS, Datacom/DB.

Eventually, the firm will also provide an end-user set of tools for applications development and a PC-based relational DBMS, ADR officials said.

Joseph W. Farrelly, vice-president of research and development, said last week that ADR has acquired the rights to XDB, a relational DBMS from Software Systems Technology, Inc., a tiny development firm in College Park, Md.

The little-known XDB was developed under the direction of Software Systems Technology President S. Bing Yao, an associate professor at the University of Maryland. Yao's research on SQL query optimization has been incorporated into XDB, according to company spokesmen.

Software Systems Technology, with fewer than 10 full-time employees, does not have a direct sales force and has few large corporate customers. However, 50 copies of the $750 product have been sold to the National Aeronautics and Space Administration, Software Systems spokesman Kim Ball said.

In addition to a relational DBMS, ADR acquired a set of tools that it eventually plans to offer as an end-user applications development tool kit. The XDB tools include a report writer, forms manager, menu generator and data import/export facility.

No date was set for when the PC-based products might become available, but Farrelly indicated ADR's first priority will be to produce a mainframe implementation of XDB's SQL. ADR's implementation will meet the American National Standards Institute standard for SQL. SQL was originated by IBM as Structured Query Language.

XDB's SQL engine offers strong performance characteristics, which will be extended to a line of PC and local-area network products that ADR committed itself to develop last September, Farrelly claimed.

One of the first products scheduled to emerge from that commitment this March is Ideal Escort, a PC version of ADR's fourth-generation language Ideal.

The project is on schedule with eight beta-test users lined up, according to Farrelly.

In contrast to the data processing-oriented Ideal and Datacom/DB, ADR seeks to offer an end-user applications development capability through highly automated screens and menus via the XDB tools.

Initially, this tool set would not work in tandem with ADR's mainframe product line, Farrelly acknowledged.

AT&T aims 80286-based AT clone at workstation market

BY ALAN J. RYAN
CW STAFF

MORRISTOWN, N.J. — AT&T last week rolled out its latest personal computer offering — this one an IBM Personal Computer AT clone.

The AT&T PC 6310 uses the Intel Corp. 80286 processor and is aimed at the Microsoft Corp. MS-DOS and IBM PC-DOS workstation market, according to spokesman Mark Siegel.

"It is meant to be an AT-compatible machine," Siegel said. The PC 6310 "is designed to run with all the software that runs on the AT. We did that to meet the needs of an increasing number of customers who specified they want AT compatibility in their computers," he claimed.

The units will be manufactured in Italy by Ing C. Olivetti & Co., and prices start at $3,045 for the 1.2M-byte floppy-disk 512K-byte random-access memory (RAM) Model 31.

For the Model 31 with monochrome monitor, keyboard and MS-DOS 3.2, the price tag would be $3,590.

The spokesman said that in comparison to IBM's AT offering, "it is a very similar machine. We do offer the Intel 80286 chip, which offers some advantages, and we offer a one-year on-site warranty." He added that the PC 6310 is priced slightly below IBM's AT.

AT&T said the unit is compatible with "virtually all peripherals and MS-DOS and PC-DOS applications software written for the IBM PC AT."

The PC 6310 is available in 20M-, 40M- and 68M-byte hard-disk versions with a 1.2M-byte floppy disk drive. It also has space for a third drive and up to 80M bytes of storage.

Networking capabilities

The microcomputer features such attributes as high-resolution graphics — 640 by 400 pixels — and networking capabilities, the vendor said.

It can link to other computers and outside information sources, including the AT&T Starlan local-area network, up to four RS-232C serial connectors and Systems Network Architecture/Binary Synchronous Communication and other terminal emulation software and hardware.

Other single-quantity prices are as follows: the Model 32, with a 20M-byte hard disk, 1.2M-byte floppy and 512K-byte RAM sells for $3,995; the Model 34 with a 40M-byte hard disk, 1.2M-byte floppy and 512K bytes of RAM costs $4,995; and the Model 36 with a 68M-byte hard disk, 1.2M-byte floppy and 1M byte of RAM sells for $5,795.

All models have 512K bytes of RAM, expandable to 1M byte on the motherboard and up to 7M bytes using plug-in memory cards.

Optional equipment includes the Model 303 keyboard for $195, a monochrome monitor for $255, color monitor at $795 and MS-DOS 3.2 for $95.

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Pearl River, NY 10976

[illegible]

Concurrent DOS vies for UK PC standard

BY JANE LAWRENCE
SPECIAL TO CW

BIRMINGHAM, England — Digital Research, Inc.'s recently announced Concurrent DOS 386 [CW, Feb. 16] is bucking to become the standard multiuser operating system for UK personal computers based on Intel Corp.'s 80386.

Visitors at the Which Computer? show here last week saw the launch of 80386-based systems by Apricot PLC, Comart Ltd. and Jarogate Ltd.

All of the computers were shown running the UK-developed Digital Research operating system.

At the same time, Digital Research conceded that IBM PC-DOS compatibility on Concurrent DOS 386, which is scheduled to be available March 9, is still limited, but the company has pledged to work on improvements.

According to Digital Research founder Gary Kildall, "These compatibility issues are going to be solved. We will eventually be as compatible with DOS through Version 3.2 as you can be on a multiuser system."

Kildall hinted that the company would introduce other variant operating systems based on Concurrent DOS 386 technology, as well as a multitasking version of its GEM graphics-oriented operating environment, by year's end.

As other control programs, Concurrent DOS 386 uses the virtual 8086 mode of the Intel 80386 microprocessor. This means that memory available for each program is limited to 384K bytes by operating system and video overhead.

"As Concurrent evolves, we will create more space for program code by putting the operating system itself in protected memory," Kildall said.

According to Roger Howarth, sales and marketing director for Comart, "DOS 386 is the leading microcomputer, multiuser operating system."

Comart's CP3000 system, set to be introduced in March, uses serial terminals and features 700K bytes of memory per task.

Jarogate will offer Concurrent DOS 386 in a multiuser system and also as an option for its 80386-based Sprite PC, which is targeted for availability next month.

Apricot is offering Microsoft Corp.'s Xenix on its $10,250 VX multiuser systems, but it also plans to offer Concurrent DOS 386 through Axis Systems Ltd. of Somerset, England.

Lawrence writes for *PC Business World*, a CW Communications, Inc. British publication.

Hercules boasts color version of graphics card

BY DAVID BRIGHT
CW STAFF

BERKELEY, Calif. — Hoping to strengthen its reputation as a standards setter for personal computer graphics, Hercules Computer Technology, Inc. is scheduled next week to introduce a color version of its Hercules Graphics Card Plus.

According to Hercules President Kevin Jenkins, the new Incolor Card is "a logical extension of the graphics and Ramfont standards we've created with our monochrome cards." The $499 board has better graphics resolution and a more sophisticated programmable text mode than IBM's Enhanced Graphics Adapter card, Jenkins claimed.

The board is said to be compatible with all standard text programs, programs that support the Hercules monochrome graphics standard and programs that use the Hercules Ramfont display mode.

Programmers can easily adjust applications that support the Hercules monochrome standard to display full color, according to the vendor. Jenkins said he expects most popular programs that require a full-color display will support the Incolor Card by the targeted shipping date of May 1. Color software drivers have already been developed for Lotus Development Corp.'s 1-2-3 and Symphony, Autodesk, Inc.'s Autocad and Microsoft Corp. Windows applications, Jenkins said.

The new card can display 16 colors out of a 64-color palette, with a resolution of 720 pixels by 348 pixels. Applications can also be displayed in white-on-black or in two other user-selected colors.

The Incolor Card supports an expanded version of the Ramfont display mode. With Ramfont, an application program can access a library of as many as 3,072 software-definable characters or patterns. In two colors, as many as 12,288 of the custom characters can be displayed.

By using Ramfont to store graphics characters such as italics, boldface and other font types, many programs are said to run faster, because the characters no longer need to be created on the fly.

The board requires a multisynch color monitor and is said to meet the specifications of the IBM Enhanced Color Display.

The TI Silent 700™ Portable Data Terminals – making sure Ford service always has the right connections.

When Ford Motor Company service technicians need information on service matters, Texas Instruments keeps them connected with "headquarters." By accessing Ford's On-Line Automotive Service Information System (OASIS) with TI's Silent 700 Portable Data Terminal, they can call up the latest service bulletins, warranty term information and other specific symptom-oriented special service information. A portable, affordable and effective way to make sure a Ford or Lincoln-Mercury dealer's customers receive top-quality service. Quickly.

The terminals give technicians access to Ford's service information database, which they use to diagnose and repair customers' vehicles quickly and accurately. Repairs are done right the first time. In fact, Ford has found the Silent 700 so reliable and cost-efficient that over 4,000 Ford, Lincoln and Mercury dealers now access the OASIS network with the TI terminal.

Each Model 707 terminal is equipped with an auto access cartridge programmed to gain access to the OASIS database. Therefore, the Model 707 is easy to use. It's small enough to fit anywhere on a service bench, and its construction is tough enough to stand up to life in the service [illegible]

Ford Motor Company is not the only major corporation putting TI's terminals to work as access tools. Other companies use the Silent 700 Series to eliminate telephone tag, communicate with their computers, provide instant diagnostics or specifications to the field. If you have remote communication needs, talk to us about our family of portable data terminals.

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TEXAS INSTRUMENTS

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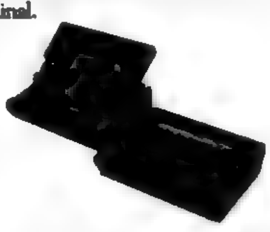

Phoenix Technologies joins the hunt for pirates

Software firm launches successful campaign against Ultimate Business Systems

BY CLINTON WILDER
CW STAFF

NORWOOD, Mass. — Phoenix Technologies, Inc., developer of IBM compatibility software for several leading microcomputer clone makers, has become the latest software company to launch an antipiracy campaign against copiers of its products in the U.S. and Canada.

Phoenix Technologies is expected to announce today that a Toronto-based clone maker has agreed to stop producing illegal copies of the IBM-compatible read-only memory (ROM) BIOS that Phoenix licenses to manufacturers of IBM-compatible micros.

Phoenix said the settlement with Ultimate Business Systems is intended as a signal to other firms that Phoenix claims are pirating its products.

"We believe another 40 to 50 potential companies may be in violation in Asia, Canada and the U.S.," Phoenix President Theodore Joseph said. "We plan to be very vigorous on enforcing our rights."

PHOENIX Technologies has worked closely with the Royal Canadian Mounted Police and other Canadian authorities in a four-month investigation of suspected pirates.

Phoenix is the market leader in its niche, licensing its ROM BIOS to IBM-compatible vendors such as Tandy Corp., Kaypro Corp., Leading Edge Computer Products, Inc., Wang Laboratories, Inc., Texas Instruments, Inc., NEC Corp. and Hewlett-Packard Co. Although Phoenix is itself, in a sense, a "cloner" of IBM software, Joseph said Phoenix believes illegitimate copying of its products is a very different matter.

"The closer you get to becoming an industry standard, the more inevitable it is that this will happen," he said. "Our own product development was more than simply building a BIOS. We went to tremendous expense to assure that we were within clear legal boundaries in designing IBM compatibility."

Phoenix has worked closely with the Royal Canadian Mounted Police and other Canadian authorities in a four-month investigation of Ultimate Business Systems and other suspected pirates.

Ultimate agreed to cease copying, return pirated copies of Phoenix software and pay Phoenix an undisclosed cash settlement.

Discovering pirates through users

Stephen Abt, marketing manager for compatibility software for Phoenix, said the firm has become aware of some instances of piracy from users of micros purchased with an illegally copied Phoenix BIOS.

"The users believe they are getting our BIOS and aren't cognizant of the piracy," he said. "When they call us for an update or technical support, then they find out it's a stolen copy."

Joseph said illegal BIOS copying would continue unchecked without legal action by Phoenix. "This will carry forward into the Intel Corp. 80386 arena as well," he said. "There is the potential for a lot more abuse unless we get the situation fixed now."

Although Phoenix itself is pursuing civil actions against suspected pirates, Canadian police have filed criminal charges in certain cases under that nation's consumer fraud statutes.

"In Canada, it is considered a criminal offense to use someone else's trade name," said Fred Myers, an attorney with the Toronto law firm of Osler, Hoskin and Harcourt, which is representing Phoenix. "To the extent that someone takes a computer program and puts his own name on it, the state may find him running afoul of the criminal statute."

Software vendor offers rewards

In an unrelated software piracy development, micro accounting software vendor Open Systems, Inc. has begun an antipiracy campaign that includes rewards for end users who discover copies of pirated programs.

Eden Prairie, Minn.-based Open Systems has offered free replacement software and one year of support to the first user who reports a suspected illegal copy and cooperates with Open Systems.

Open Systems counsel Mary Rukavina said the compensation offer helped the vendor win a recent $40,000 settlement from Vistaco, Inc., a Gainesville, Fla., reseller that Open Systems charged with illegal duplication in January.

Open Systems, a subsidiary of Convergent Technologies, Inc., has also filed piracy claims against two Quebec-based firms.

WALKER HELPS KEEP THE PEACE AT CANFOR

"We're now producing consolidated financials a full week earlier, without special programming, changing cut-off dates, or adding resources."

Bill Galloway
Applications Support Analyst
Canfor Corporation
Vancouver, British Columbia

Relations have never been better between data processing personnel and accounting users at Canfor Corporation, Canada's $1 billion forest products producer.

The reason? "Walker financial applications meet the often conflicting needs of both groups," explains Bill Galloway, Applications Support Analyst. So even fiery tempers are tamed.

GOODBYE DATA PROCESSING DISPUTES: Twenty divisions, with separate sets of books, went into production simultaneously. "Many DP managers were skeptical about this working," explains Galloway. "In fact, installation and implementation went very smoothly, far better than anticipated."

Support for the company's evolving DP environment is an ongoing concern. "During system testing, we switched from IDMS to VSAM, without a problem. In six months," says Galloway, "we'll convert from DOS/VSE to OS/MVS. We're relieved Walker can support us in either environment."

HELLO USER CONTROL: Walker's accounting control key lets users change the data dictionary as needed. According to Galloway "essential data elements, such as division, cost center, location, mill, and section, can be represented with only one or two characters. With up to 50 user-definable characters available, almost any information can be accommodated efficiently."

Report turnaround has improved dramatically. "We delivered a budget-versus-variance-report in a single afternoon, exceeding expected delivery time by a month," explains Galloway.

Galloway sums up: "Walker's flexibility, feature-rich products, and solid technical support give us a competitive advantage. If faced today with the decision of buying a financial software system, we'd certainly purchase again from Walker."

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EDITORIAL

Reality check

Without question, the key technological issue facing information managers now and for the foreseeable future is networking. The ability to link similar and disparate systems, provide efficient peer-to-peer and peer-to-host communications and take fullest advantage of the fruits of communications deregulation is the joint challenge for vendors and users alike.

One need not look hard to see just how far along the industry has come in providing the kinds of solutions users seek, or, more important, how far it has to go. The headlines 'Users skeptical about ISDN benefits, support,' 'Token-Ring keys missing' and 'Reluctant support for Netview PC' all appeared in one issue of *Computerworld* following the recent Communication and Networks Conference and Exposition.

Each case yields the uneasy feeling that users lack measurable confidence in the range of network solutions available. But on closer look, it appears that what really exists is a reality gap between what users want and what the vendor community can provide.

Increasingly networking equipment acquisitions are being directed away from component sales and toward complete and integrated system sales. Within the vendor community, the drive to provide integrated offerings has received its greatest boost in the last year from the performance of Digital Equipment Corp., the industry's most successful big company in that time. Its success is owed largely to the womb-to-tomb, relatively seamless total solution DEC offers, a solution based on a cohesive networking strategy.

There is tremendous pressure on DEC's competitors, most notably IBM, to bring a similar total-solution approach to the market. One of the more provocative conference sessions at Comnet was one at which an IBM representative was on the hot seat defending his company's Token-Ring commitment.

Apart from deflecting the arrows launched by Starlan supporters, the IBM rep spoke more subtly of a broader theme: That the kinds of network solutions for which so many users clamor are really two or three years away; that even a behemoth like IBM with so much at stake in providing these solutions won't do so overnight.

There are encouraging signs that the vendor community is indeed responding to larger elements of the network challenge. AT&T this month launched the first-ever ISDN-compatible private-branch exchange for the U.S. market, a move that vaults AT&T to the head of the PBX class.

Still, information professionals whose departments have been so tightly squeezed by declining capital budgets feel great pressure to get a more measurable return than ever from equipment outlays. Better, perhaps to take heed from the old WIN, or "Whip Inflation Now," campaign of former President Gerald Ford. One of his political opponents turned the acronym on its head to read NIM — No Immediate Miracles.

SPRINT
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HERE YA GO BOY... 'BOUT TIME YOU HAD A LONGER CHAIN.
BELLS
JUSTICE DEPT.

LETTERS TO THE EDITOR

First priorities

In his article, "Learn to profit from customized software contract mistakes" [CW, Nov. 3], Alonzo D. Saunders implies that what is crucial in a copyright infringement case is the priority of filing the application for copyright registration.

Indeed, he claims there "is little doubt that had the developer delayed filing, or had the lab filed for copyright first, the result would have been the opposite, given the similarity between the two programs." Saunders is surely mistaken.

Whereas the priority of filing is relevant in trademark actions before the Patent and Trademark Office and Trademark Trial and Appeals Board, priority of filing is not relevant in a federal court action for copyright infringement.

If the developer wrote the program first and the lab copied or prepared a derivative work from the developer's program (to create a Basic version from an EDL version), then the lab was guilty of copyright infringement regardless of when the respective filings took place or even if the filings occurred.

Of course, copyright law prohibits the bringing of a copyright infringement action until the author of the infringed work registers the copyright. But once that is done, the time of filing is irrelevant, except for determining what statutory damages or attorneys' fees may be recovered. An infringement of a work, copyrights that are registered after registration of the infringing work, is still an infringement.

Howard G. Zaharoff
Brown, Rudnick,
Freed & Gesmer
Boston

Making monopolies

In regard to your editorial, "The look and feel of a can of worms" [CW, Jan. 26], Apple Computer, Inc.'s threats to discourage anything that looks like a Macintosh and Lotus Development Corp.'s suits against 1-2-3 look-alikes may make good business sense but are little more than attempts to pull up the gangplank now that they are on board the ship. The problem is that they are trying to make it appear that their products are islands in a sea of unrelated personal computer products.

The respective products of these companies are not new but are merely extensions of previous products.

While they are arguing that they are protecting the innovators, in reality they are attempts to create monopolies.

If Xerox Corp. with the Star or Dan Bricklin with Visicalc had decided on using the courts to protect the "look and feel" of their products, the Macintosh and 1-2-3 would look much different than they do today and may not have enjoyed their current success.

The personal computer has prospered by incremental growth, as hardware and software have grown piece by piece in an attempt to create productive and useful tools.

To use the "look and feel" of a computer program as a protected function creates two risks for the future of the entire data processing industry. If every new product must look and feel different from its predecessors, the current computer Babel will grow. Instead of building upon existing patterns, users will be asked to relearn the basics for each improvement or extension in function.

A second risk is that if the look and feel become the only criteria for copyright infringement, what is to prevent a developer from rushing a product to market with a look and feel to establish preeminence? The developer can then return to the development process to finish the hardware and software to make it work.

There is no product on the market today that does absolutely everything users want. To carve up the market and make all innovation be presented from outside the current frames of reference will stunt the data processing industry in its infancy. The actions by Apple and Lotus will only protect Apple and Lotus, not the DP industry.

D.A. Hult
Chicago

This week in history

Feb. 28, 1977:
The National Commission on EFT called for legislation giving individuals the right to contest any government access to their financial information contained in electronic funds transfer (EFT) systems.

Feb. 22, 1982
SAS Institute, Inc.'s Statistical Analysis System saves California about $30 million with a computerized sentence review, which compares sentences given to offenders charged with similar crimes. The state cuts some prisoners' sentences after reviewing the statistics.

The 'Knows' vs. the 'Don't Knows'

How to cope with users who potentially threaten corporate continuity

READER'S PLATFORM

NAOMI KARTEN

They don't all result in lawsuits and they don't all make Page 1. But you can be sure that many applications developed by users are spewing out faulty results because of errors innocently introduced by users who didn't know any better. This situation occurs because there are two types of users: Those who know what they don't know and those who don't know what they don't know.

The users who know what they don't know aren't hesitant to ask questions or to admit they're baffled. They worry that they're wrong until proven right. When they get stuck, they're willing to take things slowly. They realize that the more they learn, the more there is to learn.

But the others, the ones who don't know what they don't know, are the ones we have to worry about. There are two categories of users who don't know what they don't know: Those who assume they know nothing, and those who think they know everything.

Panic-mode phone calls

The ones who assume they know nothing (even though they usually know at least a little) may interrupt you constantly, but they aren't really considered a problem. When these users run into a snag, they make a panic-mode phone call to the information center. Or they besiege the nearest breathing person with a plaintive plea for help. One way or another, they seek the help they need.

The ones who think they know everything can be a real problem. There are two types of users who think they know it all: Those who keep what they know to themselves, and those who miss no opportunity to let you know what *they* know.

The latter constantly offer useless advice and unhelpful hints. They're full of "you should haves." No matter what it is you've done, they have a better way. Two weeks on a computer and they think they're on a par with 20-year veterans. A handful of 3-by-5 spreadsheets and an ad hoc report and they're spouting advice on how to design mammoth mainframe data bases.

These users can give new meaning to the urge to scream. Nothing you can tell them makes a difference. In their view, you're the one who's misinformed and misguided, and they're only trying to help.

Evil thoughts

These users are just cause for evil thoughts. But they're not a problem — not in a business sense. That's because they hold nothing back. You always know what they're thinking, whether you want to or not. And every once in a while when they call to inform you of something you "should have known," it really is just that.

It's the users who keep to themselves that we have to worry about.

You never know what they're up to. They neither give advice — they figure you're too dim-witted to understand — nor do they seek it.

> THE information center can't be everywhere helping everybody do everything. If users are going to use computers, they must be required to take responsibility for the intelligent use of them.

There are two types of users who keep to themselves: Those who aren't doing anything that matters with their computer and those who are doing critical things.

Piddling

Those who aren't doing anything that matters are certainly not a problem. They can piddle away all day at their keyboard and make much ado over very little. They may be wasting the company's time, but they're endangering no one.

The other type, the ones who are doing critical things with their computer, are the ones to be truly concerned about.

They're the ones that are developing applications that generate results that will contribute to major corporate decisions. They manage to parade their feelings of superiority. They make it perfectly clear, however, that they don't want or need any help from MIS.

So they blunder along, certain they know what they're doing. In the process, they create colossal chaos. With any luck, they're simply using resources inefficiently.

But the bigger risk is that they're developing bad applications. Applications based on faulty assumptions or insufficient analysis. Applications with flawed logic or untested data manipulations. Applications subject to security breaches or conducive to keying errors. Nevertheless, the printed output quickly wends its way into the hands of management who blithely uses the letter-perfect, smudge-free data to make important business decisions.

Discovered snafus

If a snafu results, and it's discovered, and it's big enough buckwise, and the company doesn't fear adverse publicity, then it may make the Lawsuit-of-the-Week page of your favorite publication.

But many more snafus are squelched than reach the public eye. And many more snafus — many, *many* more — are never discovered. They may hurt the company, but not in a direct or traceable way. So no one is ever the wiser.

Information centers have their hands full with users who really want their help. But information centers shouldn't minimize the importance of educating the snafu-bound users who want nothing to do with their help. These users don't know what they don't know, think they know it all, keep to themselves and are doing critical things with their computers. They may be few in number, but they are a potential threat to corporate continuity.

Tips and techniques

Techniques must be subtle: a friendly tip, an off-hand reference to a technique, a few extra copies of the information center newsletter, an invitation to a demo or users group meeting, an article on the potential for errors sent to the user manager with a casually affixed "thought you might find this interesting."

Plus — and this is an absolute key to successful end-user computing — user management must be held accountable for the responsible use of computers in their departments and divisions. The information center can show them how.

But the information center can't be everywhere helping everybody do everything. If users are going to use computers, they must be required to take responsibility for the intelligent use of them.

This policy won't eliminate the problem user. But it can help boost the output of user-developed applications a few notches higher on the Scale of Trustworthy Results.

Karten, president of Karten Associates in Randolph, Mass., consults and lectures on the management of end-user computing. She is a former MIS and information center manager and has published more than 50 articles on end-user computing.

The most honorable form of flattery

HARVEY NEWQUIST

Since about 1982, the U.S. electronics industry has been a little, shall we say, upset with Japan. It's not necessarily just Japan, but all the countries we mean when we say Japan — Korea, Taiwan, Singapore, the People's Republic of China and, of course, Japan.

Actually, we should refer to this group as the Pacific Basin countries, because often when we say Japan, we mean foreign manufacturers in general. Even when we talk about "overseas" manufacturers, we mean those countries that are part of the American continents.

All of these countries are thorns in the side of high technology in the U.S. But Japan — the country — has actually created a program known as the Fifth-Generation Project. Begun in 1981, it is designed to give the Japanese a jump on the rest of the world by concentrating on the next level of computing.

Most of Japan's leading companies joined the project, which is actually a consortium of the best young corporate researchers. It is the first time Japan has attempted to develop a radically new technology on its own, without waiting to emulate the product success of other developers.

The Fifth-Generation Project is the brainchild of the Ministry of International Trade and Industry, which gave it its official name, the Institute for New Generation Computer Technology, or ICOT.

The next big thing

The Japanese realize that in order to really take control of the world's technology reins, they need to beat everybody else to the next big thing. These "big things" have come to be known as "generations." The first generation was the development of vacuum tube technology. The second generation brought us transistors, while the third saw the implementation of integrated circuits. The world has just jumped to the fourth generation with the use of very large-scale integrated (VLSI) circuits.

VLSI technology, the current commercial state of the art, is already prompting us to yearn for the next thing, the fifth generation. You say you're yearning, but you don't know exactly what for? Don't worry, the Japanese have figured it out for all concerned. The next obvious step is creating computers that can reason like human beings. Voila! The fifth generation is going to produce intelligent machines. Terms like knowledge bases, logical inferences per second and artificial intelligence are the bases of the project.

The ICOT program calls for a 10-year study, financed by about $213 million. That's not a lot of money in terms of a 10-year plan, but enough to scare the U.S. research and development community in the early 1980s. Prompted by a slew of literature that prophesied a technological Pearl Harbor, the U.S. took notice.The results of this frenzy were the creation of the Microelectronics Computer Technology Corp. and, to a much lesser extent, the Star Wars program.

Quite a few of Japan's leading corporations joined ICOT, and they've had to give some of their foremost talent to the institute. However, this is where the Japanese are running into a little bit of trouble. Sure, they're taking the best and the brightest and putting them into a huge think tank to encourage creativity. Sure, they're throwing millions of dollars into the effort. They're giving it 10 years. And they're asking individuals to be creative in a society that has accepted only group-think methods, traditionalism and conservativism since long before George Washington started confessing to crimes involving cherry trees.

The most original original

Thus, a fundamental problem arises. The Japanese are the best imitators in the world.Their imitations usually better the original. But they very rarely come up with an original. The Japanese government now wants to come up with the most original original of all time and is trying to do it by hoping that the best minds will start thinking differently than they ever have before.

I'm not saying that the Japanese won't produce intelligent machines; I just think that given the nature of the culture, they probably won't come up with them first. It's kind of like expecting a bulldog to fly because you give it a set of gold wings.

The fifth generation is a noble goal, however, and it does bear some watching by all who are concerned about who is really going to make the breakthrough to intelligent machines. The real problem is that if someone else comes up with truly intelligent machines, the Japanese will probably make a better one 20 minutes later

---

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

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SOFTWARE & SERVICES

Vendors quick to respond to DEC 2000

BY NINAMARY BUBA MAGINNIS
CW STAFF

MAYNARD, Mass. — Although the announcement of Digital Equipment Corp.'s low-end, busless Microvax 2000 and Vaxstation 2000 is less than two weeks old, more than 30 third-party vendors have already announced software packages to run on the processors.

Software choices range from computer-aided design and manufacturing (CAD/CAM) packages to scientific data analysis applications to full hardware and software systems offered from value-added resellers.

The newest VAX systems operate with DEC's proprietary VMS operating system or Ultrix, the firm's Unix operating system. Applications written for the VAX/VMS environment can run on the 2000-series systems, the vendor reported.

For the Vaxstation, Tektronix, Inc.'s Case division announced its SA/Real-Time Tools, a structured analysis application, and SD Tools, a structured design package. The Tektronix Computer-Aided Engineering (CAE) Systems Division offers its Designer's Database Schematic Capture (DDSC) and Hilo-3 Logic Simulation packages for both 2000-series machines.

DEC's 2000-series workstation operates the Mountain

Continued on page 20

Librarian eases programming

BY CHARLES BABCOCK
CW STAFF

PRINCETON, N.J. — An enhanced release of Applied Data Research, Inc.'s (ADR) Librarian offers a redesigned interface to users of IBM's ISPF on-line programming environment and extends the product's Change Control Facility to IBM's TSO teleprocessing monitor.

Librarian's Change Control Facility provides automatic controls of the updating of production source-code modules, offers a source code to production-load module audit trail and can compare a production-load module with a source module and report any discrepancies, according to Richard J. Parente, Librarian product manager.

The Change Control Facility, introduced last year, was previously available to run with ADR's own development environment, Roscoe. It can now run with TSO/E Version 2 and is fully compatible with the Roscoe version.

The Change Control Facility will inform a programmer who wants to update a source-code module if someone else is already modifying the module, Parente said. Discretion of how two or more updates will take place remains in the hands of the installing site.

"We don't dictate how to manage all the changes in an update cycle. The Change Control Facility installer selects how he wants to do it," Parente claimed.

The comparison program that is now part of the Change Control Facility is able to print out the exceptions that appear when a production-load module no longer matches the source module.

"Before, you would have to go back to a dump of the program and look for discrepancies. But you wouldn't necessarily know which version of the program you were looking at," Parente explained.

VM version to come

An additional version of Librarian's Change Control Facility, the Conversational Monitor, is under development for use with IBM's VM operating system, according to Parente. A redesigned interface to IBM's popular ISPF/Program Development Facility is also available with Librarian Release 3.6.

The current interface allows a programmer to perform all Librarian functions from a single ISPF-type panel. The previous interface involved a more cumbersome process of copying Librarian master files into an ISPF partitioned data set, Parente said.

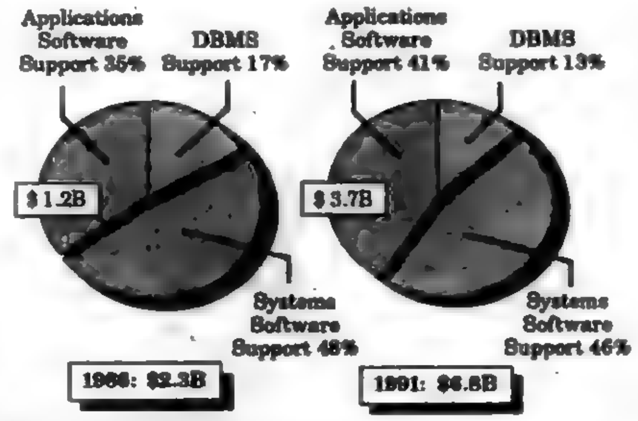
"The new release gives a programmer the capability to edit a module directly, to BROWSE, MOVE or COPY it. It offers a

Continued on page 20

Data View

Software support market headed for $6.8 billion

Software support is an industry still in its formative stages, with few third-party vendors



INFORMATION PROVIDED BY INPUT, INC.
CW CHART

Users gain SQL access

Britton Lee, Inc. has announced a menu-driven structured query language (SQL) generator that allows personal computer users to access data bases stored on Britton Lee relational data base systems. **PC/SQL Link** uses windows and menus to help generate SQL requests to users who are not trained SQL programmers.

Cadre Technologies, Inc. in Providence, R.I., has acquired the rights to market **Structsoft, Inc.'s PC Structured Analysis**. The Yourdon/DeMarco structured analysis software from the Parsippany, N.J., firm extends Cadre's software development tool kit to the personal computer marketplace.

The Cobol 85 Example Book, by **Jerome Garfunkle**, a member of the **American National Standards Institute X3.23 Cobol committee**, was recently published. In addition, Garfunkle announced that he has joined forces with the UK's Cobol authority, John Triance, to form a company to teach advanced programming techniques.

Inside

- Data Retrieval ports TextDBMS to VAX. Page 21.
- Maxway Data releases book publishing software for System/34,36,38. Page 24.
- Device drivers for DEC laser printers out. Page 25.

Advertisement

Oracle launches ALLIANCE program for software VARs

Oracle Corp., supplier of the ORACLE distributed relational DBMS and application development tools, has announced a new program for software value-added relicensors dubbed the Oracle *Alliance* program. The program offers broader markets, simpler, faster selling cycles, and shorter time-to-market for VARs who build or convert their applications to use Oracle's products.

According to Larry Harman, Oracle's Director of the VAR program, "We offer major business benefits to VARs who choose to use ORACLE with their products. Chief among these benefits is ORACLE's portability and the portability of ORACLE-based applications, allowing applications and data to be shared among different machines. Oracle also provides the link software to exchange database information among the different machines."

Broader VAR Markets

ORACLE runs on the widest array of hardware: IBM mainframes under MVS and VM, most vendors' minis under both proprietary and UNIX operating systems, and PCs under MS/DOS. Oracle also developed SQL/RT, marketed by IBM on the RT PC.

Harman states, "Only with ORACLE can an application developer produce software on one system and *inherit* a vast market of users of multiple vendors' hardware. Basically, we let our software VARs do *blindfold selling*."

"Blindfold Selling"

The company described "blindfold selling" as the ability of a VAR's salesman to walk into an end-user site blindfolded and say, "I don't know what types of hardware you're using, or how many types there are, but my applications run on all of them"

Harman points out that VARs have a tough decision to make concerning what hardware to implement on. With ORACLE, that decision needn't be made. Software VARs who establish a niche in a particular vendor's install base can take advantage of ORACLE's portability to sell in other hardware environments.

Shorter Time To Market

The company also cited the high level of productivity offered to VARs by Oracle's broad range of application tools, including a forms system, integrated spreadsheet, graphics and other tools. These yield development and maintenance efficiencies that translate into shorter time-to-market and lower costs.

And, Harman adds, "ORACLE is the most complete and mature SQL-based DBMS on the market. SQL is becoming a national standard, so developing applications with an IBM-compatible, portable DBMS makes business sense in both private-sector and public-sector markets."

Harman concludes, "Generous discounts plus support, training and co-marketing combine to make the Alliance program an outstanding opportunity for software VARs."

Oracle Corporation, founded in 1977, builds and markets the ORACLE distributed relational DBMS, 4GL and DSS tools. ORACLE was the first commercial SQL-language DBMS, and is compatible with IBM's DB2 and SQL/DS DBMSs.

ORACLE provides a standard software environment across a wide range of computers and operating systems, including IBM mainframes, minicomputers from DEC, DG, ATT, HP, Stratus, IBM, Apollo and many others, and IBM PCs. ORACLE runs with IBM's MVS and VM/CMS, DEC's VAX/VMS and DG's AOS/VS among others, as well as with UNIX on most systems.

All versions of ORACLE, from the mainframe to the PC implementation, are identical. ORACLE is the only relational DBMS which provides the complete portability of data and applications across a wide variety of systems. Oracle's SQL*Star architecture links dissimilar systems running ORACLE.

Oracle Corporation markets its products worldwide through 30 direct sales offices, 11 distributors and the Authorized Oracle Dealer network. In addition, ORACLE is sold by numerous hardware manufacturers, including IBM, Honeywell, Sperry, Stratus and Prime.

ORACLE®

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For additional information, contact Larry Harman, Director, VAR Marketing, Oracle Corporation, 20 Davis Drive, Belmont, CA 94002 or call 800-345-DBMS

Vendors

FROM PAGE 19

View, Calif.-based Case Technology, Inc.'s Case Vanguard CAE Design System.

Synercom, Inc. in Sugar Land, Texas, provides support of its Informap III, a high-resolution mapping software package. Houston-based Sierra Geophysics, Inc. supports its seismic modeling software.

General Electric Co.'s Calma group is making its Prism/DDM and Dimension II CAE/CAD/CAM software available on the Vaxstation 2000. Burlington, Mass.-based CIS, Inc. offers Medusa, a designing and drafting package that includes an integrated solid modeler.

Commercial applications for the Microvax 2000 include the Wellesley, Mass.-based Gately & Glew Data Services, Inc. Employee Productivity Information System and the Vancouver-based Technologies, Inc. ABC/MM line of integrated maintenance-management and inventory-control software.

For customers who require ruggedized equipment, Rugged Digital Systems, Inc. can provide R/VS410 Rugged Vaxstation 2000 and R/410 Rugged Microvax 2000 systems for battlefield applications.

Other third-party vendors providing offerings for the VAX 2000-series systems include BBN Software Products Corp. in Cambridge, Mass.; Execucom Systems Corp. in Austin, Texas; Touchstone Software Corp. in Seal Beach, Calif.; and Georgia Tech Research Corp./GTICES Systems Laboratory ; located in Atlanta.

Also offering products are HOK Computer Service Corp. in St. Louis; Mitchell Management Systems, Inc. in Westboro, Mass.; Futurenet Corp. in Chatworth, Calif.; Nastec Corp. in Southfield, Mich.; Autotrol Technology Corp. in Denver; and Pritsker & Associates, Inc. in West Lafayette, Ind.

Other vendors include Boston Systems Office, Inc. in Waltham, Mass.; Conetic Systems, Inc. in San Leandro, Calif.; Signal Technology, Inc. in Goleta, Calif.; and Access Technolgy, Inc. in South Natick, Mass.

Librarian

FROM PAGE 19

much more interactive way to provide those functions to an ISPF terminal," Parente said.

Among other things, a programmer could create a new module of code by copying part of an existing module.

ADR's Librarian's INCLUDE statement now can be utilized to include an existing module of production source code in a targeted module, according to Parente.

Librarian keeps a record of each update, so previous versions of production programs can be recreated, according to spokesmen.

Also included in Release 3.6 is a version of the Librarian Access Method, which supports IBM VSE Release 2. The access method for MVS supports a directory-read function.

With 5,939 copies installed, Librarian is one of the Princeton-based mainframe systems house's "bread-and-butter products." The current version sells for $19,000 in the DOS version. In the MVS version, it sells for $29,400.

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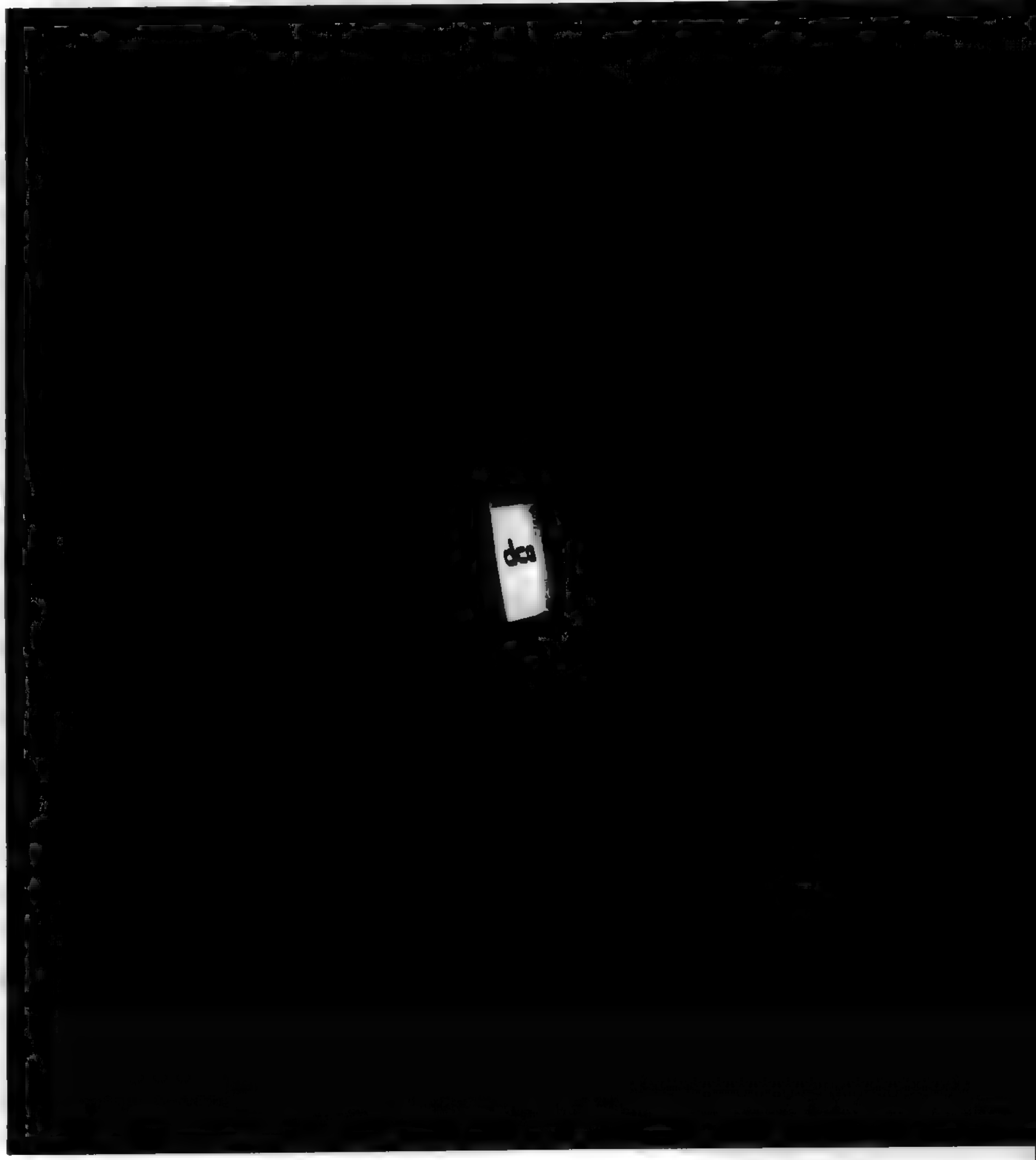

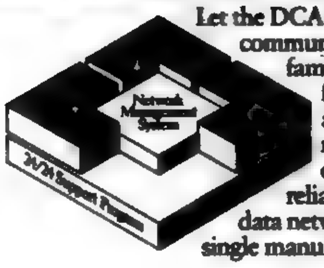

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Data Retrieval ports TextDBMS to VAX

BY JEAN S. BOZMAN
CW STAFF

MILWAUKEE — Data Retrieval Corporation of America, which has been selling text data base management systems to mainframe users since the 1960s, is offering a Digital Equipment Corp. VAX version of its TextDBMS system.

It took about six months to port TextDBMS to the VAX, Data Retrieval President Bert Sheingate said. TextDBMS was itself an enhanced version of Alter, which had been the company's primary product until 1986. The company was acquired in 1985 by West Publishing, Inc.

Alter and TextDBMS are used at more than 100 large user sites including insurance companies, state governments and federal agencies. The Data Retrieval systems allow users to create, manage and update text files through a data base management system that handles text as well as data. The text files are maintained on a central file server, often an IBM 3380 disk drive.

Typical user sites have hundreds of end users updating legislation, regulations or insurance company policies. Until now, though, TextDBMS could only run under CICS on IBM mainframes. The initial IBM versions will continue to be offered and enhanced, Sheingate said.

The DEC version of TextDBMS will bring library-services functionality to a new class of departmental users, Sheingate said. "Our goal is to have TextDBMS operate the same way on the DEC platform. as it does in the IBM environment," he said last week. The intent is to have TextDBMS run on one of the VAX computers in a Vaxcluster, giving all the users in a DEC network access to a central text data base.

Will support Microvax

Initially, the DEC version of TextDBMS will run on VAX 8200s, 8500s, 8600s and high-end VAXs. Later on, the company plans to add support for the VAX-11/780 and Microvax product lines.

The package has three modules. Textsearcher allows users to research, retrieve or update information; Textbuilder is an application language that creates the text files stored under the DBMS; and Textcomposer allows users to select the final form of output for finished text, including electronic distribution.

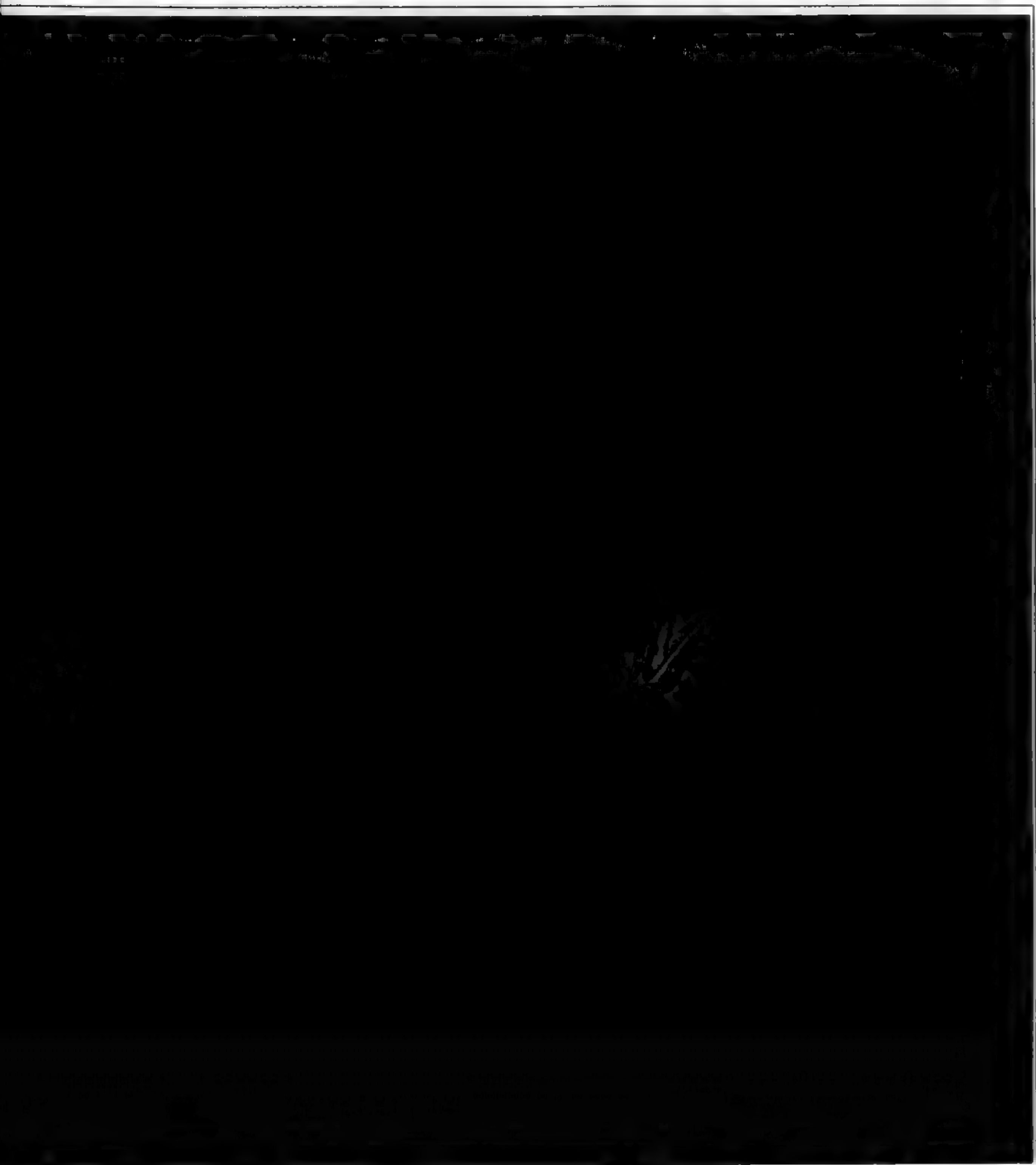
Customer shipments are scheduled to begin in the third quarter, the company said.

MCBA unveils VAX line of applications

GLENDALE, Calif. — MCBA, Inc., a 12-year-old minicomputer software vendor, has announced an 18-module line of of accounting, manufacturing and distribution applications that work together or individually on Digital Equipment Corp.'s VAX line of minicomputers.

Written in Cobol, the modules are now available at prices that range from $3,000 to $6,000 per module, MCBA President Stina Hans said.

Software in the three functional areas is designed to share files and a set of special functions, including search capabilities that allow referenced records to be retrieved.



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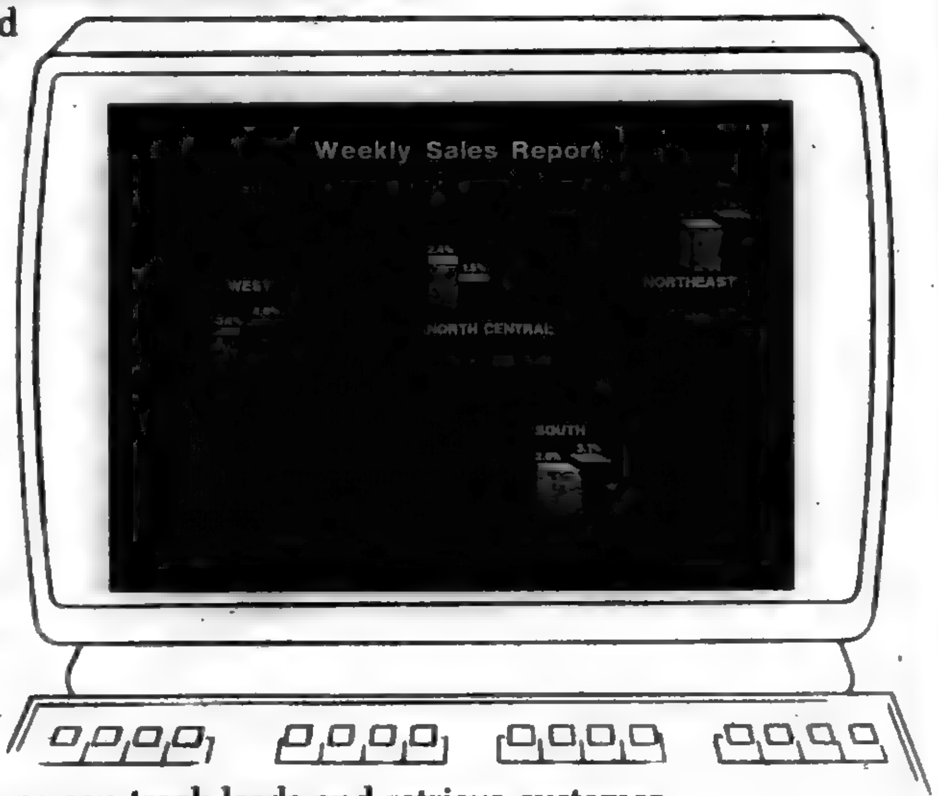

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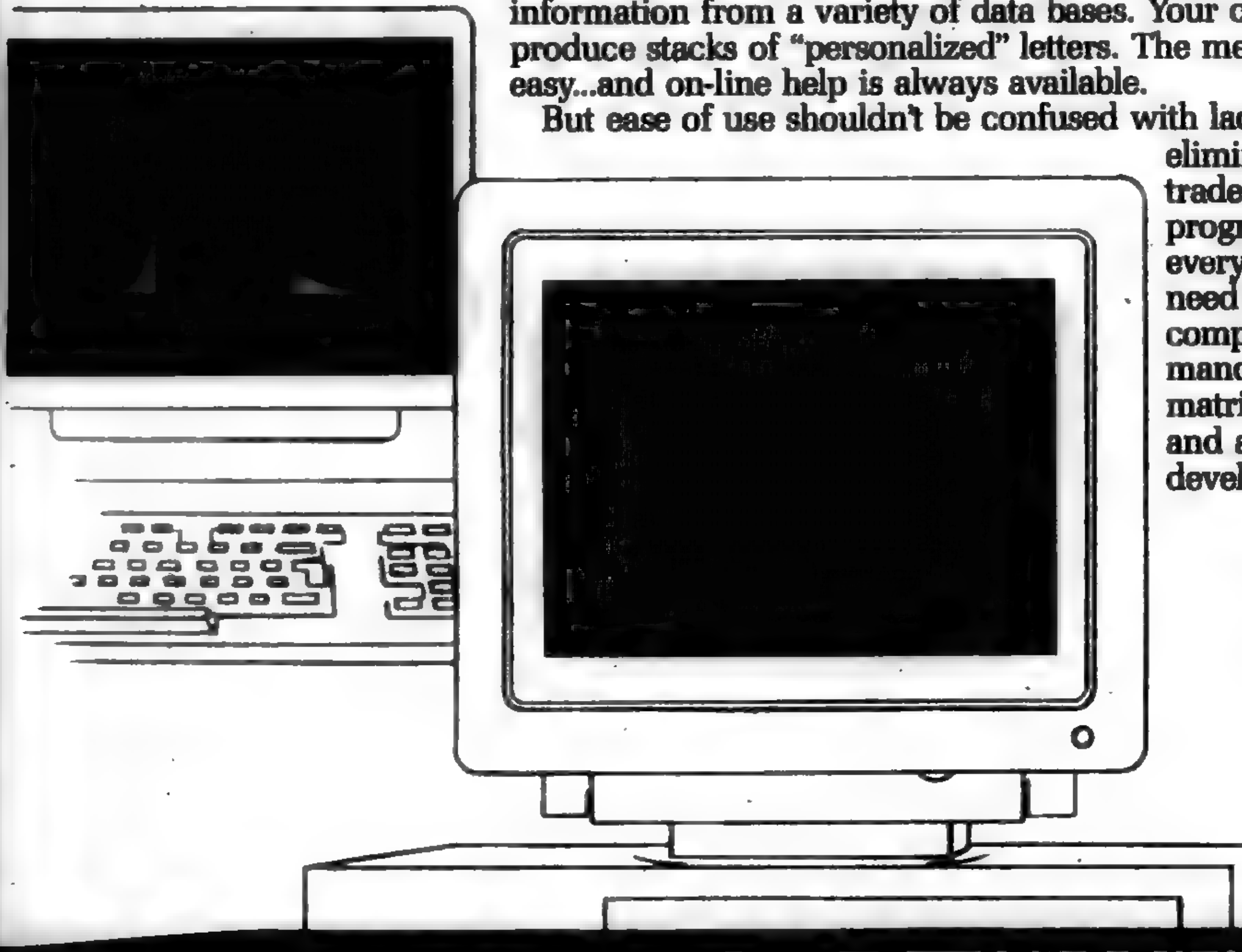

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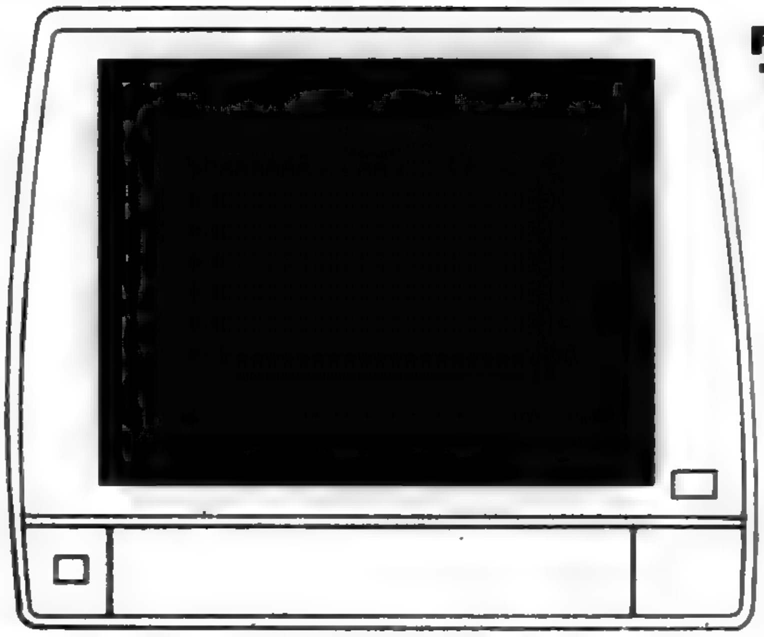

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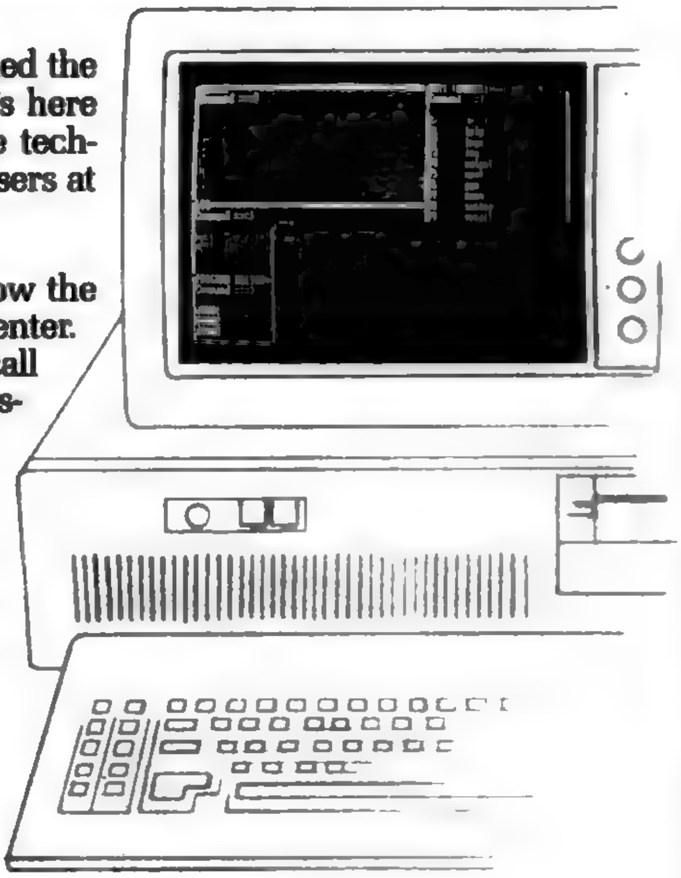

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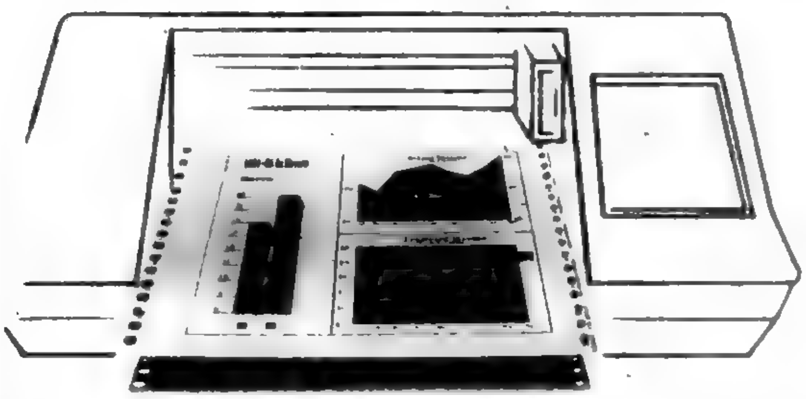

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NEW PRODUCTS

Systems software

Tandem Computers, Inc. has announced **Netbatch** and **Netbatch Plus**, batch processing software for its Nonstop systems.

Netbatch is a scheduler for batch jobs said to allow users to automate batch-job execution on a Tandem system or across a network of Tandem systems. Batch jobs can be scheduled according to job priority, system load and network configuration. Netbatch also keeps a log of batch activity.

Netbatch Plus bundles Netbatch software with DB Batch FE, a batch front-end product from MIS Information Systems, Inc. Together, they accommodate complex batch environments and provide a full-screen user interface.

Netbatch costs from $1,350 to $2,700 for an initial license with a monthly fee of $100 to $200. Netbatch Plus costs from $1,850 to $3,700 with a monthly fee of $270 to $340.

Tandem Computers, 19333 Vallco Pkwy., Cupertino, Calif. 95014.

Applications packages

Precision Visuals, Inc. has ported its **DI-3000 XPM, GK-2000** and **Picsure Plus System** graphics software packages to Digital Equipment Corp.'s Vaxstation II/GPX graphics workstations running under DEC's VMS.

The software is said to take advantage of the window and display-list functionality of DEC's UIS interface, including window resizing under control of an applications program and two-dimensional image transformations. Other hardware functions supported include 14 fonts, polygon fill, 10 line styles and 256 simultaneous colors.

Pricing is $9,000 for DI-3000 XPM; $3,500 for GK-2000; and $4,600 to $6,600 for the Picsure Plus System.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

Maxway Data Corp. has announced **Version 3.0** of its **Book Publishing Order Fulfillment** software.

Version 3.0 is said to allow name and address updates from the order-entry screen.

The order-entry screen also allows scrolling of inventory items by ISBN number or the first four chracters of the inventory item.

According to the vendor, the Maxway package includes business applications such as Invoicing, Inventory Control, Sales Analysis, Open Item Accounts Receivable, Automatic Calculation of United Parcel Service freight charges and royalty applications.

Version 3.0 runs on the IBM System/34, 36 and 38 computers. It is priced at $8,000.

Maxway Data, 225 W. 34th St., New York, N.Y. 10001.

Dynasoft Corp. has announced the **Dynasoft Integrated Software System** for IBM mainframe computers using IBM's MVS/TSO and VM/CMS.

The integrated software package is said to link the spreadsheet, word processing, graphics and data base interface business functions.

According to the vendor, other attributes of the integrated software package include full-overlay windows that allow the user to view and manipulate data in the spreadsheet, graphics display and word processing document simultaneously.

The Dynasoft package also includes pop-up menus that are said to prompt the user.

The Dynasoft Integrated Software System is priced from $17,500 to $49,000, depending on the size of the computer.

Dynasoft, Suite 500, 6300 River Road, Rosemont, Ill. 60018.

Utilities

Natural Language, Inc. has ported its **NLI Datatalker** natural-language interface to Digital Equipment Corp. VAX systems.

The NLI Datatalker is an English-language interface that enables untrained users to access relational data bases in plain English. The system incorporates knowledge representation and deductive reasoning and processes English independent of any application.

Based on proprietary technology, the Datatalker consists of an English Language Parser, a Semantic Interface, a Semantic/Pragmatics Interpreter, a Conversation Monitor, an English Language Generator, a Deductive System and a Data Base Interface.

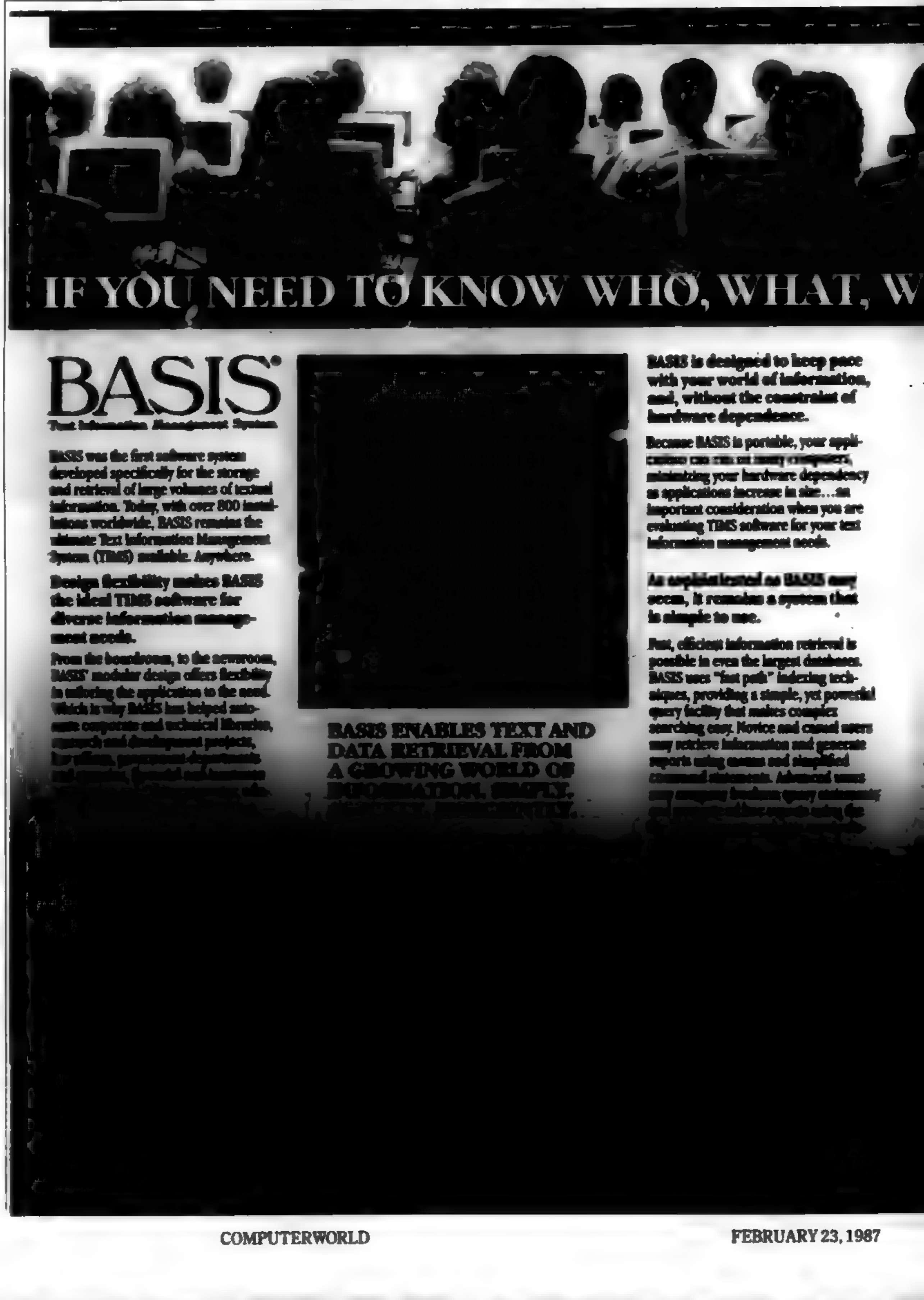
The NLI Datatalker is priced from $10,000.

Natural Language, 1786 Fifth St., Berkeley, Calif. 94710.

Walker Richer & Quinn, Inc. has announced **Release 2.5** of its **Reflection 2** VT220 terminal-emulation communications software program.

Release 2.5 adds Tektronix, Inc. 4010 graphics emulation, keyboard remapping and 132-column-wide screens to the software package. The program also includes menu and Help screens in French, German and English.

Release 2.5 with graphics support costs $199.



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Walker Richer & Quinn, 2825 Eastlake Ave. E., Seattle, Wash. 98102.

WMZ/Novatech has announced **Menu System**, a user interface to Unix-based systems.

Menu System is said to lead the user through the computer's functions as well as to protect the system from inadvertent or malicious damage. Users have the option of using brief menus and jumping directly to any location in the system if they do not wish to go through each menu.

Menu System is available for Unix System V on Plexus, Dual and Fortune computers.

It costs $750 in single quantities.

WMZ/Novatech, Suite 1330, 1485-G Enea Court, Concord, Calif. 94520.

Precision Visuals, Inc. has announced **device drivers** for the Digital Equipment Corp. LN03 Plus and LN01S laser printers.

According to the vendor, the device drivers support both portrait and landscape image orientation and a print rate of up to eight pages per minute at a resolution of 300 dot/in.

The device drivers are said to take advantage of the printers' capabilities for hardware text, line styles and widths and unique icons.

Letter- and A4 metric-size paper can be used.

The device drivers are priced at $750, including source code and documentation.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

Software Technologies and Research, Inc. has announced **Vision/1**, a conversion service and software product said to allow an IBM IMS/DC application to run in an IBM CICS environment without change to its structure or source code.

Vision/1 is a set of IMS and message format services conversion and simulation software. The conversion process is an automated, menu-driven system, resulting in a verified IMS application system running under CICS. The application source can be maintained from either the IMS or CICS environment.

Vision/1 conversion and runtime software is priced at $20,000 plus $85 per converted module or screen.

Software Technologies and Research, 160 West St., Cromwell, Conn. 06416.

Innovative Software Solutions, Inc. has announced **Version 03.04 of Dictionary Companions** for Hewlett-Packard Co. HP 3000 computers.

Dictionary Companions consists of two programs, DICTCPD and DICTCCD, that interface with HP's Dictionary/3000. Each program can compare source code with data dictionary definitions to verify the source code and, optionally, load definitions into the data dictionary. DICTCPD operates on Cobol program source code, and DICTCCD operates on Cobol Copylib source-code modules.

DICTCPD now catalogs all $INCLUDE files and called subprograms and subroutines. DICTCCD now catalogs all $INCLUDE files.

Dictionary Companions costs $1,695.

Innovative Software Solutions, 10705 Colton St., Fairfax, Va. 22032.

Tom Software, Inc. has announced the **Wang Control File Generator**, an application developed with the vendor's Speed II language.

The program is said to enable all Wang Laboratories, Inc. utilities to instantly access data files created within Speed II's applications. The utilities include 20/20 spreadsheet; EZquery, a data retrieval program; VS/Report, a report generator; VS/Graphics; and PACE, Wang's applications development environment.

The program automatically generates control files to identify user-selected data files from any Speed II application.

The Control File Generator is priced from $500.

Tom Software, P.O. Box 66596, 127 S.W. 156th, Seattle, Wash. 98166.

Parafax, Inc. has announced the **S/38 Buddy System** of desktop utilities for the IBM System/38.

According to the vendor, the Buddy System uses pop-up windows to provide a four-function calculator, a perpetual calendar and a build-as-you-go group job menu. The latter attribute allows up to 16 sessions to be started for each workstation sign-on.

In addition, workstation message display and a site-unique function defined during installation are supported.

The S/38 Buddy System is priced at $250.

Source code is available for an additional $250.

Parafax, 135 Central Road, New Lenox, Ill. 60451.

Development tools

Micro Focus, Ltd. has ported its **VS Cobol** to the IBM Personal Computer AT running Santa Cruz Operation's (SCO) Xenix.

The 32-bit VS Cobol compiler is said to handle programs with code and data spaces of up to the system limits per compiled module. VS Cobol supports Cobol variants such as IBM OS/VS Cobol and contains a preprocessor facility to ease the migration of applications written in Ryan-McFarland Corp. RM/Cobol to Micro Focus, Inc. Cobol.

Micro Focus's Development Tools, which include the Animator visual programming tool and Forms-2 screen painter, are also available.

VS Cobol costs $1,495; Development Tools costs $1,295, and the VS Cobol runtime system costs $395.

Micro Focus, Suite 400, 2465 E. Bayshore Road, Palo Alto, Calif. 94303.

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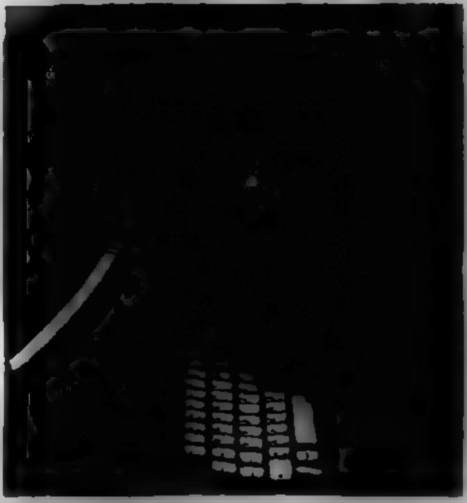

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If you need to know who, what, where, when, or why... [illegible]

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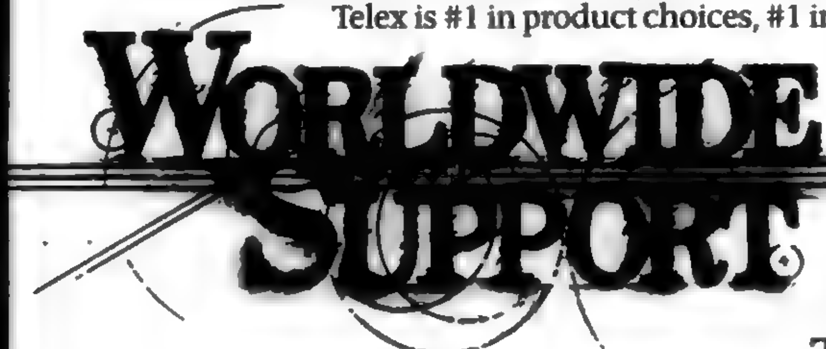

For more information, call Telex.
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MICROCOMPUTING

SMALL TALK

William Zachmann

Hut, hut, hike

Okay, so it's not a business program. My wife doesn't like it much either, and she complains that it takes up too much of my spare time. But everybody's got to relax a little once in a while, and if you are tired of evaluating or using spreadsheets, data bases and terminal emulators, this package might be just for you. I must warn, however, that a site license for this program is sure to cripple the productivity of your PC users.

I'm talking about NFL Challenge from Minnetonka, Minn.-based XOR Corp., one of the most absorbing and addictively enjoyable computer games I've encountered. Priced at $99.95 with both IBM Personal Computer and Apple Computer, Inc. Macintosh versions NFL Challenge is based on a realistic simulation model driven by actual team rosters and statistics.

In NFL Challenge, the opposing sides are selected from the actual list of National Football League teams. It can be played as a two-person game or by one person against the com-

Continued on page 30

System gives demos of programs

Computerland, ISG list includes some 150 publishers

BY ALAN J. RYAN
CW STAFF

HAYWARD, Calif. — The 800-store Computerland Corp. chain has penned a deal to provide its franchisees with a computer system allowing users to view demonstrations of up to 150 publishers' programs. The system also makes copies of the software to be sold on the spot to users.

A user interested in software can use the evaluation system at the store and, through a series of self-prompting menus, can zero in on the category of his software needs.

The user cannot put the complete package through its paces with the system. But according to a Computerland spokeswoman, the system can make demonstration disks of all the packages it includes.

The agreement with Instant Software Generation, Inc. (ISG) calls for the use of ISG's Hands On Software (HOS) system and on-site manufacturing facilities by Computerland franchisees.

Franchisees who elect to install the HOS system, through a rental or purchase agreement, can offer programs ranging from word processing packages to spreadsheets, the spokeswoman said. The system reportedly consists of hardware and software and is made up of two stations, including an evaluation station and a control station.

If a user decides to purchase the software, the control station manufactures the package on-site. "Each site is its own manufacturing facility," according to Richard Lionetti, ISG president and chief executive officer. "The actual manufacturing of the software code is resident."

Duplication speed reportedly is not a problem. "We manufacture a double-sided, double-density IBM diskette in 42 seconds," Lionetti said. Disks can be printed in standard sizes.

Because each evaluation station works with three printers, users can receive an abridged hard copy of the software's documentation produced at the time of purchase and then can request the full documentation be sent to them.

The HOS was tested at five Computerland franchises starting last July and running through November.

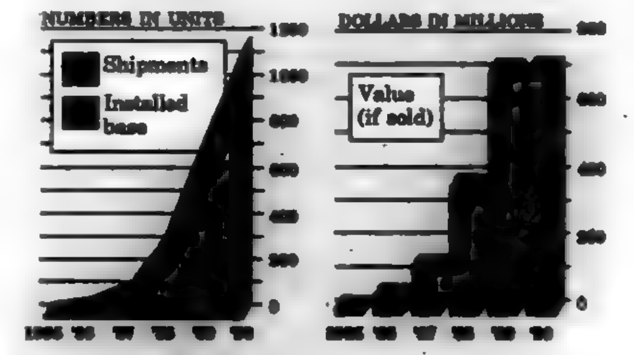
Andy Anderson, who owns four Computerland franchises in Orange County, Calif., said one of his stores was a beta-test site for the HOS. During the test, about 175 software titles existed on the system, but Anderson said he expects that number to jump to 1,500 to 1,800 titles once the paid contract goes into effect. During the test, sales were mixed between corporate purchases and home-use packages, he added.

Although ISG boasts that some 150 publishers already

Continued on page 34

Data View

U.S. office image scanners
Dollar value of shipments and installed base



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART: MITCHELL J. HAYES

Package simplifies Excel

BY DAVID BRIGHT
CW STAFF

CUPERTINO, Calif. — Macropac International has announced a collection of macros that simplifies and adds features to Microsoft Corp.'s Excel integrated spreadsheet program for the Apple Computer, Inc. Macintosh. The package, called 101 Macros for Excel, is similar to the company's IBM Personal Computer-based program, 101 Macros, for Lotus Development Corp.'s 1-2-3 and Symphony.

A macro is a shorthand method of carrying out a sequence of commands. In addition to saving keystrokes, the new package will be an important teaching tool for novice and experienced Excel users, claimed E. Michael Lunsford, president of Macropac International. With the package, users can access the included macros as well as create their own. The manual has a tutorial

Continued on page 34

Inside

- Orion Instruments announces microprocessor toolbox. Page 37.
- STB introduces a Hercules-compatible monochrome graphics adapter card. Page 38.

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Hut, hut, hike

CONTINUED FROM PAGE 29

puter. It can be used to simulate entire games with the computer playing itself.

After the two teams have been selected, both coaches have the option to view the opponent's roster and make any changes they may desire to their own. Once both coaches are ready to play, the coin is tossed and the winner chooses to kick or receive, just like in an NFL game.

Once the ball is in play after the kickoff, both coaches choose their plays. In the case of an IBM PC, one coach uses the numeric keypad to the right and the other uses the function keys on the left of the keyboard. Each can conceal his moves from the other coach with his free hand.

Completing a pass on third and long yardage or recovering an opponent's fumble can be almost as thrilling as watching a live game.

Choice of plays is made from offensive and defensive playlists. Play selection is made in two steps. First, a set group of plays is selected. Next, a play is selected from the play group. This is not shown on the screen until both offense and defense have chosen their plays.

So while it is usually possible to see which play group an opponent has selected, the actual play cannot be known until one's choice has been made. Play selections are made while a real-time 30-second play clock is running. Failure to make a selection within the 30-second time allowed results in a five-yard penalty for delay of the game.

In addition, each player may retract the play selection and make another, as long as the opponent has not yet made a final selection. So in play between two live opponents, a realistic equivalent of shifting formations is possible.

Once both the offensive and defensive coach have selected their plays, the play is shown on a graphics monitor in a typical X and O real-time chalkboard motion. This is followed by a slow-motion instant replay, unless the replay option is disabled by the players.

Until you actually play NFL Challenge, you may not appreciate how easy it is to get excited about watching the progress of your Xs or Os across the screen. Believe me, completing a pass on third and long yardage or recovering an opponent's fumble can be almost as thrilling as watching a live game.

Concise, illustrated offensive and defensive playbooks come with NFL Challenge. These can be used as a convenient reference by the coaches as they select their plays. In addition, the game comes with a special NFL Challenge edition of the Official Illustrated NFL Playbook. This is a superb booklet with everything from the basics of NFL football to an excellent treatment of how NFL teams develop and execute a game plan.

Even someone who knows nothing about football could easily become as knowledgeable as most long-time fans by studying and playing NFL Challenge. At the same time, experienced fans, and perhaps even players, will find that they are able to make use of their knowledge of the game when playing NFL Challenge.

An example of the latter, in addition to play selection, may be found in the ability to make substitutions at any time through the coaching menu. Each player on each of the 28 NFL teams is represented in the team data bases.

Each player is identified by number, height, weight and speed. Skill ratings are included for running skill or defensive skill against runners, receiving skill or defensive skill against receivers, blocking skill or defensive skill against blockers and passing and kicking skills.

The game can be played leaving the roster in the hands of the computer. Knowledgeable coaches familiar with their teams, however, can make substitutions to maximize their chances against a particular opponent.

Penalties, injuries, interceptions and fumbles are generated randomly by the computer at probabilities reflecting team statistics and NFL experience. The game is effectively played in real-time with time-outs taken via the coaching menu.

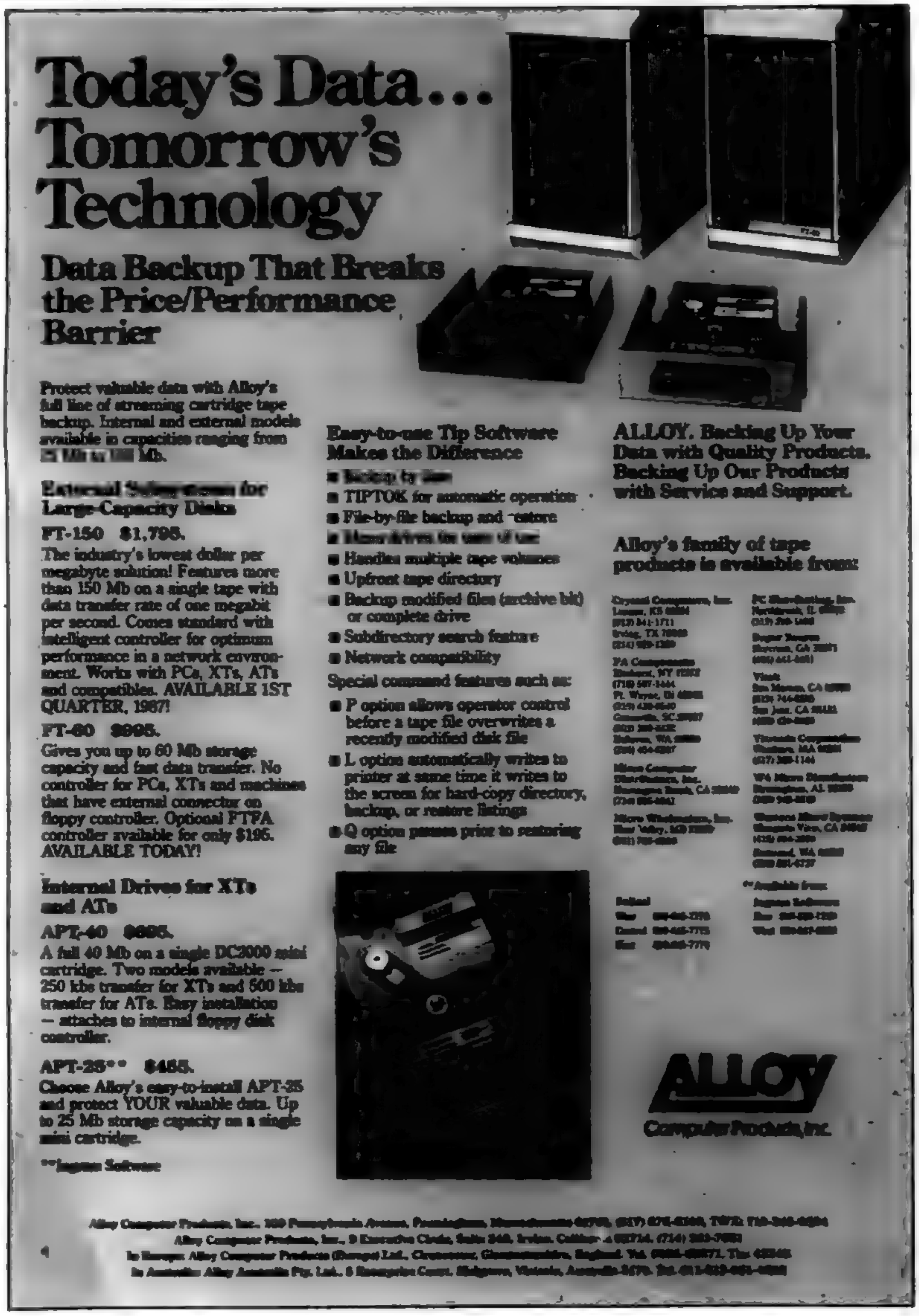
Yet another coaching option is to enter two-minute mode. This allows a trailing offensive team running out of time to make special efforts to get out of bounds or otherwise stop the clock on plays. The quarterback will also take more chances passing, in an effort for longer yardage but at greater risk of interception.

Other features include the ability to save games at any point and restore them later, to freeze action temporarily and to undo a previous play. Plays can also be sped up in two different ways.

When either team scores, NFL Challenge treats you to a scoreboard display. Field goal attempts are also shown graphically. An optional halftime extravaganza program is available for the IBM version for $14.95.

NFL Challenge is so much fun that, sitting here in frozen New England, I couldn't resist telling you about it. Maybe it can cheer you up, too, while we wait for spring.

Zachmann is vice-president of research at International Data Corp.



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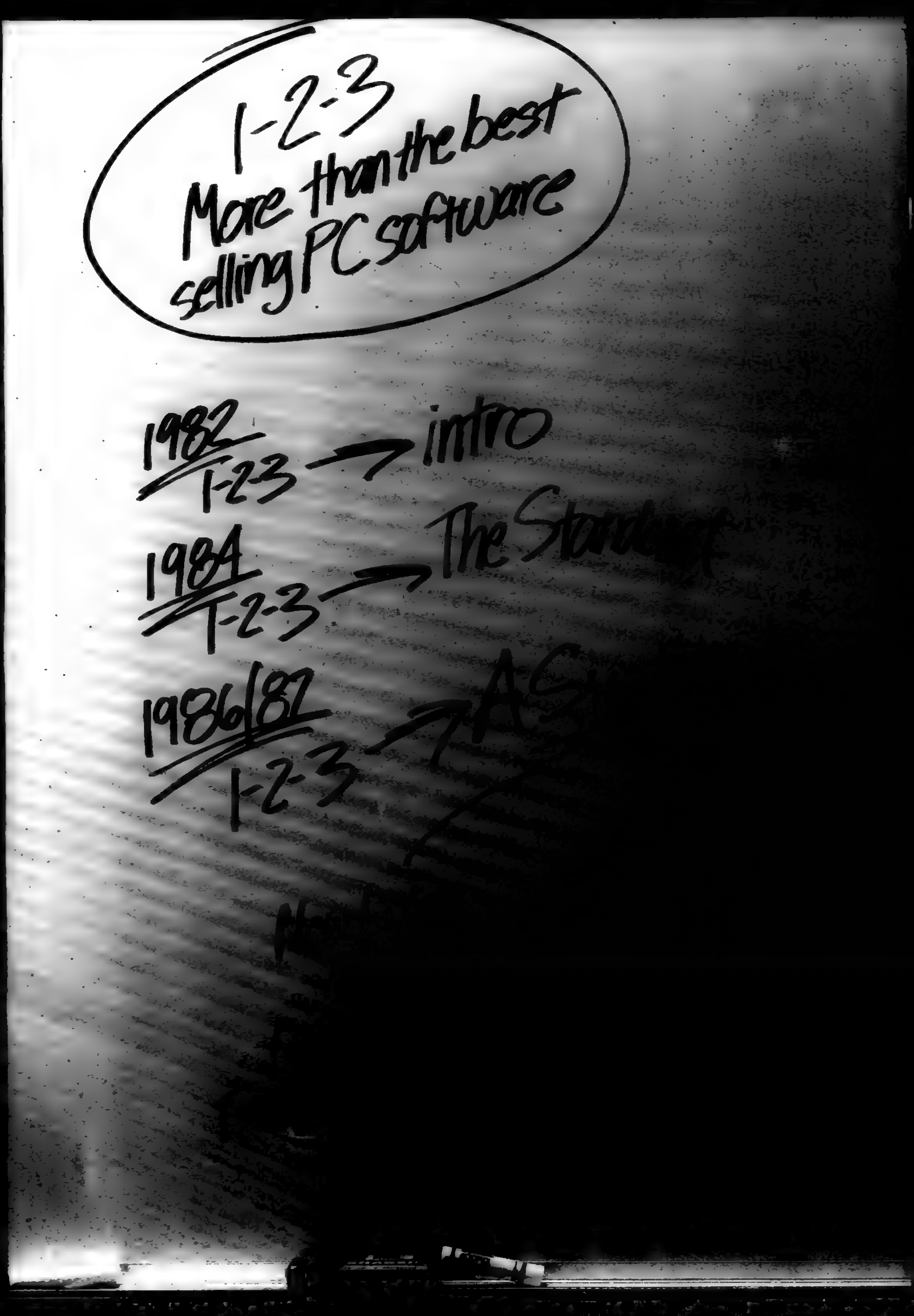
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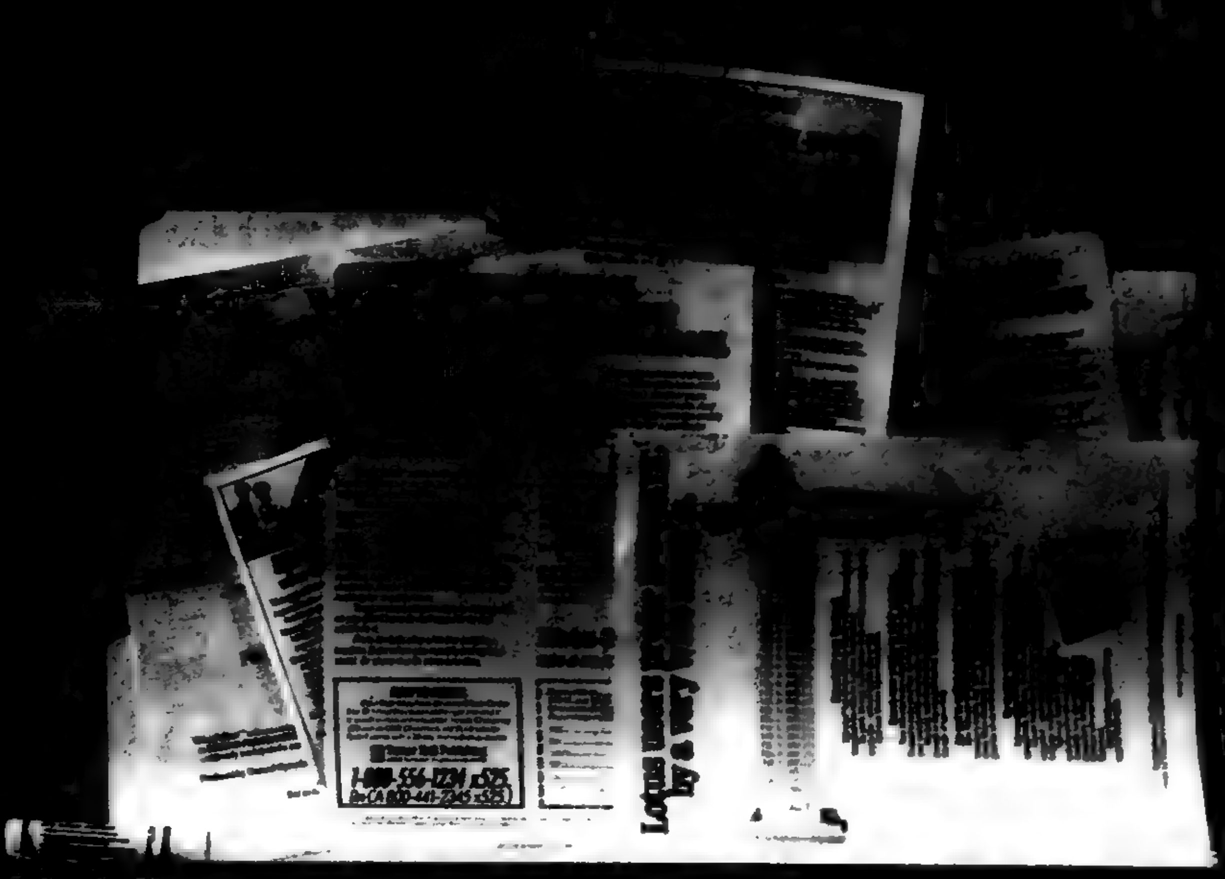


System

FROM PAGE 29

have programs on the system, noticeably absent from that list are Lotus Development Corp., Ashton-Tate, Microsoft Corp. and Wordperfect Corp.

"We're in discussions with all publishers," Lionetti said. "Clearly, Computerland will be taking an aggressive approach with us in showing the benefits and features [of the HOS system to the top publishers]."

While some publishers may be concerned that they will not receive royalties for packages sold on the system, their fears are unjustified, Lionetti said.

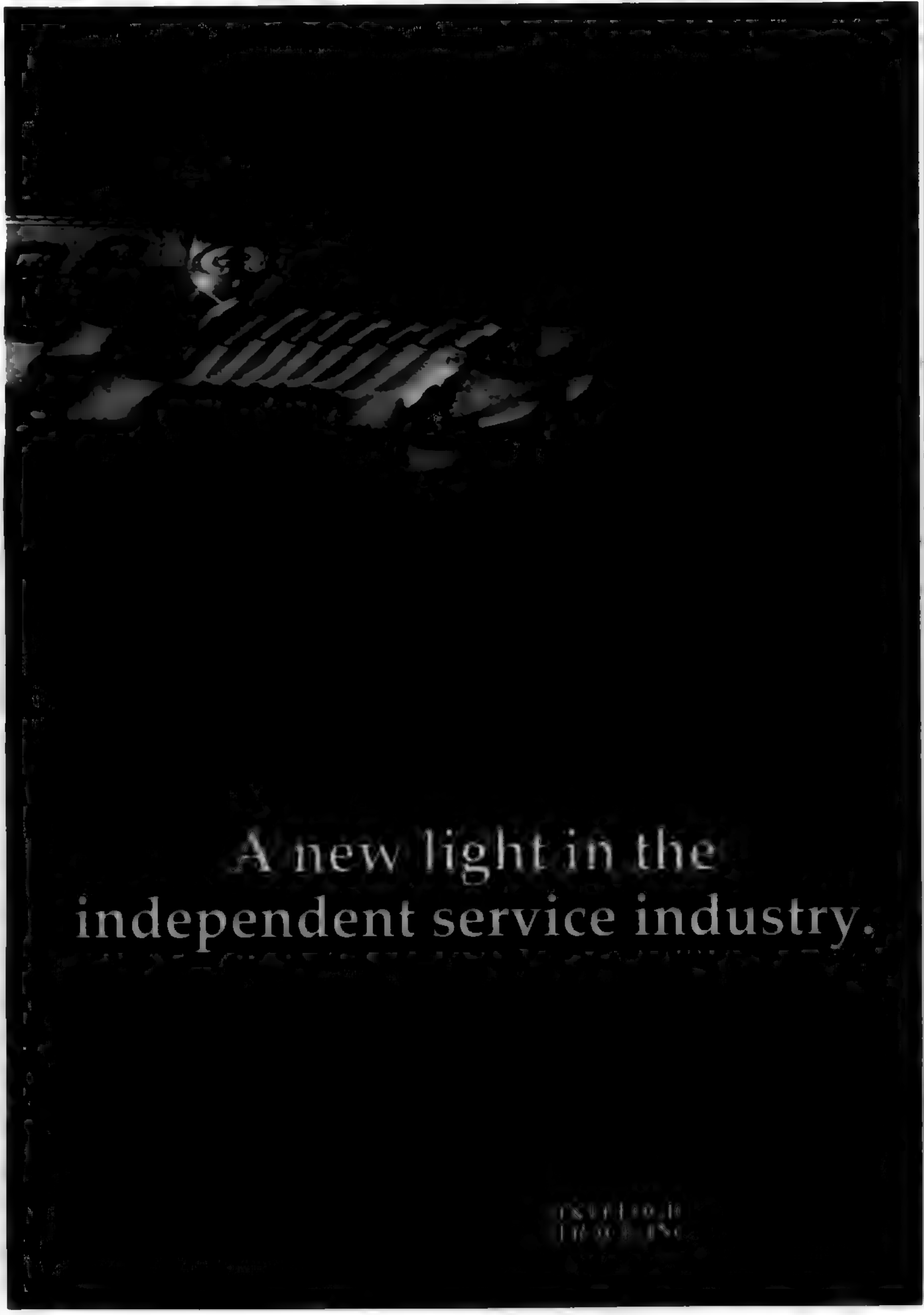
As security measures, a double-password entry system for authorization is needed, the equipment automatically shuts down if someone tampers with it and the programs are manufactured on serialized disks.

Royalties ensured

An audit trail monitoring the royalty accounting is processed through a Big Eight accounting firm, which is responsible for making sure publishers receive royalty payments for software that is replicated.

Currently, Computerland is the sole company negotiating for the systems, but it does not have an exclusive contract with ISG.

"There is an enormous potential for us to install our system in a variety of locations," including government agencies, schools and universities, corporations and other computer dealer locations, according to Lionetti.



Package

FROM PAGE 29

chapter on macro creation.

The $69.95 package includes macros that automate data base creation and maintenance, double-space work sheets, hide notes next to data cells, generate tables, save backup copies of work sheets and organize a screen full of windows.

One of the macros automatically gives subtotals of identical types of items listed in a data base.

Cursor control macros contained in the program include instructions for jumping to the top of the screen, jumping to often-accessed locations and returning to the point of origin.

Lunsford devised the idea for the macro programs when he found himself constantly repeating identical series of keystrokes.

Lunsford noted that one drawback with Lotus's competing Jazz integrated spreadsheet program for the Macintosh has been its inability to accept macros.

However, Lotus is expected to remedy that problem with an enhanced version of the program due next month, according to sources. Macropac may be offering a collection of macros for the Jazz version, Lunsford said.

LAN version of Supercalc4 out

SAN JOSE, Calif. — Computer Associates International, Inc. will this week announce a local-area network version of its Supercalc4 integrated spreadsheet.

The package, which contains the Network Activator feature, runs on Novell, Inc.'s Advanced Netware, IBM's PC Network and Token-Ring and 3Com's 3+. Supercalc4 provides file locking and spool network printing, which allows the user to output to a variety of devices on the network.

When used in conjunction with a copy of the latest version of Supercalc, the $395 Lanpak allows access for up to three users for the price of an individual package.

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NEW PRODUCTS

Systems

Orion Instruments, Inc. has announced the **Optilab Microprocessor Development Toolbox.**

The toolbox is said to be a fully integrated personal computer-based system that incorporates software program performance analysis and optimization. Functions offer the capabilities to create, assemble, analyze, modify, test and optimize software in a single system.

Other features include a line-by-line assembler, a 48-channel analyzer for monitoring bus-state activity and a full-feature universal 8/16 bit in circuit emulator.

Optilab is priced at $5,980 with 32K bytes of emulation memory.

Orion Instruments, 702 Marshall St., Redwood City, Calif. 94063.

The H. W. Wilson Co. has announced the **Wilsonline Workstation**, a package of computer and compact disk (CD) equipment for use in libraries and information centers.

The Workstation consists of an IBM Personal Computer XT with 640K bytes of memory, a color monitor, an IBM Proprinter, a modem, a CD player and peripheral equipment. It was designed to accommodate the on-line CD-read-only memory retrieval services that make up the vendor's Wilsonline Information System. The components of the workstations are also suitable for a variety of other library uses, the vendor said.

The Workstation is priced at $4,995.

H. W. Wilson, 950 University Ave., Bronx, N.Y. 10452.

Epson America, Inc. has announced the **Equity III+**, a 16-bit personal computer.

The Equity III+ is said to be hardware- and software-compatible with the IBM Personal Computer AT. It comes with an Intel Corp. 80286 microprocessor capable of running at switch-selectable rates of 6, 8 or 10 MHz. It features nine full-size option cards and comes with a built-in parallel and serial port.

The product comes with Microsoft Corp.'s MS-DOS, GW-Basic and system diagnostics.

The Equity III+ is priced from $2,695. When equipped with a 40M-byte Winchester disk drive, it costs $3,895.

Epson America, 2780 Lomita Blvd., Torrance, Calif. 90505.

Applications packages

Lexisoft, Inc. has announced a **Postscript version** of its **Spellbinder Desktop Publisher**, the page-composition and word processing program for IBM Personal Computers and compatibles with Hewlett-Packard Co. Laserjet-compatible printers.

Postscript is a page-description language said to allow laser printers to generate and modify text and graphics.

The software is said to be able to write Postscript code through in-line commands and send those instructions to the printer.

Postscript allows users to shadow letters, print text around corners and place patterns inside text characters.

Spellbinder Desktop Publisher is priced at $695.

Lexisoft, Davis, Calif. 95616.

State of the Art, Inc. has ported its **Master Accounting Series 90** software to personal computers on Novell, Inc.'s Advanced Netware local-area networks.

The software includes General Ledger, Accounts Payable, Accounts Receivable, Payroll, Inventory Management, Sales Order Processing and Purchase Order Processing as well as Library Master modules.

According to the vendor, the software takes advantage of Advanced Netware's file and record locking capabilities, allowing multiple users to access a common set of accounting data with complete data integrity. Also provided is a print-spooler capability.

Each application module is priced at $795.

State of the Art, 3191-C Airport Loop, Costa Mesa, Calif. 92626.

Softcorp has released **Pro Path Plus**, a critical-path method project-management system for IBM Personal Computers and compatibles.

The software is said to feature the ability to read and write Lotus Development Corp. 1-2-3 and Ashton-Tate Dbase III files.

It also features statistical planning functions remitting risk analysis and resource management with leveling.

Pro Path Plus provides several interactive views of a project.. Graphics dot matrix printers may rotate reports and charts 90 degrees. The full IBM character set is supported.

Pro Path Plus is priced at $495.

Softcorp, Suite 244, 2340 State Road, Clearwater, Fla. 33575.

Opus Systems has ported a full implementation of **Kyoto Common LISP** (KCL) to its Unix platform.

The Opus port of KCL is said to contain Common LISP functions, macros and special forms. It has both a compiler and an interpreter. It has a kernel written in C and compiles in C, so it is portable and ma-

"We knew precisely
And exactly what to
totalled the PC word
our demands, it was

Chris Vaal, Partner, Regional Director of Micro Applications, Arthur Young

Accountants don't have much patience with time-wasting exercises. Which is perhaps why Arthur Young has embraced our word processor from the start. Microsoft® Word for the IBM® PC and compatibles and the Apple® Macintosh.™

Because word processing is used at the management level, they required a command structure that was logical, clear, and uncomplicated. Because demanding secretaries use it, they demanded features in depth. Because they wanted everyone to use it, training had to be comprehensive, quick, and straightforward.

And because all their computers, PC and Macintosh, are wired together, they needed software that was optimized for networking [illegible] could easily share and automatically convert files created on [illegible] computer. And that would support IBM's DCA protocol [illegible] formatted files with minis and mainframes.

Then there were a few more givens. It had to [illegible] get on the printed page.

Of course, it had to lay down vast columns of [illegible] subtract, multiply, or divide.

And it had to get its money's [illegible]
When Arthur Young added [illegible]
Microsoft Word.

chine-independent, the vendor said.

Any Common LISP code has the ability to be cross-compiled. In addition, the C code generated can be used on any of the systems running KCL, according to the vendor.

Opus Systems' port of KCL is priced from $600.

Opus Systems, Building 400, 20863 Stevens Creek Blvd., Cupertino, Calif. 95014.

Software utilities

S. K. Data, Inc. has announced **Golden Retriever**, a document- and text-retrieval program.

The program uses a text-pattern recognition technique to search files for any phrase up to four words long. It locates exact matches as well as similar text patterns. Golden Retriever then informs the user which file contains the phrase, highlights the phrase and extracts a portion of the file into a proof file for further processing. Other features include wild-card character and subdirectory options.

Golden Retriever runs on IBM Personal Computers. It costs $99 plus $5 for shipping.

S. K. Data, P.O. Box 413, Burlington, Mass. 01803.

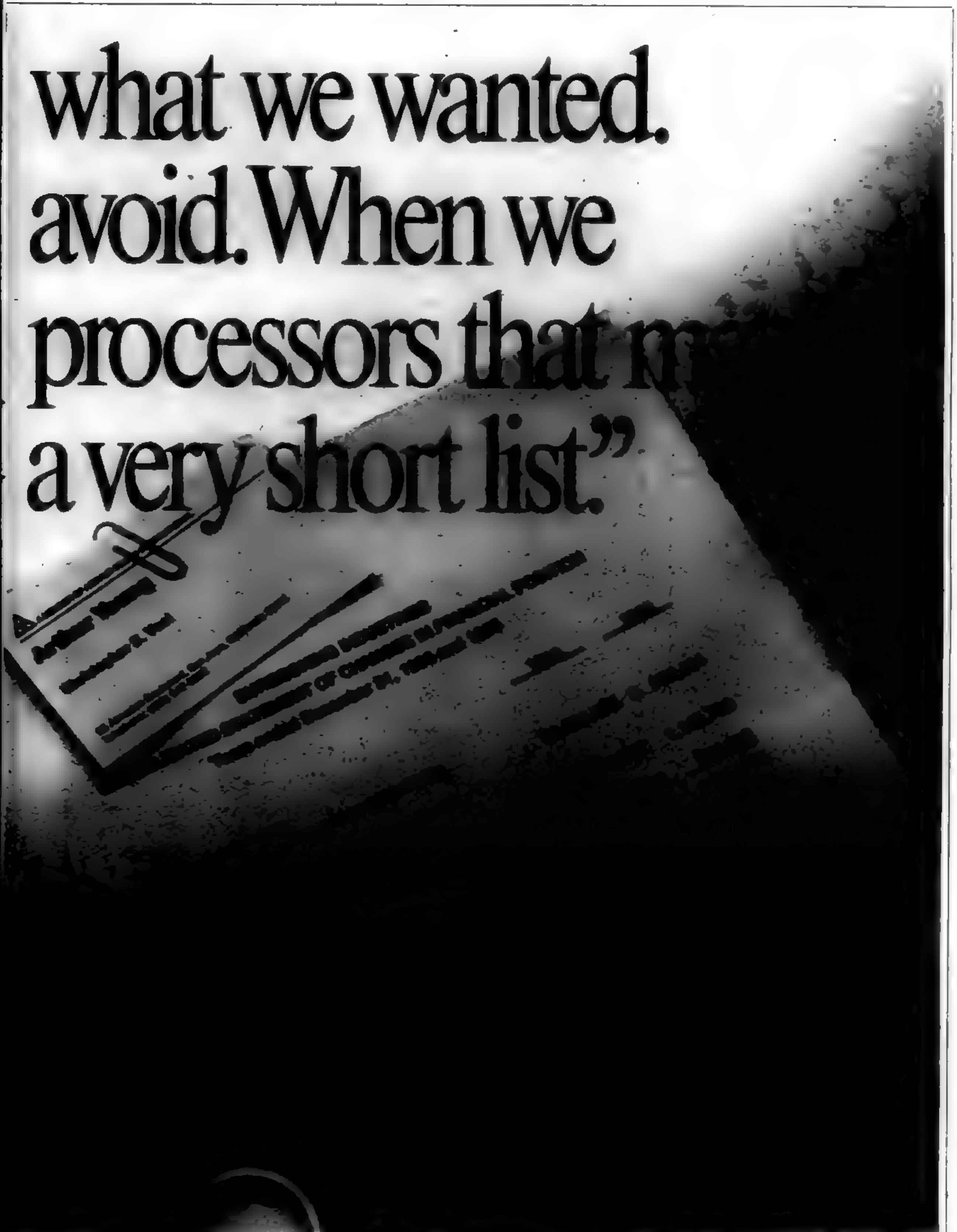
Blaise Computing, Inc. has announced **Light Tools**, a C support library designed for the Datalight C compiler on IBM Personal Computers.

Light Tools features fast video I/O using BIOS services or direct access to video memory, full-function windows that can be stacked and removed and can accept user input and IBM Enhanced Graphics Adapter support, including 43-line mode, according to the vendor.

The product is also said to feature interrupt-service support for resident applications and general-utility functions. These functions include keyboard input, sound, disk-volume label support, management of memory outside a Datalight C program, BIOS time-of-day and dot and line graphics.

Light Tools is priced at $99.95 including reference manual, source code and sample programs.

Blaise Computing, Suite 316, 2560 Ninth St., Berkeley, Calif. 94710.



Software enhancements

Spectrum Software has announced **Version 1.0** of its **Micro-Logic II** interactive design and analysis system for digital electronics.

The system includes an integrated mouse-driven schematic editor and shape- and component-library editors. Micro-Logic II is available for the IBM Personal Computer and compatibles.

Micro-Logic II costs $895.

Spectrum Software, 1021 S. Wolfe Road, Sunnyvale, Calif. 94086.

Rational Systems, Inc. has announced **Instant-C 2.2**, an upgraded version of its C-language incremental compiler.

Version 2.2 is said to offer support for Micrososft Corp. Microsoft 4.0 and Lattice, Inc. Lattice 3.1 object files and libraries.

Other features include the ability to edit an entire memory file with the EDM command, a pop-up window enabling users to see the declarations of globals defined in other files and an updated manual.

Instant-C 2.2 incorporates a full-screen editor, compiler and interpreter, source-level debugger, source code formatted, object-code linker, source-code checker and a dynamic runtime checker. It costs $495.

Rational Systems, P.O. Box 480, Natick, Mass. 01760.

Secad has announced **Autolog 3.0**, an upgrade of its project drawing manager for use with Autodesk, Inc.'s Autocad versions 2.1 and higher.

The software is said to organize drawings in a data base by either project or library on an IBM Personal Computer or compatible. Data files are Ashton-Tate Dbase III-compatible.

Features include passwording, administrator-control options, unlimited Project, Library and Drawing note sizes and a built-in note editor.

Autolog is priced at $295.

Secad, 4707 S.W. 72nd. Ave., Miami, Fla. 33155.

Carterfone Communications Corp. has introduced **PC Reach 3.0**.

Version 3.0 includes an applications manager designed to allow users access to the operating system and various applications through a menu-oriented user interface. Additionally, PC Reach features a text editor and support for both the X and Y Modem protocols capable of driving modems to a speed of 19.2K bit/sec.

PC Reach runs on IBM Personal Computers and compatibles. It is priced at $199.

Carterfone Communications, West Tower, 1341 W. Mockingbird Lane, Dallas, Texas 75247.

Software Publishing Corp. has announced **Harvard Total Project Manager II** (HTPM II), a personal computer-based project management system that is said to allow users to plan projects on-screen.

In addition, the program is said to permit users to choose from four formats in which to plan projects: Work Breakdown Structure, PERT chart, Gantt chart or Task List format.

Other features include automatic resource leveling and resource tracking

Continued on page 38

Continued from page 37

across multiple projects and the ability to replicate real-world planning and resource situations using man-hour and overtime calculations and lag relationships, according to the vendor.

HTPM II is priced at $595.

Software Publishing, P.O. Box 7210, 1901 Landings Drive, Mountain View, Calif. 94039.

Data Storage

Xebec Corp. has announced the **Owl III Model 40** and the **Owl III Model 80D** 5¼-in. hard disk drives.

The half-height Model 40 is said to offer a formatted capacity of 40M bytes. The full-height Model 80D offers 80M bytes of formatted capacity.

Both drives use the small computer systems interface standard and are said to comply with American National Standards Institute standards.

The two hard drives were designed for multiuser and multitasking applications. They incorporate controller logic and drive electronics on a single printed-circuit board.

The Owl III Model 40 is priced at $750. The Owl III Model 80D is priced at $1,295.

Xebec, 3579 Highway 50 E., Carson City, Nev. 89701.

Printers/Plotters/ Peripherals

Ampex Corp. has announced a price reduction on its **Ampex 232** personal computer-compatible video display terminal.

According to the vendor, the Ampex 232 can be configured to function in either single IBM Personal Computer AT or multiuser environments. When used with a modem and compatible host software, it can also act as a remote terminal. It offers the PC AT-style keyboard and emulates IBM PC scan codes, screen display and video attributes. It features a 25 line by 80- or 132-col display.

The Ampex 232 is priced at $499.

Ampex, 401 Broadway, Redwood City, Calif. 94063.

Business Systems International, Inc. has introduced its IBM Personal Computer-based **Lasersoft Printing Systems** for laser printers.

The Lasersoft Printing Systems are said to automate the development and maintenance of electronic forms and reports. They operate in a single- or multiuser environment, allowing combinations of mainframes, minicomputers and PCs.

Lasersoft Printing System I includes a laser printer; software for printer preparation, font management, forms design, form completion and data entry; five downloadable fonts; one company logo, one signature and one page form. It costs $5,495.

Lasersoft Printing System II includes the above as well as increased print speed from eight to 15 pages per minute. It costs $6,995.

Business Systems International, 20942 Osborne St., Canoga Park, Calif. 91304.

Board-level devices

Jadine Research, Inc. has announced the **286 GTI**, a 10-MHz, half-size accelerator card for IBM Personal Computers and compatibles.

The 286 GTI is said to support all versions of DOS. It requires no software patch and is compatible with Lotus/Intel/Microsoft Expanded Memory Specification boards.

The board includes 8K bytes of zero-wait state, 16-bit, data path cache memory with 45 nsec memory speed. There is an optional Intel Corp. 80287 math coprocessor that operates in both 5- and 8-MHz modes.

The 286 GTI accelerator card is priced at $399.

Jadine Research, Suite 334, 1647 Willow Pass Road, Concord, Calif. 94520.

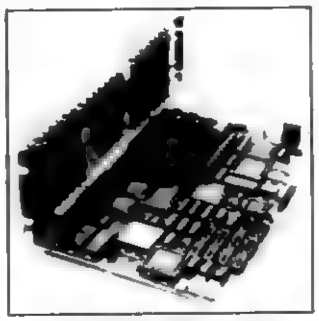
Zeos International has announced its **Zeos 386/M**, which is an IBM Personal Computer AT-compatible motherboard.

The motherboard is said to upgrade IBM Personal Computers to full Intel Corp. 80386-based systems.

The 386/M features a 16-bit, AT-compatible bus for peripherals and a 32-bit, 16-MHz, zero-wait state bus for memory, the vendor said.

There are provisions for up to 16M bytes of dynamic random-access memory, according to the vendor.

The board is also said to have the ability to support IBM Enhanced Graphics Adapter capability in addition to IBM Professional Graphics Adapter displays.



Zeos's *386/M motherboard*

The Zeos 386/M is priced at $1,995. This price applies to the version without memory.

Zeos International, Suite 1000, 530 5th Ave. N.W., St. Paul, Minn. 55112.

STB Systems, Inc. has announced the **H Card**, a Hercules Computer Technology, Inc.-compatible monochrome graphics adapter card.

The H Card is said to offer 720- by 348-pixel monochrome graphics.

The card is compatible with such software packages as Lotus Development Corp.'s 1-2-3, according to the vendor.

It is said to allow 80-col by 25-line text display and to provide video attributes of highlight, blink, underline, reverse and blank.

The H Card works in IBM Personal Computers and compatibles.

It comes with an IBM-compatible parallel port and 64K bytes of standard display memory, the vendor said.

The H card is priced at $239.

STB Systems, P.O. Box 850957, Richardson, Texas 75085.

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Greatly enhances CICS 1.7 allocation capability
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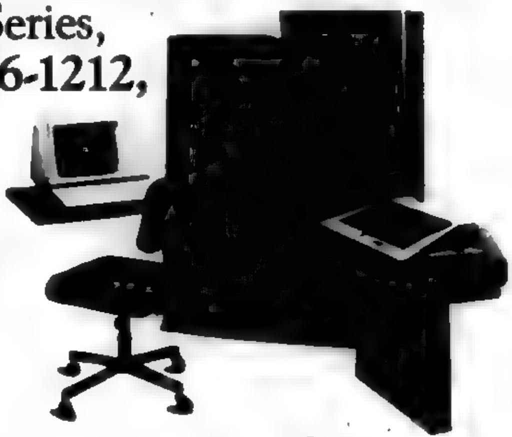
A 32-bit minicomputer provides optimum system capacity for true "end-to-end" network management, so without missing a beat you can continuously monitor up to 25 different network parameters, support up to ten control terminals at once, address up to sixteen segments per line, and manage up to 6,000 devices from one or more sites.

Codex 4800 Series network management systems are now available with low-, mid-, and high-range models structured to meet your needs today and grow with you into the future.

For more information about the Codex 4800 Series, call **1-800-426-1212, ext. 284.** Or write Codex Corporation, Dept. 707-84, 20 Cabot Boulevard, Mansfield, MA 02048.



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DATA STREAM

Walter Ulrich

Unleashing Baby Bells

The U.S. Department of Justice has come full circle.

In 1974, the department vigorously pursued antitrust legislation against AT&T. In 1982, AT&T agreed to divest itself of local telephone services and to accept prohibitions aimed at enhancing competition.

In 1984, the old AT&T was broken up in the largest industrial restructuring since World War II. And now, the Justice Department recommends unleashing the regional Bell holding companies to pursue a variety of new markets, including customer-premise equipment, information services and interexchange transmission services — subject only to the Federal Communications Commission.

The nonregulated communication service companies, many information suppliers and most industry trade associations can be expected to strongly disagree with the Justice Department. They see the consumers — themselves — not as beneficiaries but as victims of monop-

Continued on page 44

Network firms join product lines

BY ELISABETH HORWITT
CW STAFF

WASHINGTON, D.C. — Doelz Networks, Inc. and Network Equipment Technologies, Inc. (NET) recently announced an exclusive joint marketing and product development agreement aimed at integrating their network equipment into a comprehensive, centrally managed voice/data communications system, the companies said. Both firms also announced additions to their product lines.

Under the terms of the agreement, which was unveiled at the Communication Networks Conference and Exposition (Comnet), Doelz and NET will jointly market their product lines and provide a single point of contact for service and support, according to Tony Russo, NET's vice-president of marketing.

Together, the two companies hope to provide a "full network solution, with NET's T1 switches providing bulk transmission bandwidth between network nodes and Doelz's concentrators and switches supplying the interfaces that distribute data to user devices," noted Frank Connors, Doelz president.

NET offers the Integrated Digital Network Exchange (IDNX) line of intelligent T1 switches, which target high-end, multinode T1 networking installations. Doelz sells network concentrators, switches and multiplexers that incorporate a proprietary fast-packet data technology and can support a variety of transmission modes including virtual Systems Network Architecture circuits, according to Connors. Since NET handles voice transmissions but Doelz does not, the companies will use NET's existing links to private branch exchanges to provide local distribution of voice, Connors noted.

Doelz has just announced low-end versions of its Esprit One and Elite One line of network devices. The Elite One FP is a one- to four-port multipoint concentrator switch used primarily for data distribution networks. It offers the same functionality as the higher end Esprit products, including multiple protocol sup-

Continued on page 42

Dissimilar machines are linked

BY PATRICIA KEEFE
CW STAFF

WALTHAM, Mass. — Jupiter Technology, Inc. has introduced the System 1000 family of integrated data communications computer systems, said to enable compatible and incompatible computer products to communicate freely.

Jupiter claimed the System 1000 family is a breakthrough in systems integration and the sharing of data between computer and communications systems.

The System 1000 has been installed at three major financial institutions and at a leading credit authorization company.

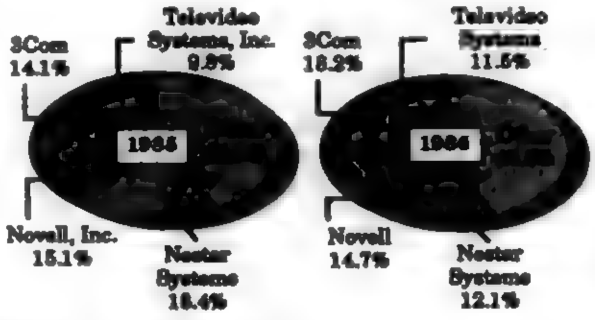
The System 1000 combines Softlink, a proprietary communications operating system, and modular software with a modular, multiprocessor hardware architecture. Users gain the advantage of customized software solutions coupled with programmable data communications

Continued on page 43

Data View

Personal computer local-area network server market

3Com Corp. replaces Nestar Systems, Inc. as contender with the largest installed base



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

AT&T debuts primary rate for System 85

BY DONNA RAIMONDI
CW STAFF

WASHINGTON, D.C. — AT&T has announced a System 85 Advanced Networking Switch that is fully compatible with the Integrated Services Digital Network (ISDN) Primary Rate Interface standard. AT&T also unveiled several new functions for the System 85 networking private branch exchange (PBX). Both announcements were made at

Continued on page 43

Inside

- Wang releases network monitoring tools. Page 42.
- Mitek adds implementations of its SNS Presentation Services for VAXs, IBM PCs. Page 45.

printf("Hello, MAINFRAME world\n");

Meet the Industry's New Standard for Mainframe C Compilers

SAS Institute Inc. announces a mainframe version of the Lattice® C compiler—your key to truly portable applications.

With our compiler, you can develop C programs on IBM 370 machines, interface easily with non-C programs and software packages, and protect your programming investment across operating environments. Virtually every new computer supports C, and portable programs created with the mainframe compiler under OS or CMS will run on any other machine with a C compiler.

The mainframe compiler uses standard IBM linkage conventions. Assembler programs, MAIN routines in other high-level languages, and packages such as IBM's ISPF and GDDM can be invoked directly from C. And you can use C, instead of assembler, to develop small and fast subroutines called from other languages.

We designed the compiler listing and cross-reference to make programs easy to follow and errors easy to find. An extensive library offers functions from Kernighan and Ritchie and the Lattice PC C compiler. The run-time library produces explicit numbered error messages and a traceback of active function calls if an error occurs

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Controller handles voice, data simultaneously

BY DONNA RAIMONDI
CW STAFF

Wang Laboratories, Inc. has announced network management software modules and an extension to its Wang Business Exchange (WBX) integrated office controller, which handles simultaneous voice and data traffic.

The software, part of Wang's Distributed Management Facility family, runs on all VS minicomputers and will be available in the third quarter. The Communications Network Services (CNS) Manager allows the network administrator to monitor, control and test Wang's CNS, which handles data routing and provides the means for communications sessions to be established, maintained and terminated. The CNS Manager, which costs from $300 to $1,200 per VS depending upon the model, runs in background mode.

Using the VS Input/Output Manager, network managers can monitor VS I/O processors, which permit data transfer between VS systems and peripherals and the devices attached to the I/O processors. Up to eight I/O processors on a VS can be monitored with the VS Input/Output Manager.

It costs from $500 to $1,000 per VS, depending on the model.

The company also released an expansion of the WBX — an enhanced version of Telenova, Inc.'s Telenova 1 private branch exchange product — to double the number of users the system supports from 80 to 160. The WBX is an integrated office controller. It can be linked with a VS computer to form the Wang Integrated Office Solution, an information processing and communications system.

The expanded WBX version will be available in late summer, and the cost per line will range from $550 for voice only to $1,200 for integrated voice and data.

If only there were more of you.

Wouldn't it be great if you could multiply yourself? Do an honest day's work before lunch?

Well, you can. With Microsoft® Windows.

Windows lets you work with multiple applications at the same time — more programs than your PC's memory can normally hold. Neatly sidestepping the 640K limit.

You can switch from, say, 1-2-3® to dBase II® or to Microsoft Word or to Microsoft Chart in a couple of keystrokes. Leave one program and jump to another.

And you can select and edit information from several different programs. Then quickly combine and print it all on a single piece of paper.

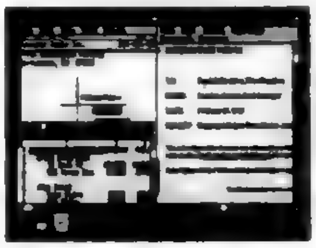
We've only just begun.

Windows is a graphic extension of MS-DOS® which gives you a more intuitive way to work. Your bridge to a new generation of applications which can be easily integrated. And which take advantage of Windows' common interface for commands, options, and data exchange.

In the Windows world, you move information freely. Do more work, more kinds of work, and do it faster.

A startling value.

Buy Windows now and you get a whole desktop full of applications to help you manage your day to day business.



In addition, you get Windows Write, a graphically-based word processing program. And Windows Paint, a simple, easy to use drawing program. Not bad for $99.

Find out how productive you can be with a Windows office. Get all of yourselves down to your Microsoft dealer.

And take a really good look into Windows.

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Microsoft and MS-DOS are registered trademarks of Microsoft Corporation. 1-2-3 is a registered trademark of Lotus Development Corporation. dBase II is a registered trademark of Ashton-Tate. Note: Photos show color and resolution obtained on an IBM PC equipped with an IBM Enhanced Graphics Adapter. Monochrome display is generated when an IBM Color/Graphics Adapter or compatible graphics adapter card is used.

Network

CONTINUED FROM PAGE 41

port, diagnostics and application priority levels. However, the Elite One FP's $3,500 to $5,200 price range makes it cost-justifiable for sites with only one terminal and application, according to Connors.

The Esprit One FP offers the same functions as the higher end Esprit One network concentrator at approximately half the entry-level cost, according to Connors.

Supporting approximately 1,400 concurrent virtual circuits, the Esprit One FP can act as a concentration point for small networks or as a data distribution facility between Elite One Network Links and local devices.

Pricing starts at $19,750. Both the Esprit One FP and Elite One FP will be available in the second quarter of this year.

Doelz also announced the DCP 3080, a combined Customer Service Unit/Data Service Unit that interfaces user devices over a Dataphone Digital Service network. Priced at $1,000 and available immediately, the device supports transmission rates between 2.4K and 56K bit/sec. and supports both RS-232 and V.35 interfaces. It also transmits diagnostic information to Doelz's network management system.

Unified system

Doelz and NET plan to merge their respective centralized network management systems into one system that will enable users to access, manipulate and store "everything from alarms to traffic, usage and error statistics" from both vendors' networking devices, Connors said.

NET's Integrated Network Command System/500 network management system, announced at Comnet, provides centralized network monitoring, security and fault management, performance measurement and configuration.

Based on a Sun Microsystems, Inc. multiwindowing, multitasking workstation, the system features topological network maps that offer views of the network from an overview down to the component level.

The Integrated Network Command System/500 costs $87,500.

Release 7 software added

NET also announced at the conference Release 7 software for its IDNX product line. Available in the third quarter of this year, Release 7 enables IDNX nodes to support up to 96 IDNX T1 trunk modules and 1,024 active calls.

The software also supports several new features, including a clear 64K bit/sec. channel interface, 2-to-1 voice compression conforming to the CCITT Advanced Digital Pulse Code Modulation standard and compatibility with Extended Superframe and D4 framing protocols and Dataphone Digital Service.

A third NET introduction, the Alert Monitor software, provides an interface between NET's network management system and IBM's Netview PC. This enables users to centrally monitor alarms on IDNX corporate backbone networks through Netview, IBM's family of SNA-based network management products, NET claimed.

The Alert Monitor software features real-time access to IDNX status information.

AT&T

CONTINUED FROM PAGE 41

the recent Communication Networks Conference and Exposition held here.

The Primary Rate Interface specifies 23 64K bit/sec. channels plus a 16K or 64K bit/sec. channel for signaling and packet switching. The interface was designed to support high-capacity digital voice, data and video transmissions between customer-premise PBXs and switches, hosts and carrier central-office switches.

"Our implementation of the Primary Rate on the System 85 is another indication that ISDN is real, and we're committed to it," said Richard Snowden, director of AT&T's Concept Development Center.

Any System 85 can be software-upgraded to support the interface while still using existing communications protocols and applications, Snowden added.

AT&T is continuing to work on implementing the ISDN Basic Rate Interface on its systems, Snowden confirmed. The Basic Rate defines two 64K bit/sec. transmission channels for connections between user voice and data workstations and switching systems.

AT&T "took a chance and lost" by choosing to develop its own version of the Basic Rate before the CCITT standard was complete, according to Snowden. As a result, the AT&T Digital Communication Protocol defines an 8K bit/sec. D channel, while ISDN defines a 16K bit/sec. D channel.

The software enhancements of the System 85 Advanced Network Switch include network management, message sharing among switches in a private network and subdivision of a single System 85 to look like multiple independent systems. Prices start at $35,000 for the features, which will be available late this year.

AT&T also introduced several System 85 enhancements, including:

- Automatic Call Distributor enhancements for greater call control and flexibility and improved administration and reporting capabilities on the System 85's 3B Call Management System. The enhancements center on call vectoring, a multistep routing of incoming calls. There will be a one-time charge of $10,000 to upgrade a 3B Call Management System to support call vectoring.
- Call Detail Recording Utility, a $6,500 3B2-based piece of applications software that increases capacity for call-record collection, storage and processing.
- Visual Maintenance and Administration Panel, a $4,000 AT&T Unix PC-based tool for controlling PBXs and networks.
- Audix-S, a voice-mail system that supports up to 1,000 light-volume users. With four ports and 10 hours of storage, the Audix-S costs approximately $42,000.
- 3B2 Messaging Server Software for designing departmental messaging systems. The software costs $15,000.

Dissimilar

CONTINUED FROM PAGE 41

hardware, the vendor said.

The System 1000 software was designed to accommodate new communications standards and protocols as they are developed. This means that it eliminates the need to purchase new communications equipment when corporate needs change, the vendor claimed.

Acts as user interface

The Softlink program controls all communications applications and protocols and acts as a user interface to control the System 1000.

Softlink also breaks the communications processing systems into discrete functions implemented in software modules called Softblocks. Each Softblock supports a different communications function or protocol, such as IBM's Systems Network Architecture, IBM 3270 terminal emulation or X.25.

> Each Softblock supports a different communications function or protocol, such as IBM's Systems Network Architecture, IBM 3270 terminal emulation or X.25.

Softlink connects Softblocks via dynamic data paths called Softwires, which transfer data from point to point and link Softblock functions. The resulting communications processing capability represents a new way to link computers in an environment that is not vendor- or protocol-specific, Jupiter said.

The System 1000 hardware allows a large number of communications processing pathways to be created and utilized simultaneously, the vendor said.

The Motorola, Inc. 68000-based Unix-compatible host processor controls the configuration of Softblocks and Softwires and performs system administration and network management.

The system can be expanded to incorporate up to 14 MC68000 family processor modules. The System 1000 is available in a variety of configurations, supporting from four lines on the Model 3 up to 624 lines on the Model 14.

Exact system prices are dependent on the configuration and processing functions included.

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Banyan serves up support for David LAN

WESTBORO, Mass. — Banyan Systems, Inc. has announced support for an integrated voice Ethernet local-area network (LAN), the David Information Manager from David Systems, Inc. in Sunnyvale, Calif.

In addition, Banyan added support for both Natick, Mass.-based Proteon, Inc.'s Pronet-4 token-ring network and Santa Clara, Calif.-based 3Com Corp.'s Etherlink + adapter.

Etherlink + is a high-performance, intelligent Ethernet adapter that runs at 10M bit/sec.

In addition, Banyan introduced an uninterruptible power supply for its Vines/286 product.

PCs part of the network

Support for David Systems' integrated voice LAN allows personal computers connected to that LAN to become part of a Banyan virtual network.

In a David Ethernet, data is transferred at high speeds over in-place, single twisted-pair telephone wiring.

Banyan's support of the David LAN enables personal computers to use the existing wiring to share files, services and peripherals attached to a Banyan server on a network.

Support for Pronet-4 covers Pronet model numbers P1340 — a 16-bit IBM Personal Computer AT bus adapter — and P1344, an 8-bit IBM PC bus adapter.

Banyan already supports Pronet-10 and provides a bridge between these two otherwise incompatible networks.

In addition, PC ATs or true compatibles running Vines/286 software now have the same uninterruptible power supply capabilities available for other Banyan servers.

Certified power supply

Banyan has certified the American Power Conversion's uninterruptible power supply, Model UPS-121, for use with Vines/286 software.

The uninterruptible power supply connects to the PC AT through a control cable at the parallel port.

Available directly from Banyan, the UPS costs $850.

Banyan's support of the David LAN enables PCs to use the existing wiring to share files, services and peripherals attached to a Banyan server on a network.

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Unleashing

FROM PAGE 41

oly power being exercised in competitive markets. They too have rational and persuasive arguments.

Three-pronged argument

One of their foremost objections is that the regional Bell holding companies will use revenue from their local-exchange monopolies and other protected businesses to subsidize activities in the competitive arena. Another is that the holding companies will use their control of the local-exchange facility to the detriment of competitors. A third potential hazard is that the regional Bell holding companies' purchasing power, partially due to the purchasing clout of these companies' regulated telephone monopolies, will give them significant procurement advantages. Equipment manufacturers fear that once the holding companies are allowed to make their own equipment, they will stop utilizing their present suppliers.

On the other side of the fence, the Justice Department, the FCC and the holding companies make a strong and reasoned case for deregulation. The current regulatory and judicial processes are redundant and inefficient, they claim. Foreign communications suppliers are becoming more successful in the domestic market, and divested Bell company participation would improve the trade balance and offer other economic benefits.

Supporters of the Justice Department's proposal further point out that consumers are being cheated out of products that the regional Bell holding companies, with their tremendous technological resources, could supply in a variety of markets; the companies' entry into these markets would also encourage competition.

In defense of its proposal, the Justice Department has suggested that "many information services are closely related to local telephone services and can at times be provided most efficiently by local telephone companies." It has claimed that Computer Inquiry III rules will ensure "quality of access" and fair competition in the marketplace.

Facing complex reality

How can one predict who will prove right in the long run: the Justice Department or the regional Bell holding companies' nervous customers and competitors? In an ideal world, the Justice Department's recommendations would work as intended. Unfortunately, this is a far from ideal world, and the issues are complex. The history of communications regulations is a history marked by reasonable theories that proved imperfect in practice; no wonder these latest recommendations are being criticized.

Even if Computer Inquiry III regulations and FCC control prove technically effective, it may be that the perception of the regional Bell holding companies' monopoly strength will reduce competition by discouraging new market entrants and make it harder for new ventures to raise capital.

Existing competitors may reduce the size of their investments or reallocate their resources to other markets so that the increased technological innovation coming from the holding companies may be offset by the stifling of innovation from other vendors. As a result, consumers may end up paying higher prices because of decreased competition.

One man will decide whether the benefits of unleashing the regional Bell holding companies are worth the risks. U.S. District Judge Harold Greene's decision will determine the structure of the communications industry for years to come. He will be accepting comments and responses for only a few months, so now is the time to exercise your franchise in the outcome of this crucial issue.

Ulrich is president of Walter Ulrich Consulting, a subsidiary of Coopers & Lybrand.

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NETWORKING

NEW PRODUCTS

Local-area network hardware

Mitek Systems Corp. has announced **implementations** of its **SNS Presentation Services** for Digital Equipment Corp.'s VAX and Microvax computers running the VMS operating system and IBM Personal Computers using IBM PC-DOS.

Both implementations utilize Mitek's approach of distributed Systems Network Architecture (SNA) services for Transmission Control Protocol/Internet Protocol Ethernet local-area networks (LAN).

The SNA Network Server provides Ethernet LAN connectivity either directly channel-attached to an IBM mainframe environment or remotely attached, with speeds of up to 64K bit/sec.

Pricing for the SNA Network Servers ranges from $21,000 to $29,500. Pricing for the SNS Presentation Systems ranges from $750 to $4,500.

Mitek Systems, 2033 Chennault Drive, Carrollton, Texas 75006.

Tecmar, Inc. has enhanced its **QIC-60** line of cartridge tape systems with a software offering said to allow the system to be used with Novell, Inc. local-area networks.

The software is said to retain all of the QIC-60's original features including automatic reordering of fragmented files when restoring data to the hard disk, selective file backup and restore, direct read-after-write data verification and bad sector detection when restoring data to a different hard disk than was originally backed up

The network-compatible version of the QIC-60 line costs $1,695 for the half-height internal 5¼-in. cartridge tape drive for the IBM Personal Computer AT and compatibles and $2,144 for the external subsystem.

Tecmar, 6225 Cochran Road, Solon, Ohio 44139.

Codex Corp. has introduced the **4320 LAN Hub**, a network interface said to allow up to eight devices to share a single access point to a baseband Ethernet network, and the **4303 Transceiver**, which attaches to the 4320 LAN Hub.

The 4320 LAN Hub allows a mix of computer-aided design and manufacturing workstations, IBM Personal Computers and terminal servers to connect to the single Ethernet transceiver. Up to eight 4320 LAN Hubs can be cascaded to support 64 ports, according to the vendor.

A switch allows users to configure the connected devices to pass through the Ethernet heartbeat test when connected to a transceiver or to generate the heartbeat when attached to a stand-alone local-area network The 4303 Transceiver also employs a switch that enables or disables the heartbeat test.

The 4320 LAN Hub costs $1,095. The 4303 Transceiver costs $270.

Codex, 20 Cabot Blvd., Mansfield, Mass. 02048.

Local-area network software

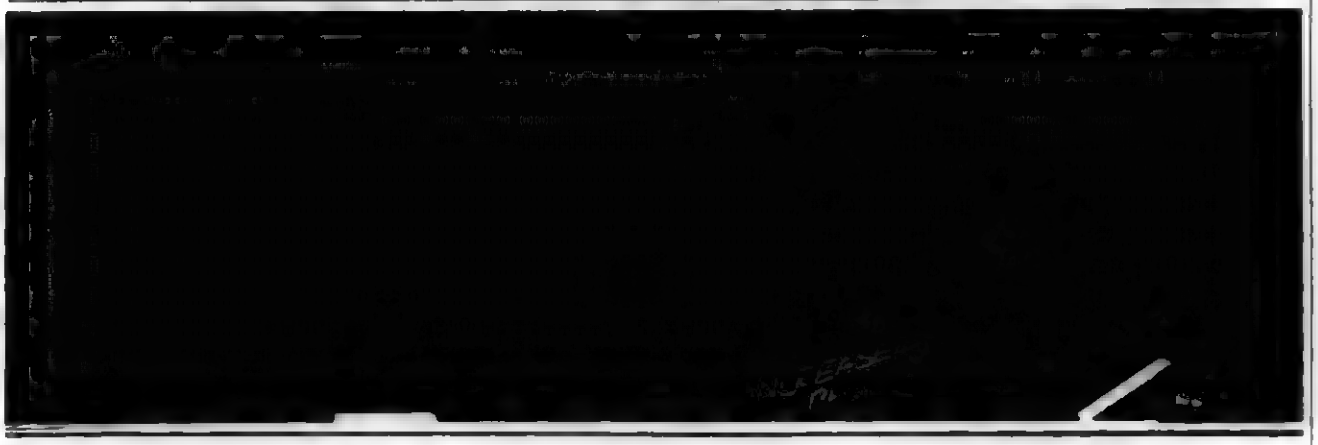
Touchstone Software Corp. has announced **Unicall**, a data communications programming package for Unix-based computers.

Unicall is said to allow Unix computers to initiate and control data network applications involving other Unix systems, personal computers, Digital Equipment Corp. VAX/VMS computers and the Apple Computer, Inc. Macintosh. Supported applications include electronic mail, file transfers between operating systems, terminal emulation, printer sharing and connection management.

Unicall provides dial-out capabilities using asynchronous direct-connect ports and Hayes Microcomputer Products, Inc.-compatible modems.

Unicall is priced between $995 and $3,295.

Touchstone Software, 909 Electric Ave., Seal Beach, Calif. 90740.



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Customer-premise equipment

Voice Control Systems has announced the **VCS1000** speaker-independent voice recognition system.
las, Texas 75244.
port an 82-word vocabulary divided into three application areas: home security, machine control and telephone function control. It is also said to respond to any speaker without having been trained to the speaker's voice.

The system does not require a separate computer system for operation.

VCS is priced from $995, including a microphone and voice response software appropriate for the particular application.

Voice Control Systems, Suite 100, 14140 Midway Road, Dallas, Texas 75244.

Links

IBM has announced that the Interactive Communication Facility Finance Subsystem of IBM's System Support Program (SSP) for the System/36 has been enhanced to include primary **communications support** for the IBM 5170 Personal Computer AT Model 849.

The connectivity enhancement is said to allow all models of the departmental processor line to communicate with IBM's 4680 Store Systems point-of-sale (POS) terminals. The 5170 PC AT Model 849 acts as a communications controller for up to 128 4680 POS terminals.

The enhanced version of Release 5 Modification Level 1 of the SSP communicates with the 5170 PC AT through IBM's Systems Network Architecture/Synchronous Data Link Control.

IBM's Interactive Communications Facility Finance Subsystem costs $1,600 for System/36 Models 5360 and 5362 and $1,500 for the System/36 Model 5364.

IBM, 44 S. Broadway, White Plains, N.Y. 10601.

Electronic mail

Interactive Network Technologies, Inc. has introduced **Intermail PC**, its IBM Personal Computer interface for the Intermail system.

Intermail is a desktop communications system that enables users to exchange electronic mail and files. The Apple Computer, Inc. Macintosh version also allows users to move object- or pixel-oriented images from one Macintosh to another.

Intermail's server-to-server communications feature enables microcomputers on both local and remote networks to communicate. Intermail also can act as a gateway enabling Macintoshes on an Appletalk network to communicate with systems that conform to the X.400 electronic-mail standard.

Intermail PC is site-licensed at $199 per server for IBM PCs and compatibles.
Mass. 02168
nologies, 20 Amy Circle, Waban, Mass. 02168

Multiplexers/ Modems

Gespac, Inc. has announced the **Gesmod-1**, a smart modem board built on a single-height Eurocard.

The modem is said to be compatible with the standard G-64 bus. It was designed for data communication over the public switched telephone network or over leased telephone lines. It can transmit data at 300 bit/sec. in full-duplex mode or 12K bit/sec. in half-duplex mode.

The Gesmod-1 costs $750.

Gespac, 100 W. Hoover Ave., Mesa, Ariz. 85202.

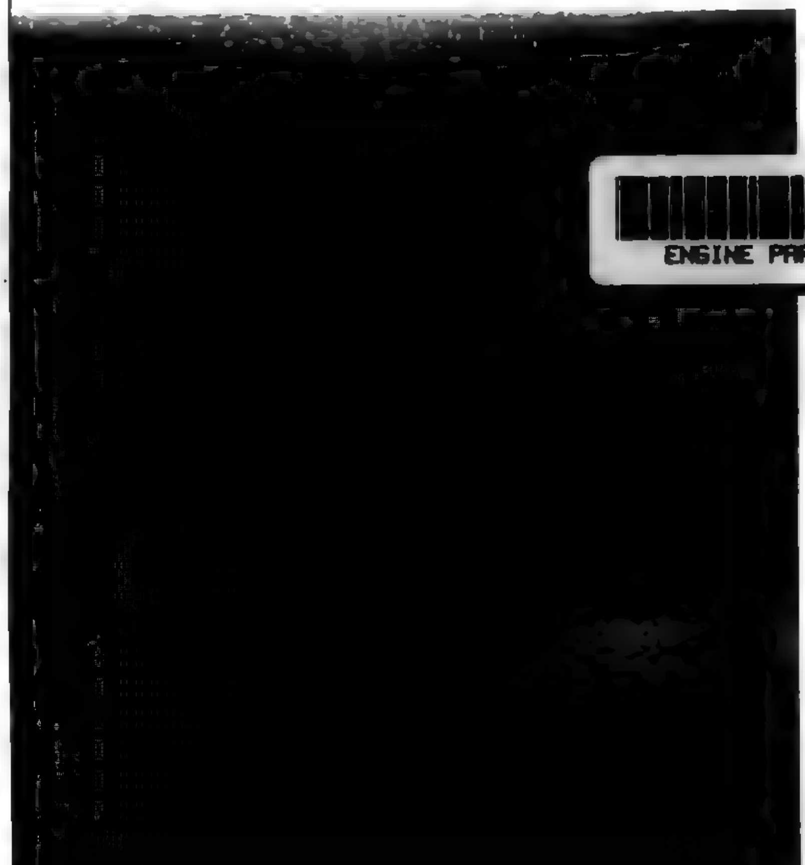
Anderson Jacobson, Inc. has announced the **AJ 9631-S** V.32 modem.

The full-duplex, 9.6K bit/sec. modem is said to operate on dial-up networks with a single phone call or on 2- or 4-wire leased lines. It is V.32 compatible and provides Trellis coded modulation, local and remote echo cancellation and satellite transmission capability.

It also has an integral V.25 synchronous autodialer.

The AJ 9631-S is priced at $2,995.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.



Once again, we've made shop floor productivity take off.

Not long ago, production controllers in PSA's Airmotive Division were spending half their day tracking the engine parts they serviced. Which created a lot of paperwork. And little productivity.

Thanks to a bar code system from INTERMEC, things are now looking up.

With bar code scanners and readers replacing pencils and clipboards, parts-tracking has been reduced from hours to minutes. Allowing production controllers to be more productive with their time.

Of course, it didn't take long to get the system off the ground. INTERMEC bar code systems are designed to talk with virtually any mainframe under any operating system.

And programmable readers allow application programs to be written and modified without changing hardware or burning chips.

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Amdahl learns lesson

There was one line in Amdahl Corp.'s product announcement that seemed simple enough to be less than noteworthy — but could be all too indicative of attitudes in the computer industry.

Amdahl followed up IBM's introduction of enhancements for 3090 mainframes by offering enhanced models of its own Amdahl 5890. There was little startling in that move, which not-so-coincidentally involved Amdahl copying IBM's decision to call its new systems the E series. After all, Amdahl makes its living in the IBM-compatible world.

The line in question read, "Currently installed 5890 processors can optionally be upgraded to the E models for a charge of $120,000. . . ." It may be that $120,000 is a lot of money to spend for a 4% performance boost. But at least the option is there.

When IBM announced its E models, the company boasted that customers could realize price/performance gains of 25% to 28% through upgrades. However, in that case, the upgrade involved jumps from one model number to another — for example, from a dyadic-processor 3090 Model 200 to a four-processor 3090 Model 400E.

Where Amdahl voluntarily quoted an upgrade price for a move such as one from a 5890-400 to a 5890-400E, IBM officials hemmed and hawed and did a quick shuffle when customers and the media asked for price and performance numbers for a Model 200-to-Model 200E upgrade. IBM's only answer was that while a Model 200E is faster than a Model 200, such an upgrade was impossible — thus implying that there were technical reasons for the answer.

Those technical reasons were never made clear.

For more than a week IBM stuck to its story. They said it couldn't be done, even though

Continued on page 50

BBN adds high-speed adapter

BY JAMES CONNOLLY
CW STAFF

CAMBRIDGE, Mass. — BBN Advanced Computers, Inc., which produces the Butterfly parallel processor, has announced a VMEbus adapter designed to provide an I/O bandwidth of up to 300M byte/sec. for throughput-intensive parallel applications.

The company said a 128-processor Butterfly system with a 256-port switch can support 32 VMEbuses with two Butterfly VMEbus Adapters per bus. The Butterfly, introduced in 1981, was designed to support 1G byte of memory and 256 processors based on the Motorola, Inc. 68020 microprocessor with expansion in single-processor increments.

"For many applications, like image understanding, complex simulation and real-time control, it is critical for a high-performance computer like the Butterfly parallel processor to support equally fast I/O. With the VMEbus Adapter, the Butterfly system can expand to large configurations and maintain high throughput for I/O devices such as array processors, graphics systems and high-speed disk interfaces," said Gary Schmidt, vice-president of marketing for the vendor.

The adapter attaches directly to the Butterfly switch, which is an interconnection network providing all processors with equal access to all memory in the system. The switch connection allows data to be moved to and from the VMEbus without going through intermediate processor nodes. I/O transfers then can use memory from any processor node, reducing the load on any given memory module, according to BBN officials.

Continued on page 49

UPDATE

The ups and downs of downsizing

ANTHONY RUSSO

BY JANET FIDERIO
CW STAFF

There is no doubt about it: Smaller systems, both minicomputers and microcomputers, show superior price/performance ratios when compared with their bigger mainframe brothers. But what role can these systems play in the traditional MIS shop? Under what circumstances should smaller systems run, or develop, traditional applications? When is downsizing a good idea?

Computerworld invited three professionals to discuss downsizing and discovered that although large shops may be keenly eyeing new technology, the hurdles to its rapid adoption are many.

The three roundtable participants are Martin A. Hupka, assistant vice-president

Continued on page 53

SI883 answers DEC disk

BY JAMES CONNOLLY
CW STAFF

MILPITAS, Calif. — System Industries, Inc. has followed up Digital Equipment Corp.'s announcement of a 2.5G-byte storage array with its own 4G-byte storage subsystem for DEC systems.

System Industries introduced its SI83 Disk Drive as the foundation of the SI883 C-Series storage array and as the DEC-compatible vendor's answer to DEC's Jan. 20 announcement of the 2.5G-byte DEC SA482 array for large DEC VAX systems.

The SI883 C-Series reportedly consists of eight SI83s packaged to provide 1.5G bytes more capacity than the four-drive DEC SA482 in the same floor space. The SI drives were designed to be attached directly to DEC's HSC50, HSC70, KDB50, KDA50 and UDA50 controllers.

"The new SI83 drives deliver an average seek time of only 16 msec, which is 33% faster than DEC's latest offering. Furthermore, advanced mechanical features such as dual-supported spindles and cartridges help SI83

Continued on page 50

Inside

- Norsk Data bolsters ND-5000 series. Page 48.
- Microtouch adds touch-screen monitor. Page 57.

IRS tries to stretch life of overloaded mainframes

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Internal Revenue Service is taking a variety of steps — such as capping work-load growth at 10% per year — so that it can keep its nearly overloaded tax processing systems working until they are replaced in 1993 or 1994, according to testimony at a recent congressional hearing.

If the capacity stretching effort fails, mainframe capacity could run out as early as mid-1988 and the IRS might face a processing disaster such as the one it experienced in 1985, according to the U.S. General Accounting Office (GAO).

IRS Commissioner Lawrence B. Gibbs said the IRS is acutely aware of the capacity problem and is taking action to stretch the capacity of the Unisys Corp. 1100/80 series processors at 10 service centers. Unisys is the product of the merger of the former Burroughs Corp. and Sperry Corp.

The IRS had considered replacing some mainframes in 1989 as an interim step to boost capacity but discarded that idea last April in favor of stretching the life of the old processors and concentrating on developing state-of-the-art information systems under the Tax System Redesign program, to be deployed in 1993 or 1994.

The initiatives include spreading the tax processing work load better among the service centers; purging unnecessary data from on-line data bases; limiting computer applications growth to an 8% to 10% annual rate; increasing the efficiency of Cobol software for weekend processing by 25%; and adding more Unisys processors where needed.

The IRS said it believes these actions will stretch the useful life of the 1100/80 processors to 1993, but the GAO auditors are less sure. The GAO said its rough calculations show that the effort will make the systems last only until mid-1991, leaving a possible gap of 18 to 30 months.

James R. Watts, associate director of the GAO's information management and technology division, strongly urged the IRS to improve its ability to monitor mainframe performance and work load. Otherwise, he said, the "IRS will not have adequate information to determine whether its initiatives are working and could find itself short of computer capacity earlier than planned, without enough warning to take

Continued on page 50

Norsk adds high-end system to ND-5000 series

BY JAMES CONNOLLY
CW STAFF

WESTBORO, Mass. — Norsk Data NA has added a high-end system to its ND-5000 series with company claims of up to eight times the capacity of the current ND-570/CX.

The ND-5700, ND-5800 and ND-5900 models are available in single-cabinet versions, although the ND-5900 is a multiprocessor configuration that can include up to four ND-5800 CPUs. The systems are designed to run as the primary computer in a medium-size network or as a local processor in a large organization's distributed network.

The systems were designed to run either of two Norsk operating systems. They run Norsk Cimtran and Norsk NDIX, which is the company's implementation of Unix. The ND-5000 series, which supports up to 512M bytes of main memory and up to 7.2G bytes of disk storage, is targeted primarily toward applications requiring large data bases, such as material planning systems, order/invoice systems and information data bases.

The processors are based on complementary metal oxide semiconductor gate-array technology. The ND-5700 costs $400,000. A configured system with an ND-5800 CPU and 20M bytes of memory costs $550,000. The ND-5900 costs $875,000 with two CPUs, $1.2 million with three CPUs and $1.53 million with four CPUs.

Microvax gets image system

WOBURN, Mass. — Imaging Technology, Inc. has introduced an image processing system designed to be compatible with Digital Equipment Corp. Microvax II and other computers based on the DEC Q-Bus.

Officials at Imaging Technology claimed the Series 200 features three architectural breakthroughs that improve throughput and algorithmic flexibility. The company said the breakthroughs include a programmable video bus network that allows the Series 200 to be dynamically reconfigured under software control.

Another advance is a dual-scanning frame buffer supporting parallel real-time operations on one or more images. The third feature is a multiple-instruction, multiple-data array processor that is closely coupled with image memory via a dedicated high-speed bus.

The Series 200 is designed for applications that require large image memories, video-rate pipeline processing and high-speed nonpipeline operations.

The subsystem consists of four modules that are linked to a Microvax II via a Q-Bus repeater, the company said. The modules are an analog/digital interface, a dual-scanning frame buffer, a 50 million operations per second pipeline processor and a closely coupled array processor operating at 16 million operations per second.

An entry-level Series 200 costs $28,995 for the four modules, a Q-Bus repeater, a chassis with power supply and DEC MicroVMS-compatible software. Additional frame buffers cost $4,995.

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Systems maker shifts to integration

BY JAMES CONNOLLY
[illegible]

WILMINGTON, Mass. — Compugraphic Corp. recently introduced an interactive document-publishing system and announced a strategy emphasizing greater systems integration and a move toward open architecture based on standard hardware and software platforms.

"Compugraphic is developing integrated systems that provide the next step up for users of entry-level desktop products," said John M. Duker, Compugraphic senior vice-president of sales and marketing.

He said Compugraphic will operate as a system integrator, providing consulting services and supporting accessories and supplies. Use of common hardware and software platforms is intended to provide cost benefits and system compatibility for customers, he added.

Duker said the Compugraphic Automated Publishing System (CAPS) is designed to merge text and graphics into fully composed pages and output them on a variety of proofers, printers and typesetters.

CAPS is designed to accept text input from a range of word processors, personal computers and mainframe- and minicomputer-based text editors and front-end systems.

Graphics can be input from a variety of computer-aided design and technical illustration systems, including graphics packages used with personal computers. The system also accepts line art and photographs from the Compugraphic Scanner 2000, Duker claimed.

CAPS, which runs on a Sun Microsystems, Inc. workstation, is a Unix-based software package that supports Xerox Corp.'s Interpress and Adobe Systems, Inc.'s Postscript page-description languages. A Compugraphic spokesman said Interpress will soon be available on its CG 9600 Imagesetter.

Plain-paper printer

The company also announced the CG 400-PS, an 18 page/min, 400 by 400 dot/in., nonimpact, plain-paper printer that incorporates Postscript.

The price of CAPS ranges from $49,500 for an entry-level hardware and software configuration to $113,500 for a high-end configuration. A mid-range system costs $73,500 with a 170M-byte disk drive, a cartridge tape drive, 4M bytes of memory, a 19-in. screen and two ports. The CG 400-PS costs $29,900.

In other announcements, Compugraphic doubled the speed of its MCS 8000 digital typesetter to 200 line/min and added enhancements to its Q6000 text and graphics system and MCS Powerview interactive workstation.

Adapter

FROM PAGE 47

The VMEbus Adapter operates with a standard 32-bit address and data VMEbus and consists of two boards driven by a 68020 chip. One board contains a VMEbus interface and plugs into the VMEbus backplane. The other board, containing the 68020, interfaces to two ports on the Butterfly switch and occupies one slot in the Butterfly card cage.

The adapter can provide bandwidths ranging from 6M to 300M byte/sec.

The adapter costs $15,000.

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[illegible]

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Dr. Edward A. Feigenbaum, AI pioneer, author and lecturer, renowned educator from Stanford, past president of the American Association of Artificial Intelligence.

Dr. George Heilmeier, Senior Vice President and Chief Technical Officer of Texas Instruments, former Director of the Defense Advanced Research Projects Agency (DARPA).

Dr. Alan C. Kay, Apple Fellow, pioneer and key innovator in personal computing and artificial intelligence. Invented "Smalltalk" computer language and pioneered the use of icons.

Dr. Douglas B. Lenat, Principal Scientist for Microelectronics and Computer Technology Corporation (MCC), pioneer in machine learning through study of the nature of heuristics.

Dr. Roger C. Schank, Professor of Computer Science and Psychology, Yale University, and Chairman of Cognitive Systems, Inc. Pioneer in development of computer models of memory and learning.

Dr. Herbert Schorr, Group Director of Products and Technology, IBM. Responsible for the introduction of new, advanced technology and applications.

Dr. Harry R. Tennant, roundtable host, Senior Member Technical Staff and Manager of AI Research in Texas Instruments Computer Science Laboratory. Inventor of the concept of menu-based natural language understanding.

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Amdahl

FROM PAGE 47

the basic Model 200 box was integrated into the Model 400E when a user laid out the requisite $3.7 million. "Why can't the vanilla Model 200 be made into a 200E if that same box can be used in a 400E?" IBM would be asked.

The IBM answer typically was, "Because it can't." The company's only concession was that if there were enough user demand, they might someday find a way to handle upgrades such as a 200-to-200E move.

Finally, IBM admitted what so many observers had figured out on announcement day. Upgrades were technically possible, but IBM chose not to offer them at this time.

What harm would there have been in providing a price, even an excessive price, for an upgrade to E models with IBM's original announcement? The odds are that many users wouldn't opt for such an upgrade if it meant shutting down their on-line systems and paying a healthy price for a gain of 2 or 3 million instructions per second (MIPS). But IBM had an obligation to those who would want to make such a move.

Some of those customers may have been among those who already were upset when IBM failed to tell them it planned to rework the 3090s only months after shipments began for most models.

How does IBM justify its actions to loyal, early buyers who paid $8 million for a Model 400 in September or October, only to realize they would have done better to wait until January and pay about the same price for a system with an extra 10 MIPS of power — the equivalent of an IBM 3081 Model D?

The only justification is that it was one more public relations and marketing blunder by a company long considered to be one of the world's best marketing organizations.

Meanwhile Amdahl, a company built by former IBM employees trying to take advantage of IBM user dissatisfaction more than a decade ago, gave its users an option. That option may not be a good deal for many users, but Amdahl knew enough to make the offer. It is a case in which the parent can learn a lesson from the offspring that ran away so many years ago.

IRS tries

FROM PAGE 47

corrective action."

IRS officials agreed and said they have formed a task force to improve work-load analysis and plan to begin full monitoring of computer performance by June 30, Watts reported.

The GAO official added that the IRS goal of restraining work-load growth to less than 10% a year is the most important "stretching-out" initiative and also the most difficult to achieve.

Pressure for larger work loads will come from IRS plans to install faster front-end processors and expand its network of terminals, as well as a variety of new applications, some of which are related to the Tax Reform Act of 1986.

The congressional hearing was chaired by U.S. Rep. J. J. Pickle (D-Texas), chairman of the House Ways and Means Committee's Subcommittee on Oversight.

Pickle said he wants to ensure that future tax processing seasons will run smoothly and that IRS computer operations can meet the increasing demands on the tax system.

SI883

FROM PAGE 47

disk drives achieve a mean time between failure rating of more than 35,000 hours," said Jay Greenberg, System Industries senior vice-president of engineering.

The SI883 C-Series features dual-channel capabilities allowing fault-tolerant configurations for systems employing two discrete disk servers.

The subsystems will be available in early March. Prices range from $16,000 for a single drive to $115,000 for an SI883 setup.

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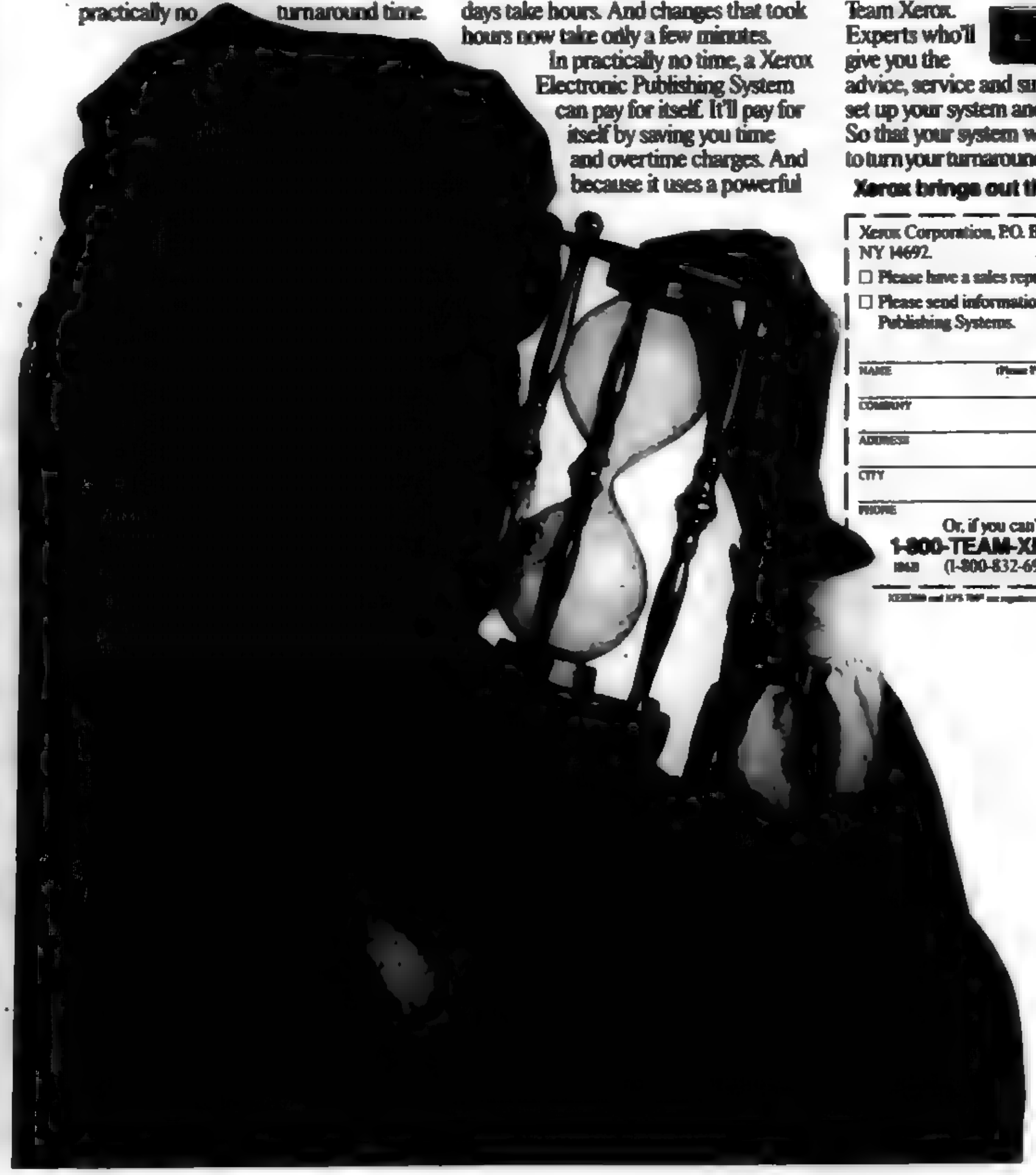

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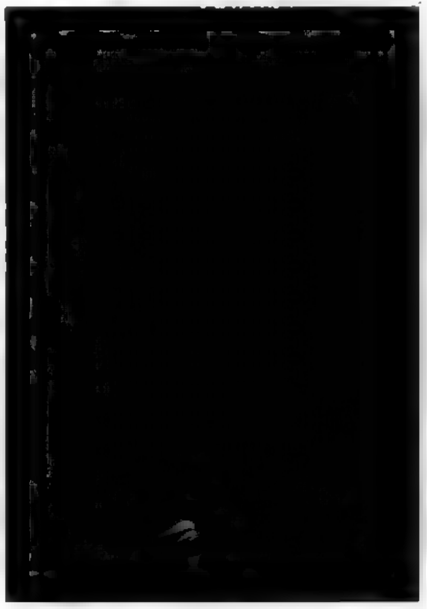

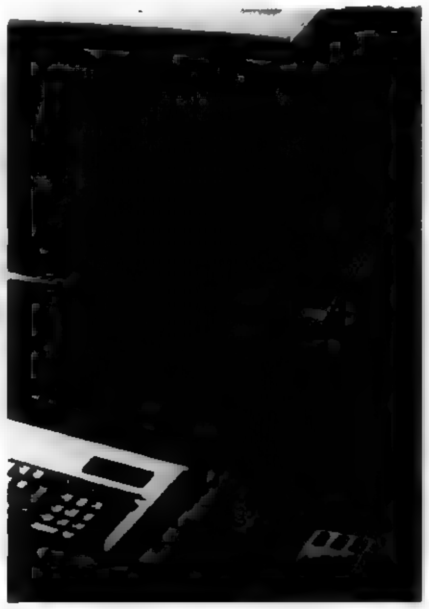

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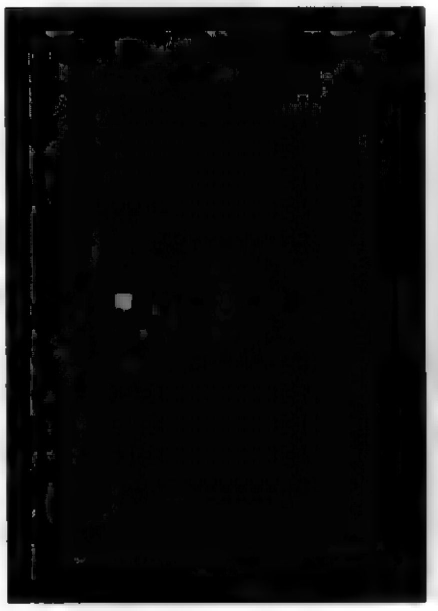

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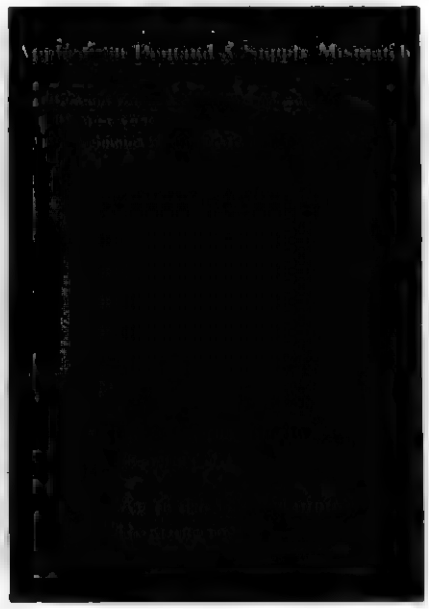

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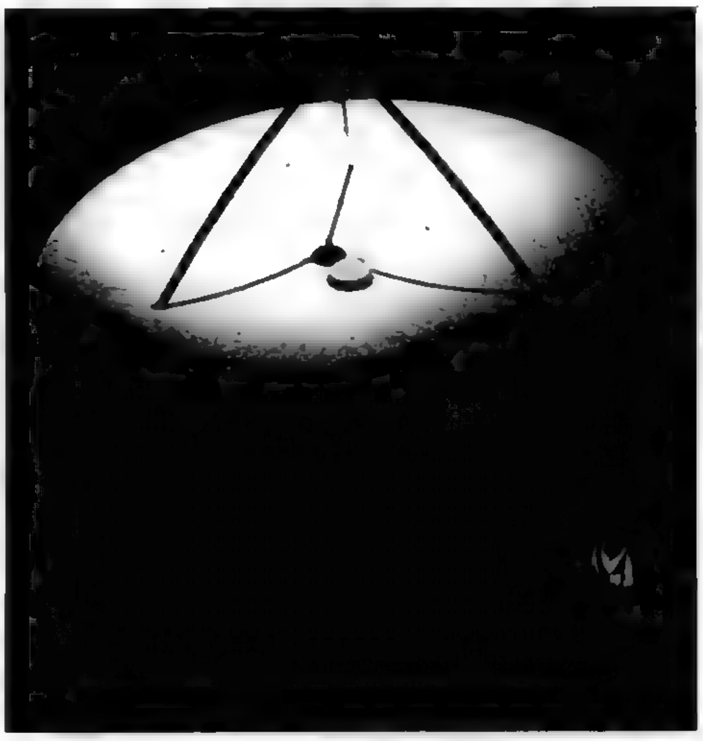

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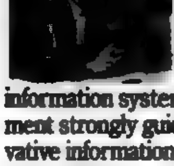

As the City and County of San Francisco has discovered, there's only one sensible way to evaluate and integrate products into one cohesive information system. And that's with a department strongly guided by an experienced, innovative information services professional like Henry Nanjo.

Henry didn't always have a multi-million dollar budget, with responsibility for the acquisition of hundreds of micros every year. In fact, when he started working with San Francisco's computers 31 years ago, Henry didn't even have a DP department. He simply worked in accounting with his state-of-the-art IBM 305.

Over the years, many of the applications Henry developed have helped keep San Francisco among the country's most innovative users of computer technology.

San Francisco made headlines recently with the first computerized fingerprint matching system. With it, prints can now be matched in less than 3 minutes—a far cry from the 4 weeks required to do the job by hand. Already, the system is credited with helping solve some 40 major unsolved crimes.

Today, Henry is in the process of evaluating both existing and potential vendors of minis and micros—and maintaining an approval list of vendors for purchases made throughout the organization. Every computer-related expenditure, whether it falls within Henry's $30 million budget or the City and County's $60 million budget, must bear the name of a vendor appearing on Henry's approval list.

What little spare time Henry finds, he spends with his sons camping, hiking and cross country skiing in areas like Tahoe, Yosemite Park and the Shasta Mountains.

If you'd really like to reach Henry, you'll find him on Monday mornings with his copy of Computerworld—he's been a subscriber since the first issue. He finds Computerworld's perspective meshes closely with the way he does business, covering everything from mainframes to micros, software and state-of-the-art technologies.

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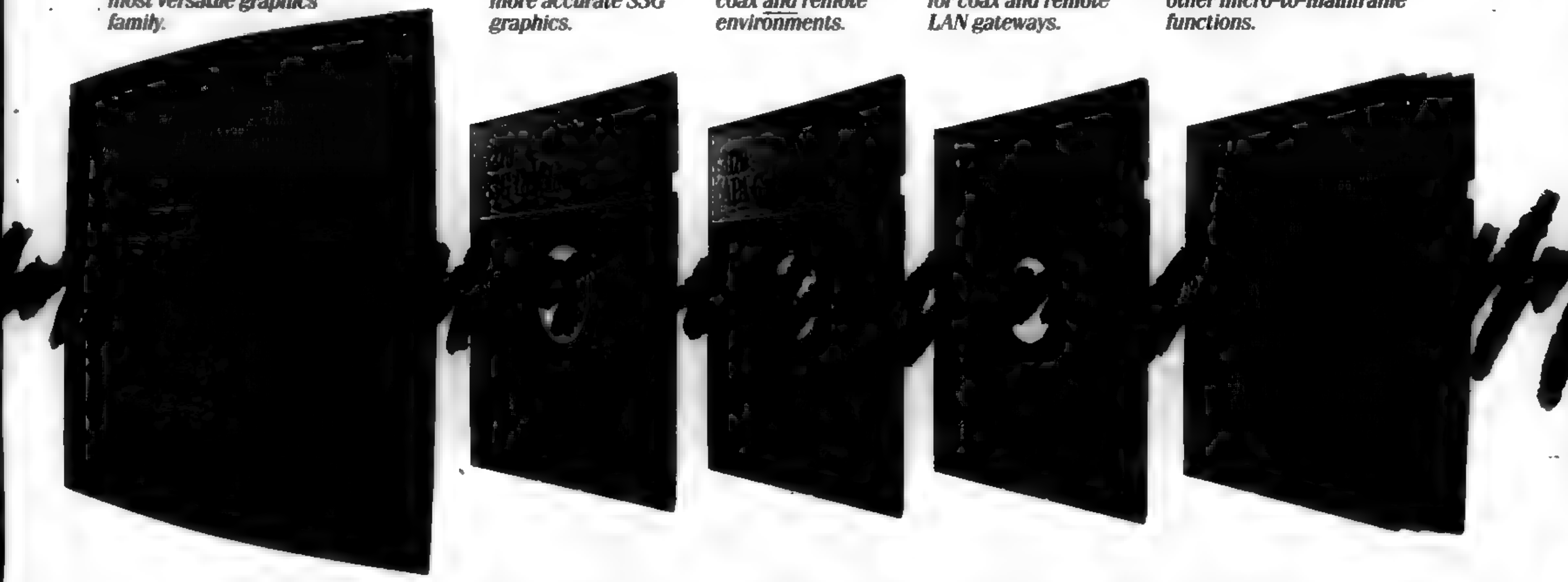

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Downsizing

FROM PAGE 47

architecture of the Hartford Insurance Group; Gary Perrelli, controller for Cox Cable, Greater Hartford, Inc.; and Timothy O'Connor, manager of computer operations at United Technologies' Hamilton Standard.

What type of company is best suited to downsizing?

O'Connor: I think downsizing fits shops that are decentralized and that have applications and operating systems that aren't going to change that much. If you're on the leading edge in a lot of areas, I don't think it works well, because then you just can't put the expertise out in 35 different sites to keep it going.

Hamilton is very strongly centralized, and I don't see any large projects coming down the line that would really fit the classic definition of downsizing. I see a lot of distributed [processing] out there to intelligent terminals, but to pick out a project and say, "Well this is something I'm going to downsize," I don't see that happening in the next two, three, maybe even four years.

But can downsizing take place within a centralized MIS center? Would you at some point say, "Maybe we can run certain applications on a smaller mainframe as opposed to a very large mainframe?"

Hupka: I think it's a matter of semantics. I think what Gary [Perrelli] is doing is really decentralization; it's to say, "I can run it on a smaller machine, and I can take advantage of that."

It's not very different in our environment. We're highly centralized from the standpoint of economies of scale, but that doesn't mean we can't distribute some of that work out into other areas. I think the Hartford and Hamilton Standard are in the same spot: We're centralized organizations, but that doesn't mean we don't decentralize the functionality and hardware that would follow it or is required to support it. All we're talking about is how we support it.

In the Hartford's shop, we have 2,200 people building applications and changing them all the time. We're regulated by the government, and every state does things differently, so we're constantly changing.

So, yes, we decentralize the functionality, but how we manage it and control it is from our centralized environment. I think what you've done at Cox, Gary, is decentralize your support and your direction. The only question I have is: Once you decentralize and each area has its own options, what happens next week if DEC comes in and says, "Hey, I can really run this cheaper"? Can you say, "OK, now I'll run it on my DEC machine"?

Perrelli: Well, the important issue there is the standardization. There are other cable systems within our company that are not running off of System/36s and 38s. We have some Tandem equipment out there, and it's also supported by a different vendor. But I think the end result is what we're looking for.

Obviously, we have to bill our customer. Now how we do that depends on the size of the cable system. The end result is that we need to roll our billing package into our financial package and report those numbers at the end of each month to our corporate office. As long as that information is standardized to some degree, we've reached that end result.

Hupka: Your central environment doesn't need to get into your office?

Perrelli: Right.

Hupka: The problem we run into is that our people in our distributed environment need to get to those large data sources sitting back in the mainframe. I also have people in other areas who need to get to that file information out in the field.

If you can truly be independent, then you can have a different type of system. Some of our office systems we have out there [in the field] aren't connected to anything. They process our administrative, clerical work — our Wang word processing systems. They don't have to be connected to anything. So, yes, they can be independent. Is that departmentalized? It's "kind of" downsized. Why run that stuff on the mainframe?

O'Connor: It's tough defining what downsizing is. A lot of the concerns we're talking about here are for classical DP data centers — commercial-type applications. If you look on the engineering side of the house, of course, there are applications for DEC VAXs, and we've got a lot of them at Hamilton.

We've got more than I know about, which I'm embarrassed to say, but it's not unusual for us to win a contract, and part of that contract is we will buy a machine — let's say a VAX — and we'll develop the software in a format that the government, or whoever, the vendor is, wants, and when the product goes out, we send everything out. So in our engineering/development area, there is a lot of downsizing, but what downsizing there is isn't planned. I don't think anybody in MIS sat down and said, "Hey, jeez, we're going to downsize this thing." It just happens.

Can you downsize within your own MIS shop at Hamilton Standard?

O'Connor: I can't imagine bringing in a 4341. If anything, it would be a front end to the CPU for something else.

We're in a constant state of change in a lot of areas. And we would have to pick and choose very carefully anything that we would want to downsize.

The other thing we get into is the government is very conscious of security now. How do you secure those data bases out there in the field? How do you maintain access? What kind of communications schemes or encryption do you need out there?

And another cost that I would foresee in doing a lot of downsizing would be in software licenses. There's even a fine line when you run a 3084 with a dyadic machine that has two serial numbers. If it's tightly coupled, you pay one license. If you happen to cut the cord, it's two. It's the same machine, it's still in the same room, it's still doing the same thing, but all of a sudden you're paying $100,000 more a year for software.

So those are the issues that I see would be tough to address. Now, downloading functions to intelligent terminals, that's a different subject.

Perrelli: Those are three main hurdles that we had to get over. The fact is that Cox not only downsized the MIS department, they downsized the corporate accounting department, too. They laid the groundwork for some standardized reports that give the [corporate] engineering, marketing, accounting and tax departments the information they need on a monthly basis.

Granted, it wasn't the easiest transition to make; for years, those people always had those reports. But I think we've gotten to the point now where they understand that the information comes in once a month, and with that information they can pull the numbers that they need.

Hupka: I think it's a benefit that you know that you're not going to pick up a cable company and move it. If you look at it from the insurance standpoint, we've got to look at our market, how our office has to expand and move to follow the market. We may have an office that's large through one cycle — two years — then we may want to downsize the office because the market isn't there anymore. We have to manage those fluctuations and balances.

Perrelli: The cable industry is unique in that regard. I think the way Cox looks at [downsizing] is that now they have cable systems that do their own billing, their own accounting. If the time comes when they want to sell out or buy a cable system, the opportunity's there. They've got it in one central location, so it's not that difficult to move things around.

Was security a big issue while Cox was downsizing its operations?

Perrelli: Definitely. The System/36s and 38s have a fairly good security package. In addi-

The roundtable participants

Gary Perrelli, controller for Cox Cable, Greater Hartford, Inc. During his tenure at this branch operation of Cox Enterprises, Inc., a cable television and communications conglomerate based in Atlanta, Perrelli has experienced downsizing firsthand. Although he is the branch's controller, due to a massive downsizing and decentralization program at the parent company, he is also now responsible for his office's IBM System/36.

Two years ago, Cox Enterprises supported all of its branch office financial applications through dumb terminals connected to its IBM 3081 mainframe. During mainframe downtime, however, cable systems were unable to access customer files. In response, Cox installed either System/36s, IBM System/38s or Tandem Computers, Inc. minis in each of its cable offices. When the MIS reorganization was complete, the cable offices began to process all payments locally and to realize the benefit of on-line customer inquiry.

Perrelli's perspective on downsizing: "It's an interesting philosophy, and it's worked in my industry. I'm not sure it can work everywhere, but I think Cox has made the best of it."

Timothy O'Connor, manager of computer operations at United Technologies Corp.'s Hamilton Standard. The company, an aerospace manufacturer and the world's leading supplier of propellers, is a division of United Technologies and is based in Windsor Locks, Conn.

O'Connor manages a highly centralized data center with three IBM mainframes running IBM MVS. The work load is split between its commercial processing needs — accounts receivable and accounts payable — and the company's engineering development processing needs.

Although Hamilton does not have a formal downsizing policy, it downsizes by "default." It distributes some of its processing by off-loading some jobs to its extensive computer-aided design and manufacturing network and the newer engineering workstations. It also runs stand-alone materials requirement planning applications at its Midwestern plants.

O'Connor on running large DP applications on smaller systems: "How will we support downsized systems, and will we run into the cost of duplicate software licenses per CPU serial number? What about security?"

Martin Hupka, assistant vice-president of architecture for the Hartford Insurance Group. Hupka's department, located in company headquarters in Hartford, Conn., oversees two types of projects: those that actually build the applications to support the business and those that introduce or position new technology or take advantage of expense reduction and cost performance.

The Hartford's corporate offices operate under a three-tiered architecture with a centralized mainframe processing environment and departmental minis and micros. The architecture is designed to reduce the drain of expensive mainframe computing power. In addition, the Hartford's mainframes support an external network of 8,000 terminals in branch offices.

Currently, the company is experimenting with placing some processing power in the claims processing offices.

Hupka's thoughts on downsizing and distributing processing: "Costs per million instructions per second or cost per CPU cycle may be cheaper with smaller systems than on the mainframe, but what are the other offsetting costs? What support structure must be put in place? Where do new vendors fit in?"

Downsizing

FROM PREVIOUS PAGE

tion, what we've done is, with our software, we've menu-restricted people and only allow them to get into the functions they need. One big problem is that we have financial information out there — rates. We had to be careful, so we set up a good security system. Also, [headquarters] placed people into each of the systems — the controller, who's responsible for the accounting and data processing functions. That person is responsible for security too. They've also increased their internal audit staff, which visits a lot more frequently now.

Do any of you have pressure from upper management — even the chief executive officer — to move to less expensive processors because of increased price-performance ratios?

Hupka: Sure. They read the magazines. So we have to stand up and answer to some of those issues. After all, the first thing they zero in on when you talk to them is some article that says CPU power is cheaper now.

And then we're in the same boat as the discussion here. We say, "I understand it's cheaper, but listen, here's the cost of doing that. If you want that functionality there, here's the total cost of it." You have to bring everybody back into reality to get that total picture. And then, it's still their decision, how they want to spend the money. The key issue is that of support costs.

O'Connor: We all hope we make cost-effective decisions. And we are asked to all the time. But the other thing that's happened is mainframe CPU costs have been coming down, too.

So everything's been going down. We're in a pretty nice industry for that. And if you break it down, sometimes you've got to look at what's the cost per user? Cost per unit? Cost per MIPS? Things like that. Because we're a zero-budget department, we charge back everything.

We're of the mind that, if our users are willing to pay for it, then the costs are reasonable, and if the costs are essentially flat, we don't feel challenged. We feel we are doing a good job for the division, and if there are applications that we would look at for downsizing, we also have the staff to do that.

If you had the opportunity to organize a large MIS shop from scratch, one to support 10,000 users, would you go with the traditional large mainframe setup, or would you experiment with perhaps superminis or small mainframes for some of your applications?

O'Connor: That's a tough question to answer. I don't see anything much that we would do differently. I think we would change our office systems, which we run on Wang now. We have their Office Information System that does not grow as well as the Wang VS. As you know, you can have as many users as you want — as long as it's 24.

> "IF OUR users are willing to pay for it, then the costs are reasonable; if the costs are flat, we don't feel challenged."
>
> TIMOTHY O'CONNOR
> HAMILTON STANDARD

And that's the only thing I would see that I would change in the large data center. We service our users very well with what we have, and with the planning process and all else that goes on, I think we have a good setup.

Hupka: I think we would go with our three-tiered architecture, and the only difference would be that we would look at some of the systems that were built 10 to 15 years ago that assumed everything was going to run on the mainframe — we would look at how you build them. Those pieces that belong in a mainframe, you put in a mainframe. Those pieces that now you could put out in the front end, you put out there.

I don't think anyone would take a Lotus spreadsheet and run it on a front end. So you have to look at the application. Today, we have a lot more options. When you start new, you can choose those options that you really want. You would be in a position to make better decisions.

O'Connor: And again, you would have to start with a basic philosophy of "What do I want to do with my data?"

What about downsizing application development?

Hupka: That's the whole issue of portability. That says, "Hey, if I can get away with it, can I economically build something that would run on my processor for 10 people, and can I use the same application to run on my mid-size processor for 200 people and run on my mainframe?"

I sure would like to do that, because from a support standpoint I need less people to maintain the system. I need only one type of expertise. Again, if we could start fresh, we would like to do that, but where we are today it doesn't always happen. I'm sure that you at Cox, Gary, must have some portability problems since the System/36 and 38 architecture isn't yet together.

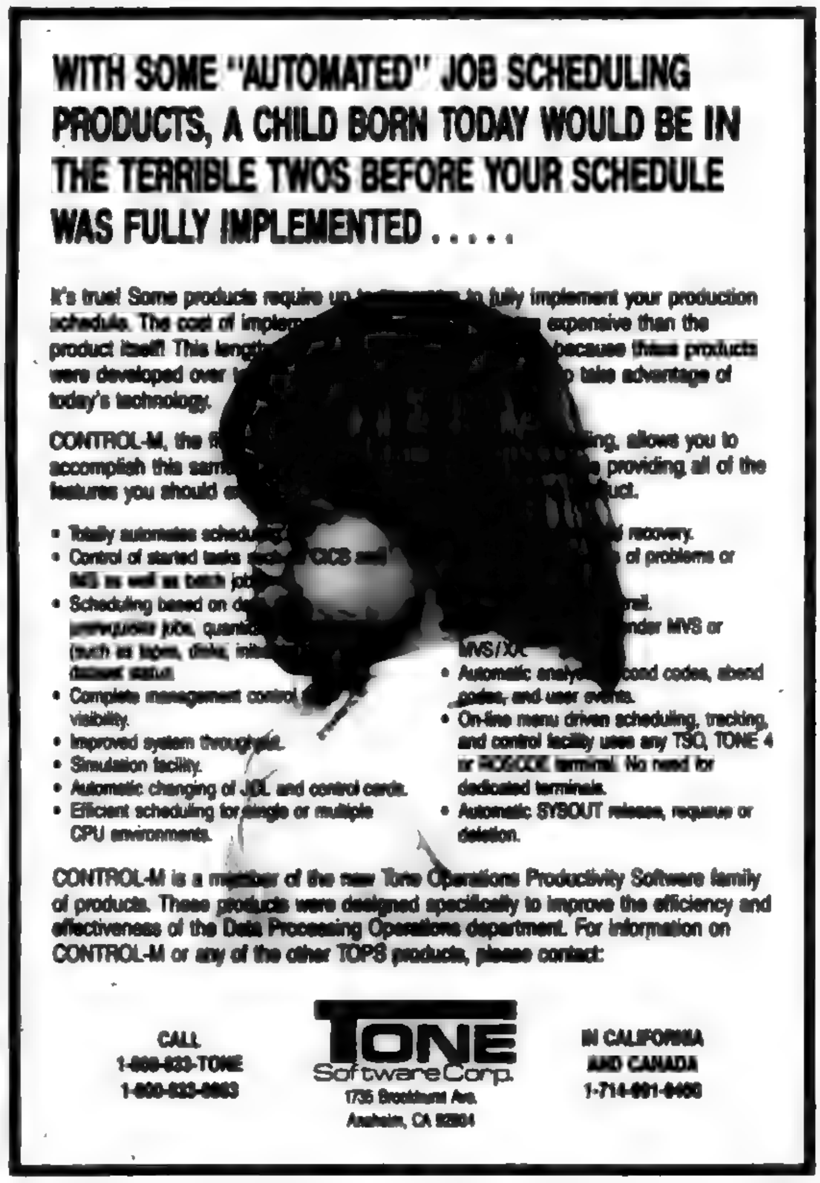
Perrelli: If a program change is needed, it has to be rewritten on the System/36 and on the 38.

Hupka: That's always an issue, so now you have two changes. It would be nice if you had just one change, and it worked on both systems — and it should be across vendors.

O'Connor: Even your big software houses can't come up with software that does that.

Hupka: And some people talk about the Unix operating system as if you could run it anywhere. What about all the old applications you have running, and how do you transition them?

O'Connor: In the meantime, people keep publishing articles that executives keep reading that I have to keep delivering, and a lot of it we call 'The emperor's new clothes.' Nobody can see them, but everyone says they're there. •



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Bill Lowe, a manager for Los Angeles-based Merit Steamship Agency, Inc., added that ITT Worldcom experts had made it "much, much easier" to transmit cargo schedules.

Merit, a nationwide shipping agency, is one of the few agencies to represent a number of steamship companies in worldwide cargo transport, Mr. Lowe explained.

"We dispatch over 40,000 telex messages a month," he said. "So we really needed a first-rate communications network to keep our customers on top of their imports and exports."

BACK IN TOUCH—Shipping agent Bill Lowe after rescue.

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ITT Worldcom solved all the sticky problems that Merit faced with its last international carrier, Mr. Lowe pointed out. "And they even cut some of our costs—by 50%!"

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NEW PRODUCTS

Processors

Dynatem, Inc. has announced the **DCPU1** Cmos CPU board for the VMEbus.

The module is said to offer two serial ports, 40 programmable parallel lines, three 16-bit timers and a real-time clock/calendar. It offers up to 512K bytes of dual-ported static random-access memory, accessible with no wait states. It also has provision for up to 128K bytes of programmable read-only memory.

The board is based on Cmos Motorola, Inc. 68000 or 68010 CPU devices at speeds up to 12.5 MHz. It features an on-board rechargeable battery to maintain the memory and clock and conforms to VME Revision C specifications.

The DCPU1 costs $975 with 64K bytes of static memory. With 512K bytes, it costs $1,675.

Dynatem, 19 Thomas, Irvine, Calif. 92718.

Data storage

Roland DG has announced the **SYA-350 Data Buffer.**

The buffer is said to store output on a removable 3½-in. disk as it is simultaneously buffered to the peripheral. Once the data is on the disk, the buffer can re-output it to peripherals such as an X-Y plotter or printer. According to the vendor, the same operation can be repeated without having to interrupt work being done on the host computer. Each 3½-in. disk can store up to 640K bytes of data.

The SYA-350 Data Buffer can convert serial or parallel input to output. Supported handshakes include Xon/Xoff, Data Set Ready, Acknowledgment/Negative Acknowledgment.

The SYA-350 costs $1,195.

Roland DG, 7200 Dominion Circle, Los Angeles, Calif. 90040.

Data terminals

Microtouch Systems, Inc. has announced the **Multisync Touch** monitor.

The monitor is said to employ the NEC Corp. Multisync monitor integrated with the Microtouch Screen, the company's analog capacitive touch screen. It is able to display up to 64 colors. It is compatible with the IBM Color Graphics Adapter, Enhanced Graphics Adapter and Professional Graphics Adapter.

The 14-in. monitor features a solid glass sensor with a conductive coating bonded to its surface.

The Multisync Touch monitor is priced at $1,795.

Microtouch Systems, Ten State St., Woburn, Mass. 01801.

Tektronix, Inc. has introduced the **4209 Intelligent Color Graphics Terminal** as a replacement for its 4109A and CX4109A terminals.

The 4209 includes 512K bytes of memory, 640- by 480-pixel resolution, up to 16 graphics colors and eight alphanumeric colors from a palette of 4,096 and Digital Equipment Corp. VT100 compatibility.

Other features include mouse support and a CX interface option for interfacing to an IBM 3274 or 3174 controller with 3179 alphanumerics and a 3270-style keyboard.

The 4209 is priced at $6,995.

Tektronix, P.O. Box 15273, Portland, Ore. 97215.

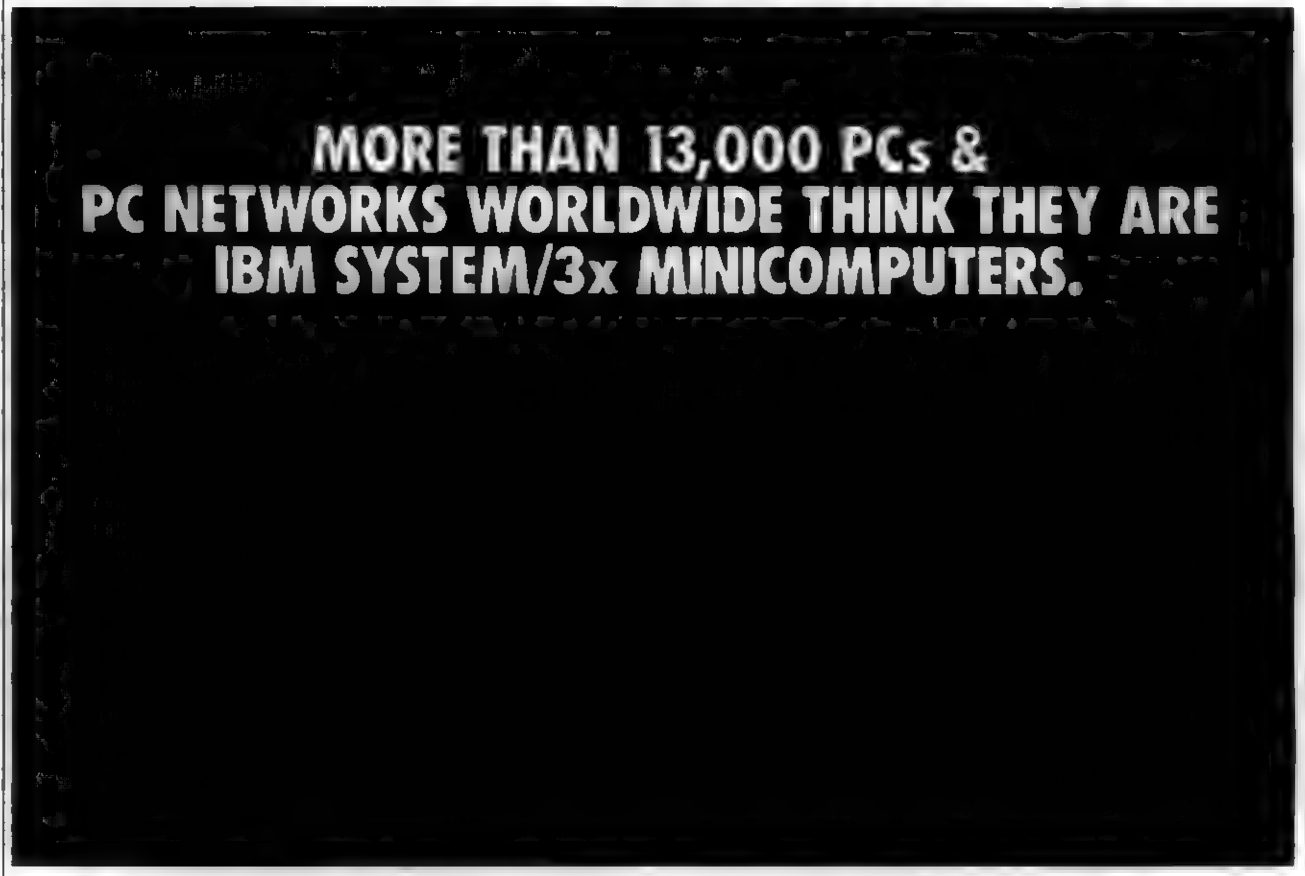
Graphics systems

Calcomp has introduced the **CGS-4600** interactive graphics subsystem designed to plug into the Q-bus of a Digital Equipment Corp. Microvax II computer.

The subsystem is said to achieve color graphics with a resolution of 1,280 by 1,024 pixels. It is available as a complete subsystem or as a graphics engine alone. The graphics engine occupies a single slot in the Microvax II.

A complete subsystem with a 15-in. monitor costs $6,995. With a 19-in. monitor, the subsystem costs $9,495. The graphics engine card alone costs $3,995.

Calcomp, 65 River Road, Hudson, N.H. 03051.



MORE THAN 13,000 PCs & PC NETWORKS WORLDWIDE THINK THEY ARE IBM SYSTEM/3x MINICOMPUTERS.

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They are *not* minicomputers, and they are *not* necessarily connected to minicomputers. They are stand-alone PCs and PC networks running BABY/36® and BABY/34®, software packages that make a personal computer think it's an IBM System/3x minicomputer.

RPG II WITHOUT THE EXPENSE OF A SYSTEM/3x.

More than 13,000 BABY/36 and BABY/34 Software packages have been installed on IBM-compatible PCs and PC networks from IBM and Novell. Users all over the world have discovered that they can still run their RPG II software without the expense of a System/3x. They don't need to spend the time and money rewriting in a PC language. Plus, they have gained ready-access to the more than 4,000 RPG II business applications presently on the market.

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Others are using the PC and BABY/36 or BABY/34 combination to virtually eliminate on-line processing and communication costs at remote sites. Some are doing all of their software development on PCs, to free their minicomputers for production work. And still others are using this combination as an entry point into RPG II programming, then upgrading to a minicomputer or PC network as their needs grow.

Now you know just a few of the benefits you will realize when your PC starts thinking like a minicomputer. Call California Software Products, Inc. for further details about BABY/36 and BABY/34 Software. We'll make your PC think like a System/3x.

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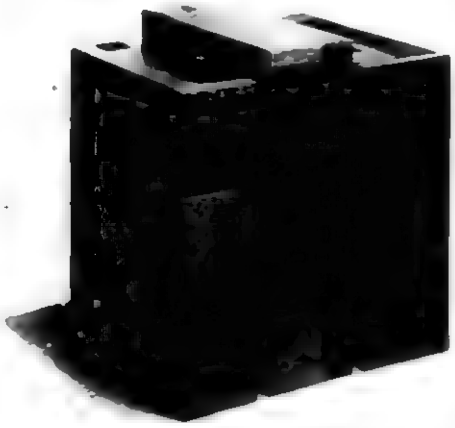

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IN DEPTH

You thought laptops were only for loners . . .

Now some of the largest corporations tie laptops to their mainframe DP strategy

BY ASHLEY GRAYSON

When I first started carrying a Hewlett-Packard 110 and Convergent Technologies Workslate into restaurants, professional people would timidly approach and ask, "Is that a computer? Wow!" Just last week, our waiter in a Chinese restaurant remarked when dropping off the spicy chicken, "Ah, you have the new Toshiba. I have a Macintosh myself."

The word from the growing group of professionals who are not working at their desks as much as they used to is that productivity is up, and the industry's flirtation with the small portable computer will settle into a serious relationship.

The reason for this change in attitude is twofold. First, the mess that was on your desk is now in a computer. In order to take work home or bring supporting information to a meeting or on a visit to a remote location, the logical evolution is to carry it inside a portable computer.

The other option — to print out all the information — is less desirable, even with the latest desktop printer, because it requires too much preplanning and would possibly take a long time to print.

Second, with the pressures of modern-day business, individuals are called on to make important decisions on such short notice that there is no time to ask the clerks to pull all the files of backup information and then call a meeting and discuss options.

Simply, the portable computer places the decision-support programs and necessary data in the hands of the decision makers, wherever these individuals may be.

Requiring key employees to journey to the electronic oracle is a waste of their time, and it makes the machine more important than the person.

Many DP managers have adopted a wait-and-see attitude toward this latest trend in computing, but by now, enough votes are in for even the most skeptical to adopt this "curiosity" as a tool.

Both large companies and individuals have achieved overall positive results from laptop and small portable computers.

Journalists were the first big users of notebook-size and small laptop computers, because the machines used full typewriter keyboards and were at hand when a story broke. By calling the modem for the paper's central computer, these writers could file their stories immediately.

Less has been said about the success of laptop computing in large corporations, mostly because many of the major users regard their portables as a competitive advantage that they do not want to broadcast to their competition.

Some, however, are willing to discuss their projects in detail, and a number of common themes appear in the stories of Du Pont Co., Chrysler Corp., General Motors Corp. and McDonnell-Douglas Corp., among others. Not surprisingly, broad planning and integration with mainframes play key parts in all major programs.

Part of an overall strategy

The most important aspect in deriving all of the benefits of portables in a corporate environment is to integrate them as part of an overall DP strategy. Users can benefit from laptop computing only when corporate facilities provide them with timely data access and an electronic mail exchange.

Only the DP staff knows where the data is and has the organization in place to maintain it, but only the users on the firing line know what they need and how they need it. Whether the

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Grayson is the president of ADG, a firm assisting corporations in utilizing and selling high-technology products. ADG has followed the laptop computer industry since its inception.

• Votes are in: This curiosity is a useful tool

• The portable as this generation's calculator

• Swap a convertible for a bulky desktop unit

vehicle that delivers the goods is a service, like Compuserve, or is the company VAX, just setting up for portables is a good way to bring these diverse groups together.

Success also requires facing the training and motivation aspects squarely. Chrysler has automated its sales force with Grid System Corp. laptops and both Epson America, Inc. and Hewlett-Packard Co. printers but says it feels the cost of the hardware is not the major expense of the program. Hardware, training for the users, mainframe support and project management all share in the total cost.

Expertise improves through practice, and a portable can be a low-cost way to provide additional training hours to motivated employees. A portable allows people to learn when they are most open to accepting new ideas without being required to sit in a classroom. Equipping the training department with a fleet of portables may be a good way to bring instruction to distant departments or allow employees taking classes to do some homework.

Training is crucial to an application like sales force automation, because the sales representative uses the system either alone or in front of a client, a situation in which a less-than-polished presentation could lose an order. Ordinarily, computer lore is learned from the person at the adjacent desk, but this is not possible when portables are used in the field. During a presentation, the portable computer is potentially an intrusive prop, and the wary salesman will think twice before letting it come between himself and his customer.

If an executive is a lone user in a hotel room or on an airplane, there is no handy way to contact the support line. In both cases, proper training must build the skills required for success.

> THE MOST encouraging aspect of the portable story is that every vendor's equipment appears to be equally good. Virtually every organization that has begun a portable project has succeeded, independent of which equipment was selected.

All systems equally good

The most encouraging aspect of the portable story is that every vendor's equipment appears to be equally good. Virtually every organization that has begun a portable project has succeeded, independent of which equipment was selected. At the pricey end of the spectrum, Du Pont has automated its sales force with both HP and Grid portables, while at the same time, McDonnell-Douglas is quite pleased with its field service dispatch system based on Tandy Corp. Model 100s. Other organizations report success with the Epson Geneva/HX-40 family, the NEC Home Electronics, Inc. Starlet, Zenith Data Systems Corp.'s Z-171 and Toshiba Ltd. portables.

Spurring the recent flurry of adoptions of laptops by industry have been the enticing new choices among "standard architecture" portables. A year ago, the laptop buyer had to relinquish some Microsoft Corp. MS-DOS compatibility to get a lightweight portable, and Apple Computer, Inc. Macintosh users found no options at all.

Today, the market in portable computers is divided between those that are operationally compatible with desktop personal computers and those that trade operational compatibility for superior portability.

The former category is dominated by the Toshiba T1100 Plus. Toshiba has burst forth from its low profile as a computer vendor, and, by popular acclaim, the T1100 Plus has become the new standard for portable computers. Compromising slightly on keyboard layout and abandoning the 5¼-in. disk format for the new 3½-in. disk, the Toshiba portable has been widely adopted for its high speed, 7.16-MHz Intel Corp. 80C86 processor, long battery life and light weight. It has become the new measurement standard against which all others are compared.

Grid, which has invested more than any other vendor in learning how to support corporate automation, continues to tune and improve its products. The company recently announced a software enhancement that allows its proprietary packages to run under MS-DOS.

The latest Grid Case 3 sports a 10M-byte hard disk and a fully IBM-compatible keyboard. Earlier Grid systems traded some compatibility for superior portability but were still a little too different from desktops for some buyers.

The HP Portable Plus maintains the best packaging of a laptop computer in terms of battery life, sealed unit operation and power per pound. Although not as IBM Personal Computer-compatible as the above machines, by today's standards it is still worthy of serious consideration.

The Zenith Z-181, with its eye-popping backlit screen, has been slow to reach the market, and both Grid's recently announced low-cost Gridlite system and NEC's Multispeed, announced at Comdex last November, are too new to judge, but all appear exciting competitors.

For anyone requiring 5¼-in. disk support, Zenith's Z-171 and Sharp Electronics Corp. PC-7000 have never looked better. Both offer the bright, backlit LCD

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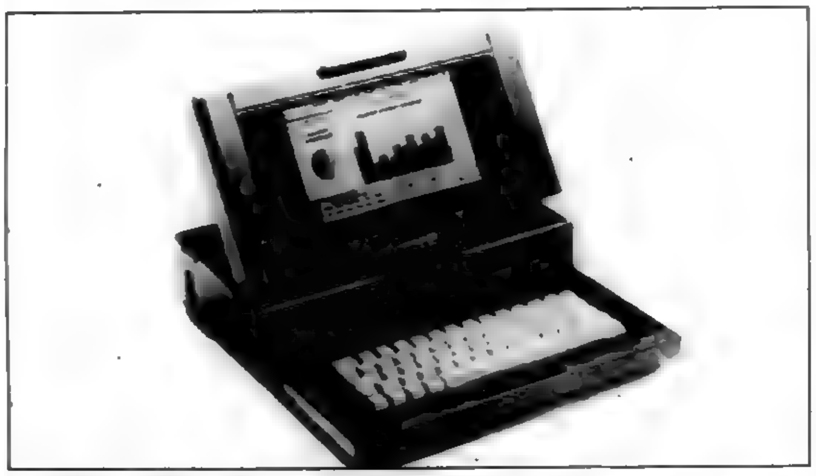

Dynamac: *A Macintosh-compatible laptop*

used on the Z-181 and hard-disk add-on options. The PC-7000, which is not battery powered, lists at an amazingly low price for the traveling flexibility it provides.

With a weight penalty of more than 24 lbs, the Compaq Computer Corp. Portable II and the less well-known AMQ Computer Corp. AMQ 286 provide 5¼-in. disks, hard disks, a real CRT and the ability to plug in many popular feature cards. The latter two features are currently unavailable in lightweight portables. The AMQ is probably the first, let alone portable, computer to provide an IBM Enhanced Graphics Adapter as the standard display.

The new Wang Laboratories, Inc. Wang Laptop Computer is the only current portable to package a printer as an integral part of the system; the printer for IBM's PC Convertible is a snap-on option. With its 10M-byte hard disk and compatibility with Wang's office systems, it should be popular with the company's large customer base.

Of Quadram Corp.'s four portables introduced in 1986, the most interesting is the Snap 1+1. Offering an innovative approach to providing the convenience features of the notebook computers, like the Tandy Model 100, while satisfying the need for MS-DOS compatibility, the Snap 1+1 comes in two snap-together parts. The keyboard and display act like a notebook system that, when snapped onto its back end, becomes an MS-DOS disk-based system. Both hard-disk and dual 3½-in. floppy-disk back ends are promised. This laptop could pave the way for the next generation of portables, or it could become the Edsel of the computer industry.

This year, the market will see the introduction of several Macintosh-compatible portables. Intellitec, Inc. and the Apple-authorized Dynamac Computer Products, Inc. have both promised delivery soon. These machines lack the flexibility for innovative packaging provided in the PC market today but are a great step forward for Macintosh users.

Other, non-MS-DOS-compatible laptops offer superior portability if the application demands it or if other constraints of budget or physical size outweigh the compatibility issue. The Tandy Model 102 is a smaller and improved version of the popular Model 100. The NEC Starlet, Tandy 200 and Epson Geneva/HX-40 are all small, full-function portables that will go anywhere and can communicate via modem with a mainframe.

Close ties to home office

Sales-force automation is a hot area at many companies, because sales representatives are usually expected to function alone while still maintaining close ties to the home office for information like the latest product briefs, prices and delivery schedules. The portable gives them a reference library, analysis tool, training module, communications system and filing system that is open 24 hours a day.

"Prior to portable computers," notes Ray Long of Du Pont's Technical Assessment Group, "our sales people had to interpolate product mixes from data in published applications notes and sometimes haul large reference books around to make the facts available. Their portables are more accurate and easier to work with than the printed charts."

In front of the customer, sales representatives can use laptops programmed to show alternatives to shift the buyer's attention from "Will I buy?" to "What will I buy?" Insurance agents like Equitable Life Insurance Co.'s Bob Rea have found that complex policy alternatives are more easily demonstrated on a computer than when they are estimated from standard tables.

Here, the laptop becomes a sales tool. It can function as both a presentation device, replacing flip charts, and as a preparation aid, assisting in time management and proposal development.

Note, however, that to take full advantage of these opportunities, the remote user must have stored, or be able to access, the latest prices, delivery status and product specifications. A central computer — either the corporate DP machine or one fed by it — is the natural choice for

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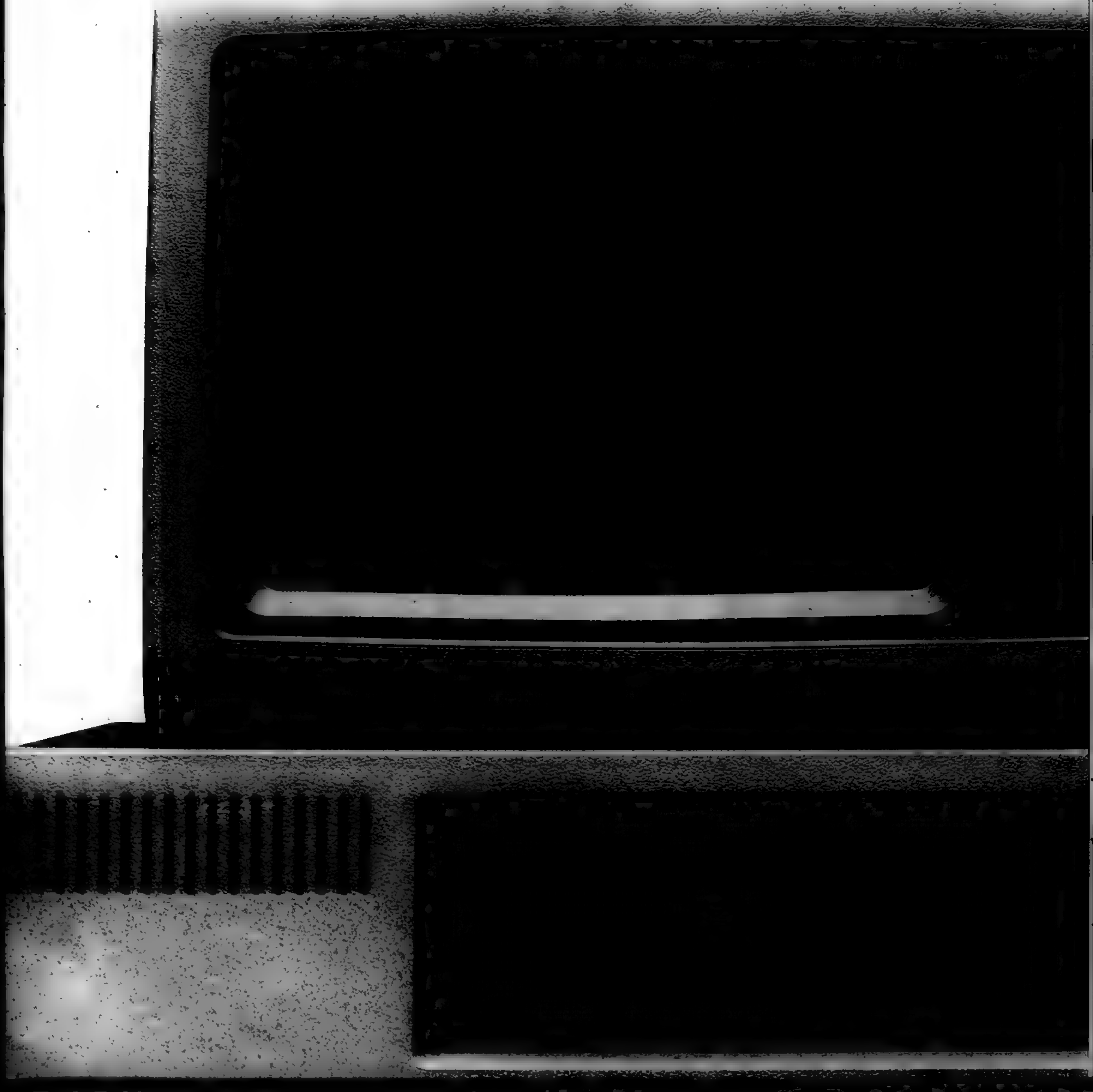

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storing information that must be pulled from the company's existing data bases.

The new calculator

Organizations whose field forces are consultants and auditors have also adopted portables. The portable computer has become this generation's calculator for anyone who computes at customer sites.

As applications grow beyond a pair of floppy disks, the white-collar migrant worker can no longer borrow a PC in a remote office to whip up a few numbers or draft a memo. Resident pop-ups, custom autoexec files and complex interactions among PC programs, not to mention copy protection schemes, make it unfeasible to mooch a computer on demand.

Often, information collected by the field representative at the drilling site or on the factory floor is time-critical: It must be transmitted back to the corporate mainframe and processed further so that the corporate information base stays up to date. Once again, the DP center is the most logical department to collect and merge the new data with existing data and programs.

McDonnell-Douglas uses Tandy 100 notebook computers to dispatch field engineers for its Unigraphics computer-aided-design products to client sites. This saves travel time and ensures quick repair because the portable computers can also download needed diagnostics from a central data base. A Data General Corp. Eclipse MV/10000 superminicomputer ties all the field people together by providing schedule information, E-mail and diagnostic libraries. The portables and the central computer are two halves of a single system, according to Earl Stallard, a senior MIS section manager at McDonnell-Douglas.

Larry Henley, a member of McDonnell-Douglas's In-House Development Group, adds, "The Tandy products were selected because they met the project requirements, were available off the shelf and cost less than competitive alternatives."

Thus, the portable enables an organization to deliver its collective knowledge to the point of need and draw upon its scattered resources in a more timely manner. Catherine O'Connell at Fireman's Fund Insurance Co. notes a purely human benefit of her company's Lotus Development Corp. 1-2-3-based HP 110 portables: The regional auditors do not have to decipher the handwriting of dozens of field agents.

Alternative to desktops

In addition to mobile use, the small portable's popularity has increased recently because of an unexpected application as an alternative to a bulky desktop machine. Not only is the laptop around when needed, but it is also easily banished when it might intrude — something not conceivable with an ordinary computer or terminal.

Surprisingly, the IBM PC Convertible, the first machine to address this market by design, has fared least well in the retail market. Providing fewer features per dollar than most of its competitors, the PC Convertible has not appealed to buyers.

Recently announced IBM enhancements [CW, Feb. 2] improve many small technical points on the PC Convertible. These will be available to users of the older systems. Nevertheless, the PC Convertible still has the weight, size and expansion problems that inhibited sales of the original model.

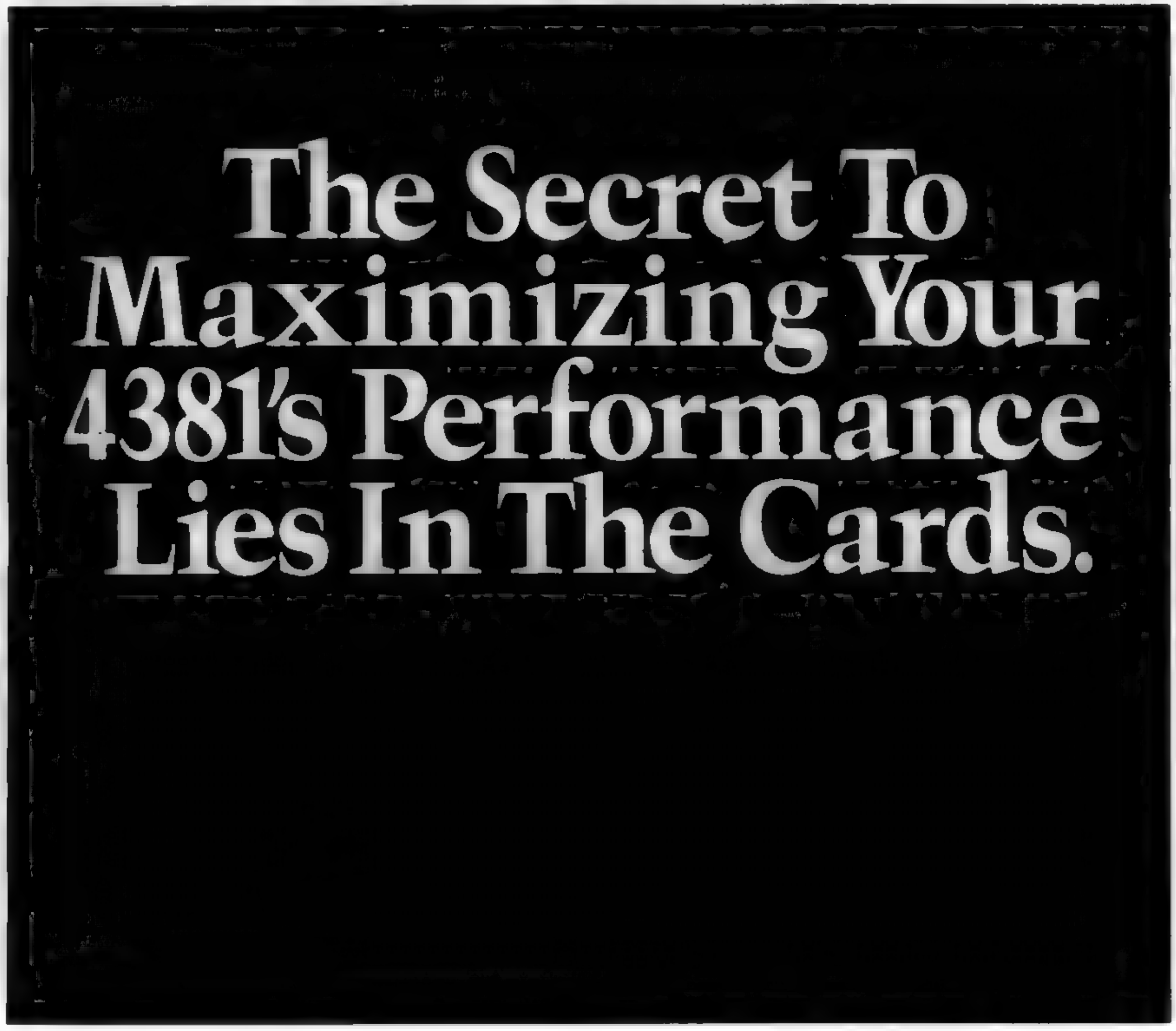
Meanwhile, Toshiba's revolutionary T3100, a lightweight, though nonbattery-powered, Intel 80286-based machine, was the pioneer in this market and is currently the only real contender. Whether the need for a 15-lb IBM Personal Computer AT-compatible existed in secret or whether this product created its own market may never be known, but its success is undeniable.

Although too new to the market for many formal programs to have embraced it, the T3100 seems to appeal to innovative executives who have adopted the sleek design and small footprint of the machine for their desks.

Board support

Although the T3100 is the most popular, the new generation of laptops — including the Zenith

Continued on page 74



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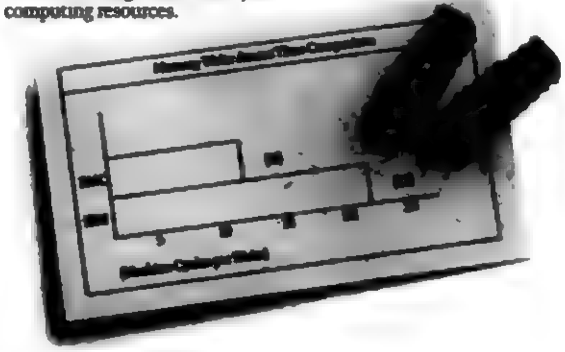

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Pack up your software in a laptop bag

As recently as a year and a half ago, evaluating a laptop computer involved assessing its software as well, because most portables included custom "portable" software. Appointment packages and portable or subset word processors and spreadsheets are packaged with the units.

Today, no trade-offs are required, as virtually all Microsoft MS-DOS packages will run on the current crop of portables. Buyers have clearly established that above a base weight of about four pounds, full compatibility is worth having to carry another six pounds.

Three possible directions are open in selecting software for a portable:

- Run the same software as your desktop personal computers.
- Run packages constructed specifically to complement your mainframe.
- Run something completely different.

If you are building a personal tool, you can choose almost anything that appeals. If you are setting the standards for your company, you need to plan more carefully.

Same thing in new places

The first choice — running desktop PC software — offers obvious benefits, since you or the users will not have to learn new program interfaces. Data files transfer from desktop micros to most MS-DOS-based portables with little trouble.

The biggest operational difficulty to avoid in this environment is "version skew" of data files. Data bases updated on a portable must be returned to the master PC to avoid losing the new information.

Also, master files on the personal computer should not be updated by someone such as a co-worker or secretary while also being processed in the portable to avoid the classic simultaneous update problem.

Users who have previously maintained their files on a pack of 5¼-in. disks should understand the potential problem with updates, but additional options provided by laptops with 3½-in. disks and 10M-byte hard disks will create the risk of media-specific versions getting out of sync. If you are selecting portables for a company-wide program or are counseling departments that have already acquired units, working out an operational solution is vital.

Mainframe support for portables

The second alternative — supporting portables from a mainframe — can be a complex issue, because it will require software on the mainframe, a telecommunications program and possibly custom programming in the portable. The following are a few aspects to consider when preparing to meet this challenge.

Adaptability. Existing mainframe applications are often designed to drive an IBM 3270- or Digital Equipment Corp. VT100-type terminal. Although emulators for these terminals exist for personal computers and can bring them on-line quickly, a portable computer may not adapt as well as a desktop in some cases. Factors to consider include how the data will be used, how long a transaction will take and possible security problems.

Use. Most portables will not provide an attached printer, so sending formatted reports may not be required. Consider transmitting raw data in a popular spreadsheet or data base interchange format and supplying users with a skeleton program to manipulate the data.

Length. Most on-line terminals sign on and off once a day; even dial-up terminals in remote offices may maintain optimized telephone service. But the remote portable user will probably be calling from a client's office or even over a cellular phone from a moving car.

Can the mainframe handle the desired queries quickly enough? Sign-on validations frequently take longer than actual transactions, so consider this time requirement also. Laptop users may turn in their units if they must wait 15 minutes just to sign on. This may not be an unusual experience if DP set up the on-line system 10 years ago.

Security. The largest DP security breaches recorded so far stem from the security system designers' unwarranted assumptions that there can be some physical restriction on access to the inquiring terminal. This is clearly not the case when a portable, set up to autodial your mainframe, can move between any two airports in the world in a matter of hours.

Since a principal virtue of the portable is to make nonproductive hours productive, you might opt for the third alternative and select software to enhance your creativity or expand your skills.

Portables give you extra hours in the day to try things you would never have time to pursue at your desk. If you think you would like to try one of the new data bases like Ansa Software Co.'s Paradox or a new spreadsheet like Javelin Software Corp.'s Javelin, run it on a portable until you determine whether it should become your new standard.

Today's laptops can run virtually any software developed for their desktop predecessors. Only a few packages using exotic copy-protection schemes will be difficult to transfer to the hard-disk or 3½-in. floppy-disk media. Market pressure is erasing this nuisance daily.

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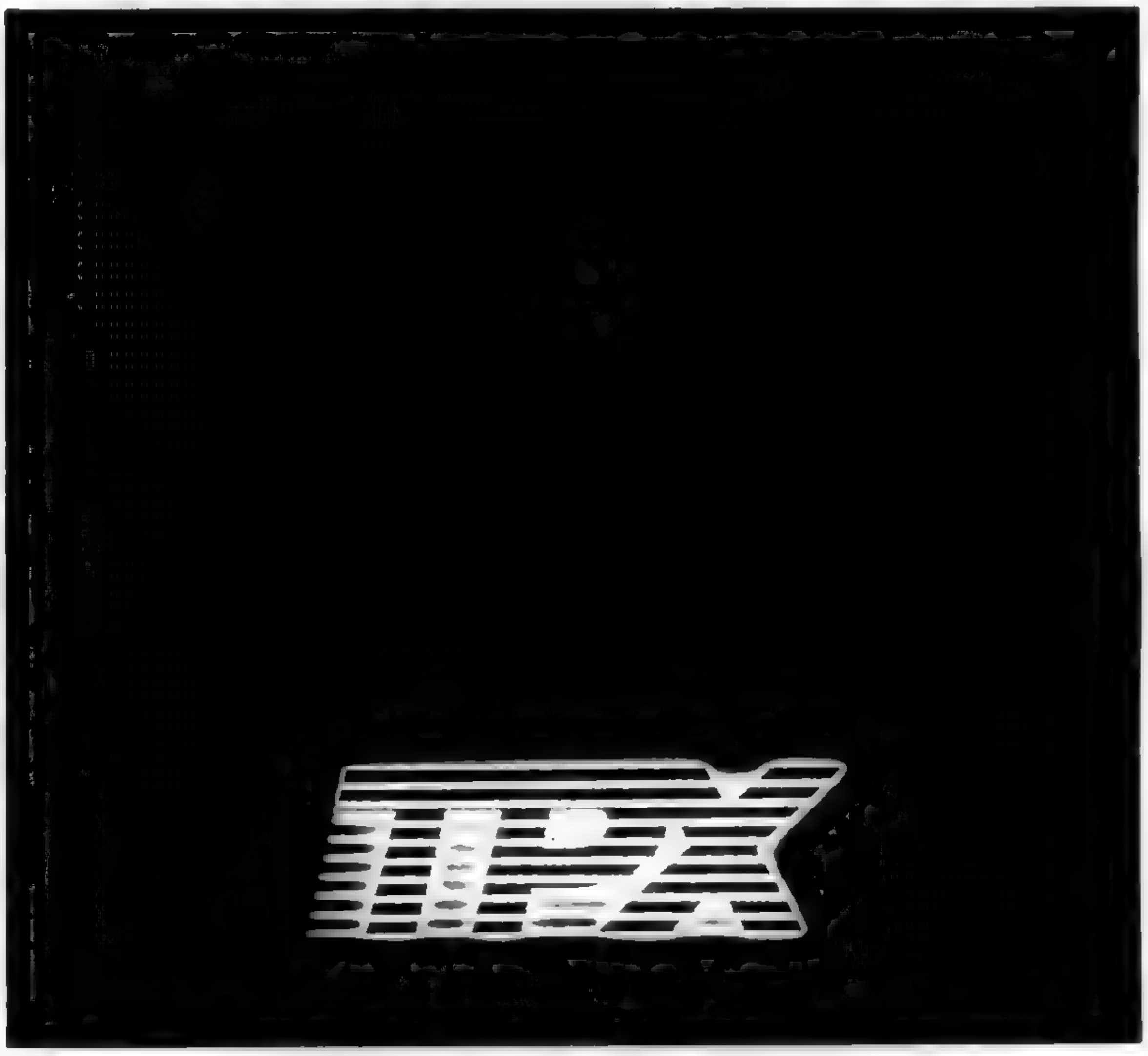

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Laptops

CONTINUED FROM PAGE 70

Z-181, Toshiba T1100 Plus and Grid computers — is finding buyers who want less on their desk.

One thing that makes this alternative feasible is that most executives of this stripe do not require the plethora of add-on boards that are now available for personal computers. The exceptions are those executives who need access to a local-area network (LAN). Except for connections based on serial lines, LANs require a special board in the personal computer.

Such feature cards can be added to Compaq's bulky portables but cannot be added to most laptops.

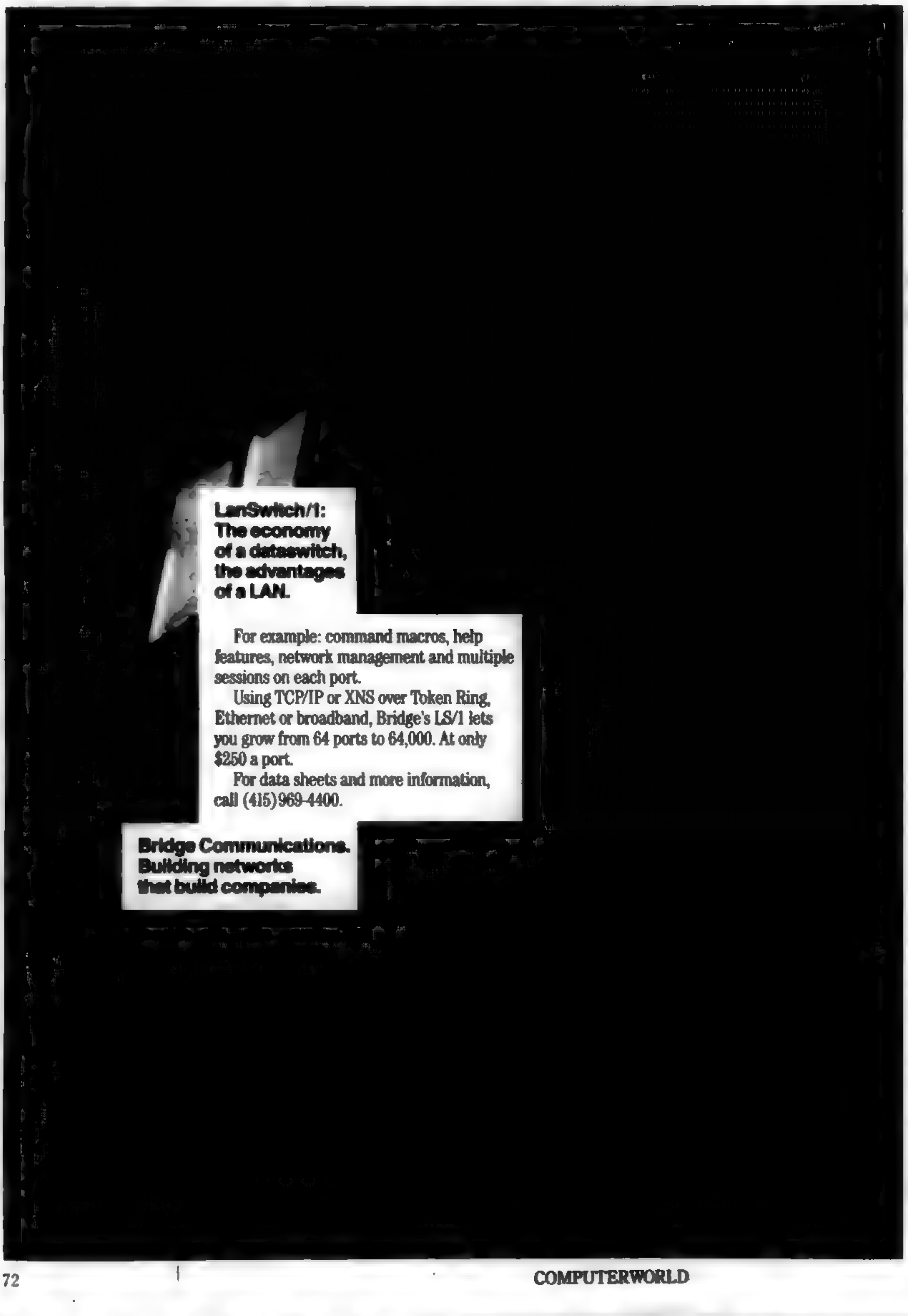
THE ILLUMINATED-screen hard-disk laptop provides battery power only as a convenience to capture an executive's spontaneous insights or to avoid searching for a power outlet during a one-hour sales call, rather than to deliver cord-free operation as an end in itself.

The Toshibas, the Data General DG One and some other vendors' systems can support PC cards via an external chassis. The external chassis is a desktop accessory and is not portable.

About the size of a pop-up toaster, this external chassis will provide an interface at a cost of about $1,000. It will also offer executives additional space on their desks. In an open office environment, one chassis can support a large number of travelers who are only occasionally working in the office.

The desk-bound executive may have to wait for the next generation of portables, which will undoubtedly close this personal computer-network gap.

In selecting a laptop or lightweight portable, key criteria to consider are power, screen technology and, except for the portable Macintoshes, IBM PC hardware compatibility.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Three keys

Power. At one end of the power scale are the systems that require external power. These personal computers are easy to carry but can only be used once they arrive at their destination. They include the Toshiba T3100, the suitcase-size Compaq portables, Sharp's PC-7000 and the portable Macintosh compatibles.

Product R&D, Inc. offers an adapter for automobile use as well as a one-hour battery option for machines including the Toshiba and the Dynamac. But not all of these systems are really designed to use on one's knees.

Battery-powered systems are grouped into those that use LCD displays and floppy disks to maximize running time and those that trade off running time in favor of more power-consumptive displays and hard disks. Toshiba's T1100 Plus will deliver almost eight hours of serious work before requiring a recharge. The PC Convertible is rated at about 10 hours — longer than the flight from New York to Rio.

Toshiba T3100: *'The only real contender.'*

The HP Portable Plus is the long-distance winner at almost 20 hours of operation per charge: This machine is also the only portable that can accurately report the percentage of remaining power. All other laptops flash a few minutes' warning before they must shut down. This should allow just enough time to save an open file to disk. Backlit LCDs, plasma and electroluminescent displays all reduce battery life significantly but provide screens that can be read in semidarkness; internal hard disks also take a bite out of the battery. The combination of the two means the laptop will seldom run for more than an hour.

Given this drawback, the illuminated-screen hard-disk laptop provides battery power only as a convenience to capture an executive's spontaneous insights or to avoid searching for a power outlet during a one-hour sales call, rather than to deliver cord-free operation as an end in itself.

Only the Grid Case family minimizes this difficulty with a cartridge battery that can be snapped in like the clip in an automatic pistol.

Screen technology. For many people, the choice of screen technology — LCD, backlit LCD, plasma — is the most important consideration in choosing a laptop; it is also the most subjective. Choosing among LCD displays is a viewer-

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subjective decision; no two people will agree on which LCD is better, and some people find them altogether unacceptable. Backlit LCD screens are substantially brighter and more clear than regular LCD screens but use a lot of battery power. Plasma screens are as good as CRTs, but they do not lend themselves to portability.

ONLY ONE vendor provides a walnut-size power adapter/recharger that can be thought of as portable. The typical laptop requires a power unit more than twice the size of a 12-oz. soda can. This adds significantly to the weight of the system.

Compatibility. Obtaining personal computer hardware compatibility is not the exciting quest it was last year; all of the systems mentioned — except the notebook computers like the Tandy 100 — are fully compatible. There are, however, some incompatibilities with desktop micros.

LCD and plasma displays are not totally equivalent to monitors, so tuning is required for some programs. For example, bold cannot be produced by driving the display harder, and some combinations, such as reverse video bright, show on these displays as black on black.

To be able to fit in a briefcase, all laptops compromise on keyboard layouts. Look for the ability to generate all PC key strokes even if it is necessary to press several keys to do so. Personal preference is the best guide in selecting a keyboard layout.

Today's typical MS-DOS portable provides 640K bytes of memory, two floppy disks — either 3½- or 5¼-in. format — a serial and parallel port, a red-green-blue port for an IBM Color Graphics Adapter-type desktop monitor and an optional built-in 300 or 1,200 bit/sec. modem.

Selecting among the many portables that are now available often boils down to investigating how the different vendors provide and expand these basic features — and at what price. It is not unusual to discover that two or three models are equally applicable and mutually compatible; this factor allows considerable purchasing flexibility.

The following are some examples of subtle engineering solutions with which different vendors have enhanced their products:

- The packaging of the PC Convertible and Zenith Z-181 completely encloses these machines' disk-drive slots when the top is closed — an excellent reliability feature. The DG One and Toshiba T3100 provide a protective cover for the rear connectors when the computer is closed for travel. Many laptops do not protect the disk-drive slots when the unit is closed. This leaves the units susceptible to impurities like crumbs and tobacco when slipped into a briefcase.
- The screen on the Toshiba T1100 Plus folds flat against the top of the unit. This allows additional viewing options when used in the lap and places the LCD screen out of the way when it is used with an external monitor.
- Grid packages its batteries as cartridges for easy replacement, whereas other vendors depend on nests of taped-together batteries that trail cables and are not meant to be replaced. Only the Grid design can reasonably cope with the realities of the power requirements of hard disks and the illuminated screens that many users require.
- Only Hewlett-Packard provides a walnut-size power adapter/recharger that can be thought of as portable. The typical laptop requires a power unit more than twice the size of a 12-oz. soda can. This adds significantly to the weight of the system.
- The PC Convertible preserves a running application before shutting the system down if the unit is closed without properly saving files to disk. The PC Convertible uses only negligible battery power in this state, while other laptops will run down at the same rate as if they were being used.
- Grid and HP provide popular programs, or users can put their own custom applications on read-only memory (ROM) cartridges. ROM-based software loads faster and cannot be lost or damaged while traveling, unless the entire computer is affected.
- Vendors such as IBM, Grid, HP and DG, which are oriented to supporting the corporate buyer, will send a sales team to service an account. This expertise can be valuable during the development of a pilot program.
- Other vendors, such as Toshiba, Sharp and NEC, operate principally through value-added resellers and dealers; excellent retail commodity prices may be achieved with a little aggressive purchasing.

Laptop and portable computers are remarkably like cameras — you must always carry them if you ever want to have them when you need them.

So, whether you are looking for a single system for yourself or enough units to automate hundreds of professionals within your organization, remember these rules:

If you don't enjoy it, you won't use it.
If it's too heavy, you won't carry it.
If it isn't with you, you won't use it.
If you've left a critical piece of it behind, it's worthless. ●

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Shut out of the boardroom

Barred from strategy sessions? Then your good ideas will fall like cold water on newly laid plans

BY BOB HILTON

The importance of financial planning, marketing planning and capital/equipment planning has long been accepted by top management as a natural extension of, or better yet an integral aspect of, the first level of the strategic planning process. For example, the top financial executive of a company is usually present when critical strategic objectives and actions are being considered.

However, in too many cases, information systems issues and human resources issues have not been considered as influencing factors in strategic planning but rather as being *influenced by* decisions coming from that process.

It is assumed that the right people can be hired and trained or that information to support an activity will be adequate. But to be effective, strategic planning must be a multilevel process.

It starts with top management concerns about overall mission. A logical second tier includes specialized planning for the major types of resources most organizations manage. Usually these are money, products and services, capital and equipment, people and finally information — the youngest member of the team.

Planning at this second level should be aimed upward toward support of the corporate mission and laterally to coordinate with the other specialized resource-management plans.

Yet managers of MIS or human resources typically are more disconnected from first-level strategic planning and from top management than are their counterparts in marketing and finance. And ways to derive strategic advantages from innovations in these two areas are still seldom discussed.

Not only are both functions relatively new at the executive-suite level, but both MIS and human resource departments carry a lot of historical baggage. In MIS, this reputation is typified by managers' roots in accounting and control systems, special jargon and a hardware orientation.

In human resources, there is the temptation for managers to get lost in the day-to-day administrative jungle of hiring, terminations and payroll.

Thus the perception lingers that MIS is full of "techies" and that human resources has more than its share of has-beens and "people people."

Of course, progress is being made, especially in companies in which dynamic business managers head up these functions. But organizational cultures change very slowly. The percentage of companies with human resources or information systems executives on a par with the top finance or marketing executives remains small.

In many cases, the fault lies with the managers themselves. Their vision of their role is still too limited. In other cases, the problem stems from the chief executive officer's failing to attach a sense of importance to these functions.

In organizations in which the latter is true, we typically find managers in MIS and human resources resorting to second-guessing top management. I know. For some time, I was responsible for business systems planning for a top U.S. firm, and we in MIS were not apprised of many of the strategic objectives of the company. When we were apprised, it came too late for our input. Likewise, human resources managers were uninformed.

At that late date, it is always hard for human resources and MIS managers to express concern over strategic objectives without it looking like they either want to reopen the case or are throwing cold water on plans already made. Many reasons explain this lack of timely communication, but ample evidence indicates a real weak link.

Opportunities abound

So how do managers carry out adequate strategic planning in MIS and human resources from their stepchild perspective?

Not very well, I am afraid. Typically, the human resources and MIS planning dialogue under these circumstances is initiated, of necessity, from the bottom up rather than from the top down. There is a lot of running ideas up the flagpole to see who salutes, often to the consternation of top management.

As I consult today with top management in the development of strategic objectives and action plans, I am amazed at how much opportunity I see for MIS and human resources to assist and to offer real improvements to the plan before it is finalized.

Recently, working with a client company's top management, we identified 48 strategic actions that the group wanted to initiate. In almost all of the action plans there was a needed level of support from both MIS and human resources — often the critical element.

How different it can be when MIS and human resources management can take a position of saying up front to top management, "We can help you accomplish that strategy." In such cases, the resulting functional plans and projects are based around business goals, around something top management wants very badly — not what MIS or human resources managers think might be nice or might be needed. As such, the resulting second-level plans are truly strategic and will be strongly supported by top management.

It is time these functions are

JON McINTOSH

Hilton is president of Systems Planning Institute, Inc., Atlanta, specializing in business planning, information systems planning and human resources.

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- **MIS fights its way into the executive suite**
- **Are you always the last to know?**
- **Progress slowed by leftover stereotypes**

no longer treated as second fiddles. They need to be made an integral part of the overall planning. In today's information- and service-oriented world, these two functions need to be carrying more of the melody, not chiming in now and then.

What you are up against

How can MIS and human resources executives help make that happen?

It will not be easy. After all, you are up against basic cultural norms: how business is and has been conducted for many years. Like those in other maturing professions, you will have to fight your way to the top.

A good starting place is for you and your department to expand your vision of your role. Assume that senior managers want and will accept support for what they want to do, not necessarily for what you want to do. Realize that your departments exist to help your company achieve its overall strategic objectives.

Ask for a written list of the strategic objectives and work toward greater involvement in the strategic planning process. Help establish a better process if a weak structure is now in place. Most top managers are willing to listen if you are sincere and if they think you are trying to understand things from their perspective.

If you are a human resources executive, realize the shortsightedness of being too people-oriented (toward individual mission) or too company-oriented (toward corporate mission). Some human resources managers may perceive their role as representing the employees, whereas others may assume that getting the most out of the employees for the sake of the bottom line is their role. The strongest organizations (and the only viable ones in the long run) are those that create a balance between the two.

Balance implies opportunities for input and dialogue between an individual and the organization as well as an understanding of and agreement with corporate strategic objectives. Consider the possibility that the highest goal of human resource management may be to bring the collective individual missions and values of employees into harmony with the organization's mission. This goal implies a vision of the human resources function that allows some ability to influence both sides of the equation — strong business- and people-oriented leadership.

If your position has evolved out of moves within your own functional area, then consider the possibility that you may not fully appreciate others' — especially top management's — point of view. Make an effort to get out of this mental box.

Of two of the best systems analysts I have known, one was formerly an assistant traffic department manager and the other was a former architect. Ironically, many existing human resources functions could be improved with the inclusion of a manager with a systems orientation, and many MIS functions could profit by a large dose of human resources management know-how.

Spirit of an entrepreneur

Perhaps the simplest next step is to concentrate on finding out what the CEO and other top executives want. Listen and try to find ways of committing your resources to satisfy those needs. Assuming you now know what the strategic objectives are for your company, you may consider proposing or even funding only those new projects you see as clearly linked to these strategic needs. Force this kind of thinking to occur with those below you.

> THE HIGHEST goal of human resource management may be to bring the collective individual missions and values of employees into harmony with the organization's mission.

Run your function like a business. Market your services as if other managers were paying for them. Approach your clients with a standard of excellence designed to keep their respect and support. After 23 years in corporate staff or service functions, nothing changed my vision like running my own firm for the last four years. It is a shame that corporations cannot instill this entrepreneurial thinking more thoroughly at all management levels and early in one's career.

Ideally, CEOs should think as generalists, not as specialists, when they visualize these top-level positions. We recently reviewed some advertisements for top MIS positions. The ads reflect more emphasis on advanced degrees in computer science and experience with particular types of technology than on proven management and planning experience.

These ads also reflect a certain expectation for people who hold these positions. As an analogy, suppose I applied for a top-level marketing job in a company, and the advertisement stressed that I should preferably have an advanced degree in marketing and be familiar with several kinds of techniques but made little or no reference to proven management performance. I would be suspicious.

The ultimate responsibility for forging links between these two key resource-management areas and top management rests with the CEO. However, much of the initiative can come from a new affirmation of mission and vision by those now responsible for MIS and human resources. If greater levels of harmony are not achieved, both the company and the functional areas will increasingly suffer. ●

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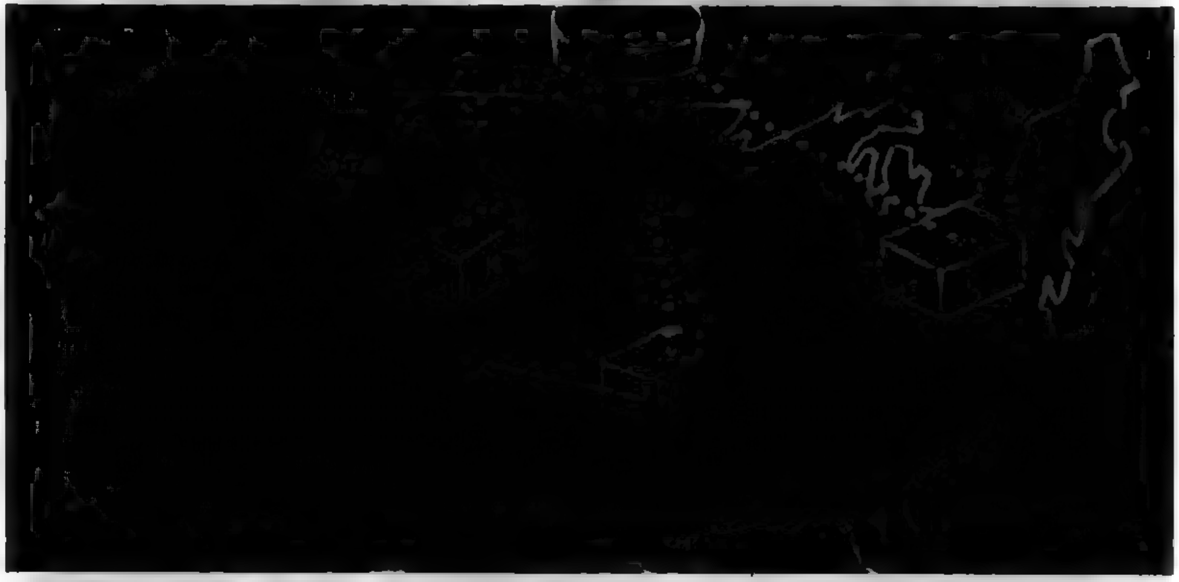

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MANAGEMENT

TAKING CHARGE

Lance B. Eliot

The strategic expert system

An expert system is a kind of technology, and discussions of expert systems tend to focus on technological issues. But the adoption of such a system is an organizational issue and, as such, it requires consideration of its impact on a firm's production processes, services and social structure.

Because most of the attention given expert systems to date has been on technological issues rather than organizational ones, we understand very little about managing them; meanwhile, the competitive edge offered by expert systems is hidden among a clamoring crowd of technologists.

But expert systems are an important topic for general managers. Let's consider the strategic opportunities that expert systems make possible.

- **Changing the nature of competition.** A building supplier developed an expert system that changed the nature of its competitive stance. Customers consulted the supplier's housing specialists to determine the kinds of materials they needed for a particular project. A housing specialist would interview a customer and produce a schedule of supplies. The company used an expert system to help the specialists draw up supply schedules, resulting in more

Continued on page 78

Managing technology portfolios

BY JANET FIDERIO
CW STAFF

INTERVIEW

Gary Biddle

Gary Biddle, vice-president of MIS for American Standard, Inc., has his hands full. He sets controls and standards for the decentralized information organizations of the company's three diverse worldwide business groups.

Sound simple? Well, think again. American Standard is a $3 billion company with over half its sales coming from outside the U.S. Its business groups, which provide plumbing products, air-conditioners and railroad services, are divided into strategic business units. The units, with sales of between $20 million and $600 million, have their own information services organizations and do their own development programming.

Biddle regularly deals with nearly 30 of these groups located around the world.

He also manages centralized MIS functions. In the U.S., American Standard operates a nationwide communications network, from which the operating units buy time, and three computer processing centers that are run like utilities.

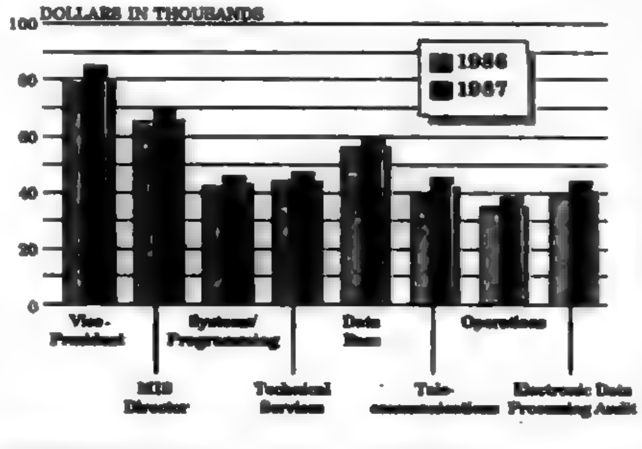
To maintain an integrated environment among American Standard's MIS operations, Biddle and a small group of professionals at headquarters promote a corporate architecture. They also promote a system called business portfolio management. This system ensures that MIS units manage technology from an investment standpoint in four areas: the traditional MIS core systems and applications, PC-related expenditures, communications technology and factory automation. Biddle's group is also responsible for tracking new

Continued on page 79

Data View

MIS management

Average executive salaries, large-scale installations



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CW CHART

Former execs try consulting

BY ALAN J. RYAN
CW STAFF

When Gene Stein lost his job through a corporate restructuring for the second time, he decided he would become master of his own destiny by working as an independent consultant. The former vice-president for data processing at Warner Leisure, Inc. says he makes much more money now and does not have to deal with corporate politics, which he calls "a big plus."

However, J. Robert Riggs, who took early retirement as vice-president of information systems at Dresser Industries,

Continued on page 81

Banks make a deal for data center

BY DAVID A. LUDLUM
CW STAFF

MILWAUKEE — First Wisconsin National Bank of Milwaukee has agreed to expand its remote data processing operations by purchasing a data center from an Illinois bank and negotiating further expansion of its services.

First Wisconsin, a subsidiary of the $7 billion First Wisconsin Corp., the largest bank holding company in Wisconsin, has agreed to buy a data center from State Bank of Freeport, lead bank of Northwest Illinois Bancorp, Inc., First Wisconsin said.

First Wisconsin, which has done data processing for other banks for 24 years and currently services about 200 banks in Wisconsin, Michigan, Iowa and Illinois, is also negotiating a deal to service a bank in St. Paul, Minn., said Rod Jaeger, the bank's manager of data network services.

The Illinois data center, which would become the sixth remote data processing facility operated by First Wisconsin, handles processing for two banks owned by Northwest Illinois Bancorp as well as 21 others in northwest Illinois.

James Shankland, vice-president of marketing at State Bank of Freeport, said First Wisconsin can provide the center's services more effectively due to its expertise and economies of scale. State Bank of Freeport will benefit from access to First Wisconsin's technology, he added. "The

Continued on page 79

MIS execs take reins at Ashton-Tate, Midland Bank, Pennzoil

BY DAVID A. LUDLUM
CW STAFF

There is nothing ignominious about being manager of corporate systems for a company whose fortune is tied to the microcomputer revolution and whose chairman has questioned the clout of MIS management.

That is the view of **Richard F. Di Giovanni**, who has been promoted to vice-president of MIS at **Ashton-Tate**, the Torrance, Calif., software maker. He had been the company's director of MIS.

In a recent interview with *Computerworld* editors, Ashton-Tate Chairman Edward M. Esber Jr. suggested users may usurp some of the purchasing decisions traditionally made by MIS managers.

Di Giovanni said such remarks likely refer to managers seeking to retain MIS's total control of information systems. In his view, mainframes may become "mass storers of data" drawn on by users' personal computers. "I want to be able to give that information out and allow them to do their own analysis," he said. He advocates "a good mix" of control and access and said there is "a real marriage" of PCs and IBM System/38s at Ashton-Tate.

Di Giovanni, 42, is also acting general manager of Ashton-Tate's support services division, a line position that he said fulfills a personal goal of managing responsibility for profit and loss. He said that suits him well, with his background providing service through an MIS organization. Before joining Ashton-Tate as MIS director in 1985, Di Giovanni spent 20 years with movie studio information systems organizations.

The film and PC software industries are similar — both are distribution businesses with success hinging on short product cycles, Di Giovanni noted. "The real difference is that this is growing so fast," he said. "What you have to do in an environment like this is make decisions a lot more quickly."

Richard Di Giovanni

After crossing the Atlantic and working with two U.S. consulting firms in London, **H. Eugene Lockart** has settled in as chief executive of information technology at **Midland Bank Group**, one of Britain's leading banking companies.

Lockart, previously a managing partner with First Manhattan Consulting Group, also has been appointed a member of Midland's group executive committee.

Like Britain's four other clearing banks, Midland has automated branches throughout the country, a nationwide data network on which it sells time and a reputation for aggressive use of technology.

Midland also has interests in

Continued on page 82

Strategic

FROM PAGE 77

complete schedules with fewer errors.

The bottom line was that business increased from both existing customers and new ones. Competitors had to scramble to try to meet new expectations. Today, many of them have a similar form of automation.

The expert system provided a competitive advantage — albeit a temporary one — and then escalated the nature of the competition.

- **Raising entry barriers.** The building supplier's expert system also increased the barriers to entry for new competitors by requiring them to have comparable automation.

A similar trend has begun in corporate tax planning. An expert system for tax planning has allowed at least one accounting firm to save time and give better advice to corporate clients. Clients with complex tax planning needs are beginning to seek out tax advisers with the new technology. Currently, the relative cost of developing such a specialized system is quite high. In the near future, it is likely that tax-oriented expert systems may become significant marketing and work producing tools. Again, such an example illustrates how an expert system hurdle must be overcome by new entrants to an area of business.

- **Increasing switching costs.** A company developed a hospital laboratory instrument that incorporated an expert system for helping users diagnose various inflammatory conditions in patients. After using the instrument for several months, many hospitals began to shape their work processes around its behavior. For example, they revised lab test forms to reflect the responses from the instrument and its embedded expert system.

Next, the company developed other instruments that directly tied into the inflammatory expert system. Hospitals with the first instrument happily bought into the line of products. Soon, the hospitals were locked into a chain of sensible purchases that narrowed their own abilities to switch suppliers. The decision to replace one of the instruments in the chain then required finding either a mimic — and none were available — or replacing an entire sequence of instruments. The expert system helped bind the company's customers and increase their switching costs.

- **Changing power relationships.** A telephone company developed an expert system that helped cable analysts with maintenance tasks. If a telephone cable needed maintenance, the expert system would provide advice on how to make repairs. Furthermore, the system would piece together numerous maintenance activities and could anticipate future maintenance needs. The system was used to guide preventive maintenance and suggest where to replace or recondition existing cables.

Eventually, the telephone company found it had amassed a substantial knowledge base concerning cables and their reliability. Negotiations with cable suppliers took on a different cast. The telephone company was in a position to play a stronger role in requiring the suppliers to meet certain specifications. It could also argue more effectively with the public utilities commission during rate-change debates.

Even the customer relationship was changed, since the telephone company now had a way of selling services at an earlier stage — that is, selling preventive maintenance rather than repairs — and billing was improved through the levying of specific charges rather than estimated annual fees.

- **Developing new business.** A law firm developed an in-house expert system that improved interaction with a legal data base. The firm was approached by other law firms not in direct competition with it and asked if the system could be shared with outsiders. Gradually, the law firm developed a new service through expert systems and legal data bases. Today, the firm sells the expert system and related software packages. It

Continued on page 79

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Managing

CONTINUED FROM PAGE 77

technologies and recommending their use.

A 30-year veteran of American Standard, Biddle worked in the manufacturing and operations side of the business for 14 years before moving over to information systems. He sees himself primarily as a business person with a specialty in technology. His goal at American Standard is to act as a catalyst for change and help business units apply new technologies.

Explain your method of breaking new technology into business portfolios.

Back in 1983, [management consulting firm] Nolan, Norton & Co. proposed that with the introduction of micro technology, there would be niche types of products coming to the market that would then attract dollars and expenditures [by] the operating units. Computer-aided design and manufacturing and robotics are other examples of technologies that were coming in.

This was important because in our industry, surveys always said that the average [information technology] expenditures per year per manufacturing company were 1.5% to 1.7% of gross sales.

When we took in all of the new technologies, which tended to then create expenditures that would fall outside of the information services budgeting process, what we started to see were expenditures as high as seven times what we normally would have seen in an information services budget, forecasted by the end of the 1990s.

Now this meant that if we could collect all those costs, a manufacturing company that was trying to stay progressive would be spending 5% of gross sales a year for information technology instead of 1.5% to 1.7%. If that's true, then there has to be a return-on-investment for that expenditure.

How did you encourage operating units to estimate return-on-investment figures?

What we did was to look at these new technologies as business portfolios. We developed a framework or a structure where we named the old traditional core of business applications "the institutional portfolio." We looked at the personal computer and all the technologies and software that have come out around the personal computer and we named that the "professional support services portfolio."

Communications became a third portfolio, which was named "external support services." The fourth portfolio we coined "factory automation," since we are a manufacturing company.

Next, we had to figure out how to distribute this hypothetical 5% of gross sales across those four portfolios. One of the things we told the operating units was,

Continued on page 80

Banks

CONTINUED FROM PAGE 77

resources they have are so much greater than ours. They are fully committed to being in the data processing business and we are not," Shankland said.

Daniel F. Heine, president of the State Bank of Freeport, said in a statement that the sale will let the bank focus on other aspects of its business. He noted that bank automation has become increasingly complex, in part due to deregulation.

The banks did not disclose terms of the transaction, which is effective May 31.

First Wisconsin hopes to maintain all the data center's clients and "expand that territory substantially," said Harvey Keller, a First Wisconsin customer service executive. He called the external data processing services "a significant piece of business" for First Wisconsin Corp.

First Wisconsin has developed systems for teller operations, on-line preparation of deposit documents and on-line signature verification, the bank's manager of data network services said.

Strategic

CONTINUED FROM PAGE 78

branched out into a new business.

Clearly then, expert systems can be important for general management. An expert system can change the nature of competition, raise barriers to entry, increase switching costs and generate new lines of business.

What makes expert systems so special? Can't other forms of information systems achieve the same kinds of strategic advantages? The answer is yes.

Expert systems tend to focus on issues of effectiveness. An expert system is built to capture and distribute limited or costly knowledge. Such knowledge may be awkward to share, in danger of disappearing through the retirement of experienced specialists or difficult to replace because of high demand for skilled labor.

Expert systems merely recognize the essential nature of knowledge as a valuable corporate resource. While a transaction-oriented processing system might stumble onto a gold mine of corporate knowledge, an expert system is supposed to seek it out and leverage it.

Eliot is director of the Expert Systems Laboratory at the University of Southern California's Institute of Safety and Systems Management.

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Managing

CONTINUED FROM PAGE 79

"We know you are spending a lot of money on PCs, so why don't you look at personal computing as a tool to increase knowledge-worker productivity? If we do so, it's a separate category that you should have strategies on within your operating unit as to how you're going to handle those expenditures."

Then we did the same thing with factory automation and with the external support services.

After all, how do you use communications into the supplier and the customer channels of distribution to make it easier for them to do business with you?

> "WHEN we took in all the new technologies, we started to see information services expenditures as high as seven times what we normally saw."
>
> GARY BIDDLE
> AMERICAN STANDARD, INC.

You must have delved into electronic data interchange [EDI] in the communications arena, then?
Yes, we have. We have a major program in place so we can explore this whole idea of EDI.

Our first experiences with EDI have come out of the transportation industry, and EDI has been very strong in that arena. With that experience as our learning curve, we're now trying to see how we can apply EDI to the other businesses that we're in.

One of the points that we try to make to our operating units' management is that they can look at these business portfolios and that we will give them a generic model to work with. They can see what fits best for their business strategies over two or three years. But if they stay within our corporate architecture, they will not have to be concerned with the integration issue.

How can you ensure that integration won't be a problem?
Because our computing architecture has addressed the integration issue, and it allows us then to move data around without concerning ourselves about connectivity.

You can maintain similar architectures throughout all of your subsidiaries?
If our operating units work within our guidelines, integration is not an issue.

We also stress to the operating units that if they stay within the business portfolio concept of management, we can relieve the external and internal pressures that we're all faced with, because we have developed processes, and at the core of those processes is the computing architecture model. The model is supported by our portfolio investment process.

Can you explain the portfolio investment process?
Basically, what we have is a core that has four architectures: communications, data, application and hardware/software. The core is then layered against the four business portfolios: institutional, professional, external and factory automation. That's the core. What we've got to do now is manage it. The portfolio investment process is a management tool, our way of managing information technology.

We stress to the operating units that they should ask themselves these questions: "What are our spending levels against the functional areas of our business within these four business portfolios? What are the ages of the applications that are in those business portfolios?" We also ask them to track their maintenance costs, so they know that applications have life cycles just like products do, because you need to know when you should start reinvesting and replacing those assets.

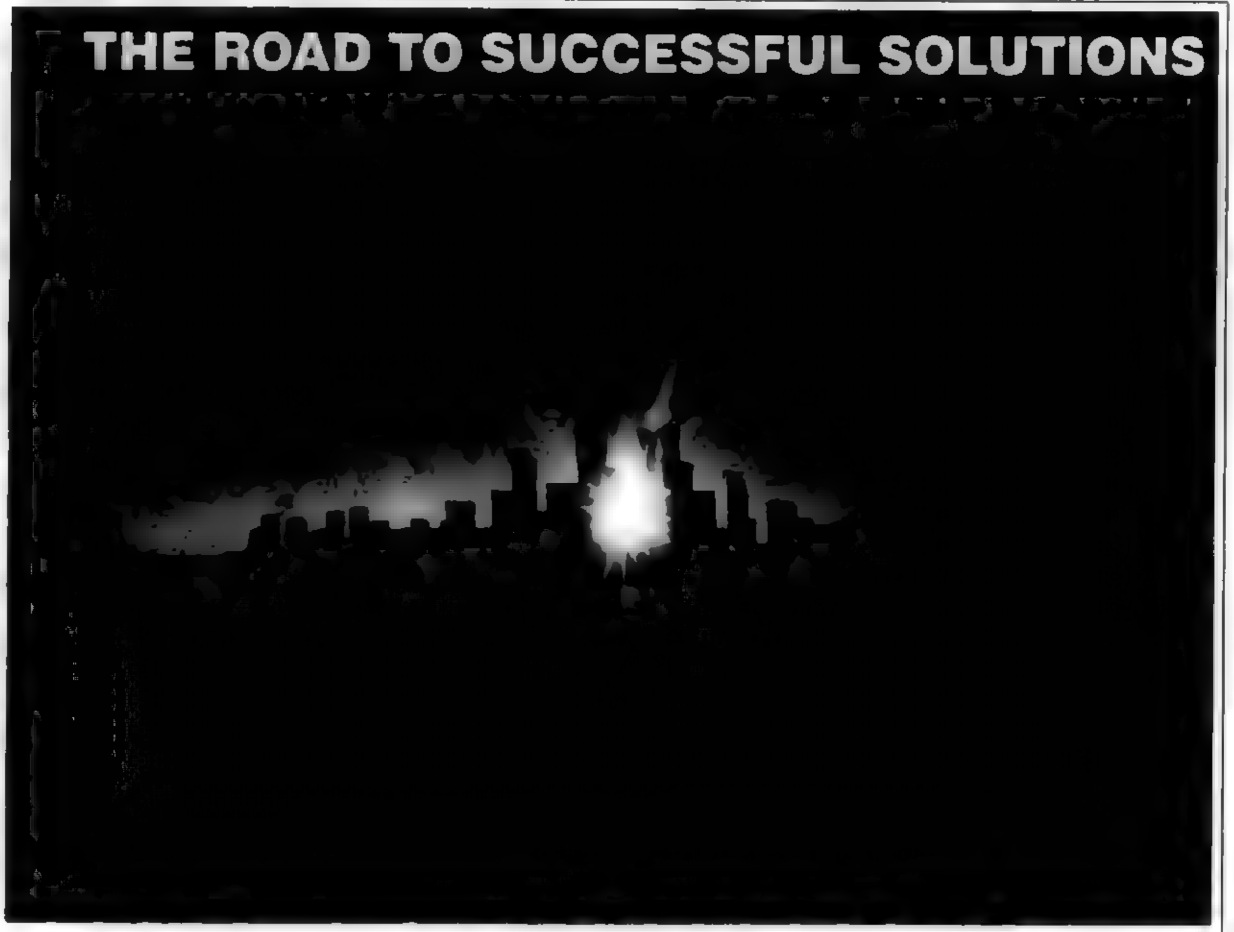
That is managing the portfolios from an investment standpoint. Answering those questions also makes sure, then, that management understands that where they're spending their money is really where they should be spending their money from a strategic alignment standpoint.

So do you serve then as a champion of these programs?
What we're giving them is a methodology of understanding as to how to manage it. And then we ask them to make sure that they're achieving strategic alignment with those programs.

We also have what we call an information technology development process, where we have a small corporate organization that tracks the introduction of new technologies and analyzes what is happening in the marketplace with that technology.

If we think we have found an application, then it passes on into an evaluation, and we do a white paper and guidelines and standards and introduce it to the operating units worldwide.

We tell the units that here is a potential technology that could be used in their businesses and we'll be glad to help them to understand the technology and some ideas that we've formulated as to how it could be used. So then we're into the technology transfer process.



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Former execs

CONTINUED FROM PAGE 77

Inc., enjoys the freedom of independent consulting but finds it has not been financially attractive in the early years. It is tough competing with the big firms, he says.

Mergers, corporate restructuring and early retirements have left numerous high-level executives out of a job, and many of them are deciding to put their know-how to work as independent consultants.

The position is appealing. The consultants work for themselves, make their own hours and can elect to say "no" to a client. But consulting has its drawbacks, too. Not everyone likes it, not everyone can make money at it and the competition can be fierce.

Senior-level executives who become independent consultants often can satisfy restrictions, which were promulgated by last year's tax reform act, on who can do such work, according to Kevin Carey, managing director of H. R. Consultants Resource in Rutherford, N.J. They are more likely to work irregularly on part-time projects, often because they have substantial savings or pension income.

'Don't want a boss'

Many former executives plunge into consulting because they do not want to work in a structured environment, says Carole Schwartz, president of consulting firm McCabe & Schwartz, Inc. in New York. "People come to a point in their lives where they don't want a boss any more," she says.

Consulting can also be a lonely field, Schwartz adds. Executives usually work with others, while being a consultant often means being on one's own. The job may require excessive hours and travel, constant pressure and long periods away from one's family to make it work, Schwartz says.

Consultants may fail because they either cannot do the work or are not able to handle the business aspect of the venture, according to Schwartz. "Consultants sell, and they have to be happy with that role," she says. "Rejection is an integral part of this whole thing, and a lot of people can't handle rejection."

And while consulting can be lucrative, some consultants say it takes a few years to become established and, by that time, many are ready to retire for good.

Billion-dollar market

The consulting market is worth billions of dollars and is growing rapidly, according to H. R. Consultants Resource's Carey.

Many companies are scaling back, but they have specific projects they want done. Rather than hiring an employee and later implementing a layoff with severance pay, the corporation can contract the work to a consultant.

Carey, whose firm has a bank of 12,000 consultants across the country, said he started it after seeing many consultants with less experience than he had. "Essentially, it was not normal to have a consultant come in to perform a project for you who had many years of experience," he says. "Many, many more [middle and top managers] were becoming available who were excellent people."

Stein, 42, of Garnerville, N.Y., went to work as an independent consultant in 1984, after Warner Communications, Inc. shut down the Rutherford subsidiary where he worked.

"I decided to go out on my own. I wrote a couple of letters and got a few small contracts," Stein says. Then he arranged to find some work through H. R. Consultants, which he says lifts some of the burden of marketing from him, letting him concentrate on his projects.

Stein's contracts have included a year-long effort consuming two to four days a month and a four-month undertaking. He has implemented a multiwarehouse distribution system and a short-term project selecting a point-of-sale system.

Stein says the drawbacks to his profession include getting a big tax bill at the end of the year and having to provide his own health-care and pension plans. There are also slow periods, and it helps that his wife has a career, he says. "But you're making much more money than you'd make at a salary," he says, adding that consulting also lets him avoids corpo-rate politics.

Riggs, however, says that he has found that the percentage of his time that is billable has not been high and that it takes a long time for an initial contact to mature into a contract. "Financially, I have not found it to be attractive in the early years," says Riggs, 59, of Dallas, who began consulting after his retirement about 18 months ago.

Riggs says that after he opted for early retirement, he wanted something to do and was drawn to consulting. "You're your own boss, and you're responsible for your own bargaining and own performance," he says. He does not work through an agency but said he might opt to do so.

Riggs says a major drawback to consulting is a lack of credibility in competing with the large, nationally known firms and advises others who wish to become consultants to "have a good, solid income base to begin with."

Stein suggests would-be consultants specialize. "It's really the age of specialization. You can't go out and be a consultant and say 'I do everything,'" he explains. Companies hiring contract labor are spending a lot of money doing so, and they do not want to spend time training the consultant. "They also expect the job to be done quicker, and they expect it to be done correctly," Stein adds.

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Execs take reins

CONTINUED FROM PAGE 77

investment banking and securities trading through its Samuel Montagu subsidiary and foreign exposure through ownership of banks throughout France and West Germany.

Lockart, 37, graduated from the University of Virginia and worked with Arthur Anderson & Co. in Washington, D.C.

He was also employed by Nolan, Norton & Co. in Boston and London, where he was managing principal; C. T. Bowring & Co.; and First Manhattan.

Keith A. Eaton has been named vice-president of MIS at **Pennzoil Co.**, with responsibility for the information network, systems services, MIS and user support and planning and administration.

Eaton succeeds Jerome Ferguson, who retired.

He joined Pennzoil last year as director of MIS and user support services, leaving **Kerr-McGee Corp.**, where he was director of systems development.

Eaton said his chief goal will be completing the final year of Pennzoil's three-year information plan, which focuses on the installation of several financial systems.

Carter Hawley Hale Information Services has appointed **Jerome E. Kenan** vice-president of development and has named **Paul A. Burrows** vice-president of computing.

Kenan, formerly of Transamerica Corp. and Rockwell International Corp., is responsible for 31 production systems that support merchandising, credit, finance and human resources for Carter Hawley Hale Stores, Inc.

Burrows, a former Marine pilot and NCR Corp. salesman who succeeds Kenan, heads the company's data center, with responsibility for systems software, capacity panning, disaster recovery and data base production support.

Carter Hawley Hale Stores operates The Broadway-Southern California, The Broadway-Southwest, Emporium Capwell Co., Thalhimers, Weinstock's, Bergdorf Goodman, Inc., Contempo Casuals and Neiman-Marcus.

CALENDAR

MARCH 1-7

Second International Conference on CD ROM. Seattle, March 2-3 — Contact: Microsoft Corp., Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

Seventh Annual Computer Operations Conference. New Orleans, March 2-5 — Contact: Association for Computer Operations Management, Suite 201, 11501 Brookhurst, Garden Grove, Calif. 92640.

Eighth Annual Conference on EDP Performance and Capacity Management. Phoenix, March 2-6 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

Corporate Electronic Publishing Systems Show and Conference. Chicago, March 3-5 — Contact: Cahners Exposition Group, 999 Summer St., Stamford, Conn. 06905.

DEXPO Europe '87. London, March 3-5 — Contact: Expoconsul, 3 Independence Way, Princeton, N.J. 08540.

Securicom '87. Paris, March 4-6 — Contact: Securicom-Sedep, 8 rue de la Michodiere, 75002 Paris, France.

Taxation of Intellectual Property. Chicago, March 5-6 — Contact: Deborah Gordon Public Relations, Inc., 320 N. Michigan Ave., Chicago, Ill. 60601.

MARCH 8-14

Cullinet Applications and End-User Computing Conference. Dallas, March 8-10 — Contact: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, Mass. 02090.

Spring 1987 Conference of the North American Honeywell Users Association. Charleston, S.C., March 8-13 — Contact: Lester T. Pacca, NAHU, Inc., P.O. Box 2037, Willingboro, N.J. 08046.

Automated Manufacturing: Computers, Communications and Controls in the Factory. St. Petersburg Beach, Fla., March 9-10 — Contact: Yvonne Chism, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

New Technologies. Beverly Hills, Calif., March 9-10 — Contact: Seybold Seminars, 6922 Wildlife Road, Malibu, Calif. 90265.

CAD/CAM, CAE Executive Workshops '87. Cambridge, Mass., March 9-10 — Contact: Daratech, Inc., 16 Myrtle Ave., Cambridge, Mass. 02138.

Electronic Banking: The Challenges of Tomorrow's Bank Within Yesterday's Legal Framework. Brussels, March 9-10 — Contact: Conference Office Brussels, 19 rue de l'Orme, B-1040 Brussels.

11th Annual BRS User Meeting. Kansas City, Mo., March 9-10 — Contact: BRS Information Technologies, 1200 Route 7, Latham, N.Y. 12110.

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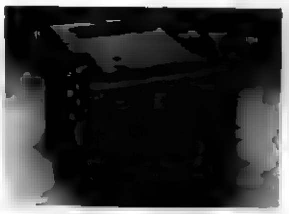
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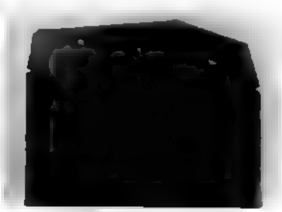
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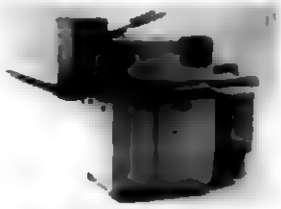
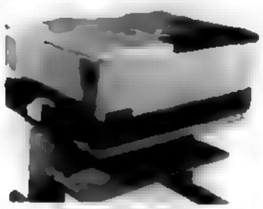
QMS-PS 2400

Linotype Linotronic 100


DEC PrintServer 40

NEC SilentWriter LC-890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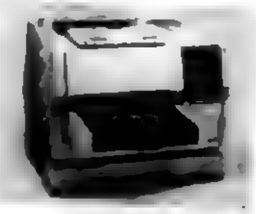
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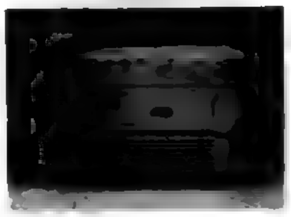
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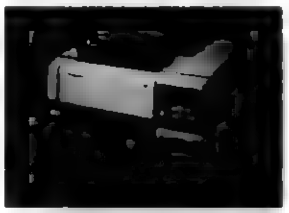
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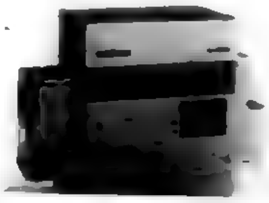
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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Efrem G. Mallach

Discarding fad as fiction

In 1960 it was Hula Hoops. The 1970s saw Pet Rocks and Rubik's Cube. Then we had Cabbage Patch dolls and Trivial Pursuit.

Fads are harmless when you're buying Christmas presents. The short-term benefits of satisfying your child, or yourself, are substantial. The long-term cost of a poor decision is minimal.

Fads are just as common in selecting computer systems. We might like to think we make rational decisions. But we don't. We can't. We're as captive to our emotions at 10 a.m. on Wednesday as we are at 10 p.m. on Saturday.

Most of us know this. We take precautions. We read research reports, subscribe to reference services and engage consultants. But there is the rub. Our advisors are human, too.

Vendor fads among reference services and consultants are every bit as extreme as fads in the toy business. They come and go as quickly and with as little reason. But computer selection fads leave a trail of poor recommendations and wrong purchase decisions in their wake.

For instance, look at Digital Equipment Corp. DEC is a fine firm with excellent products. Industry watchers praise it to the skies with good reason. But a few short years ago, the same industry watchers put DEC down for its "engineering focus," "confused management" and "overtechnical sales reps."

What has changed? Not the products, which have improved at about the same rate as everyone else's and were good in 1984, also. Not the management. Not the sales reps. Just the faddishness. DEC is "in" today.

A few quarters of good financial numbers, while the rest of the industry suffers through hard times, and suddenly everything else about the firm be-

Continued on page 94

Uccel, VM, Sterling profits strong

BY CLINTON WILDER
CW STAFF

Illustrating the relative health of the IBM mainframe systems software industry, Uccel Corp., VM Software, Inc. and Sterling Software, Inc. recently reported strong year-end profit growth.

Dallas-based Uccel, which in 1986 sold off several unrelated operations while beefing up its systems software business, said fourth-quarter profit from operations jumped 42% to $7.7 million, or 45 cents per share. Revenue grew 7% to $42.3 million.

For the year, Uccel neared the $150 million revenue mark, reporting sales of $141.6 million, up from $126.8 million in 1985. Earnings, not including an extraordinary credit, rose 47% to $17.2 million, or $1.02 per share.

Uccel said $9.8 million of its 1986 revenue came from businesses that had been divested, including a turnkey systems division, a computing services unit and three software operations. The businesses, although barely profitable, accounted for half of Uccel's revenue in 1985.

In the fourth quarter, Uccel acquired six small systems software companies for a total of approximately $60 million. Chairman Gregory J. Liemandt said the company shipped a record level of systems software products in December.

Reston, Va.-based VM Software reported that 1986 revenue grew 50% to $27 million, while earnings jumped 57% to $4.9 million, or 77 cents per share.

In 1985, the firm earned $3.1 million, or 53 cents per share, on sales of $18 million.

Fourth-quarter growth was roughly comparable with that of the full year. VM Software's profit increased 58% to $2.5 million, or 39 cents per share, on revenue that rose 64% to $10.4 million.

Sterling Software in Dallas more than doubled its profit in the first quarter ended Dec. 31, while reporting substantially lower revenue due to divestitures.

Earnings were $1.9 million, or 19 cents per share, compared with $890,000, or 16 cents per share, in the year-earlier period.

The average shares outstanding increased from 4.9 million to 9 million.

Sales dropped from $69.5 million to $45.3 million.

Japan ignoring chip trade accord

BY JAMES A. MARTIN
CW STAFF

The U.S.-Japan trade accord designed to prevent the Japanese from predatory pricing and semiconductor chip dumping practices in the U.S. is clearly not working, analysts and chip manufacturers agree.

However, until more long-term steps can be taken to correct the problem, they say, it is better than nothing at all.

The controversial trade accord, reached last July, made headlines again recently when the Semiconductor Industry Association (SIA) called for the Reagan administration to impose trade measures against the Japanese.

Claims market closed

The SIA claimed that the Japanese semiconductor industry has not opened its semiconductor market sufficiently to the U.S. and that below-cost pricing of dynamic random-access memory (RAM) chips has continued despite the agreement.

The problem does not lie with the agreement but rather with its enforcement, according to industry observers.

The main value of the trade accord is that it acted as a necessary "two-by-four that told the Japanese that the U.S. will react" to unfair competitive practices, according to T. J. Rogers.

Rogers is president and chief executive officer of Cypress Semiconductor Corp. in San Jose, Calif.

"The agreement was valuable in that it told the Japanese that if they can have a government policy targeting the U.S. industry, then we can have one targeting theirs, too," Rogers says.

"We need to help them realize that in a trade war, neither Japan nor America would win," he continues.

'Significant achievement'

"It would be a mistake to dismiss the trade accords as a mistake," says Bruce Entin, spokesman for LSI Logic Corp. in Milpitas, Calif. "It was a significant achievement in that we hadn't had one like it before. But Japan will respond only to actions, not words."

In response to the SIA's complaint, Japan's Ministry of International Trade and Industry (MITI) has urged Japanese chip firms to adhere to the agreement and buy more U.S. semiconductor products to avoid a trade conflict.

But finger-pointing by the Japanese government will do little about solving the problem.

Continued on page 87

World semiconductor market share, 1986

Hitachi Ltd., Toshiba Corp. displace U.S. vendors in top three

1986 Rank	*1985 Rank*	*Company*	*1986 Semiconductor revenue (in millions of dollars)*
1	1	NEC Corp.	$ 2,638
2	4	Hitachi	2,305
3	5	Toshiba	2,261
4	2	Motorola, Inc.	2,025
5	3	Texas Instruments, Inc.	1,820
6	6	Philips-Signetics	1,356
7	7	Fujitsu Ltd.	1,310
8	10	Matsushita	1,233
9	11	Mitsubishi Electronic Corp.	1,177
10	8	Intel Corp.	991
11	9	National Semiconductor Corp.	990
12	12	Advanced Micro Devices, Inc.	629
13	14	Sanyo Corp.	585
14	13	Fairchild Semiconductor Corp.	510
15	22	Sony Corp.	475

INFORMATION PROVIDED BY DATAQUEST INC

Memorex: Life as a distributor

BY ALAN ALPER
CW STAFF

NEW YORK — When a group of Memorex Corp.'s European executives struck a deal last fall with parent company Burroughs Corp. to purchase the peripherals subsidiary and move its headquarters from Santa Clara, Calif., to London, they hoped the leveraged buyout would provide the firm with a new lease on life.

Analysts, however, questioned their sanity.

Could the new owners transform Memorex into a healthy, thriving business after years of marginal profits, some losses and an inability to stay current with peripherals technology? More important, how could a London-based concern maintain strong relations with U.S. customers?

DASD concerns

Another nagging concern was a dependency on its former parent — operating under the name Unisys Corp. since its merger with Sperry Corp. — for IBM plug-compatible disk drives. Analysts wondered whether the firm could continue to compete without manufacturing its own direct-access storage devices (DASD).

The "new" Memorex has attempted to answer all the uncertainty by stressing the advantages of operating as a distributor. Even before the leveraged buyout [CW, Nov. 10], many of the company's IBM-compatible terminals and controllers were already made by other vendors.

"We can do a more effective job as a distributor because we are not tied down to a particular type of R&D or factory," said Sergio Mazza, president of Memorex's U.S. sales and services operations, in a recent interview. Mazza pointed out that half of the firm's $917 million in 1986 revenue came from non-Memorex-manufactured products.

"We've built a channel of dis-

Continued on page 91

Inside

- Split decision on Stratus, Tandem investments. Page 86.
- Memotec Data acquires Teleglobe Canada. Page 87.

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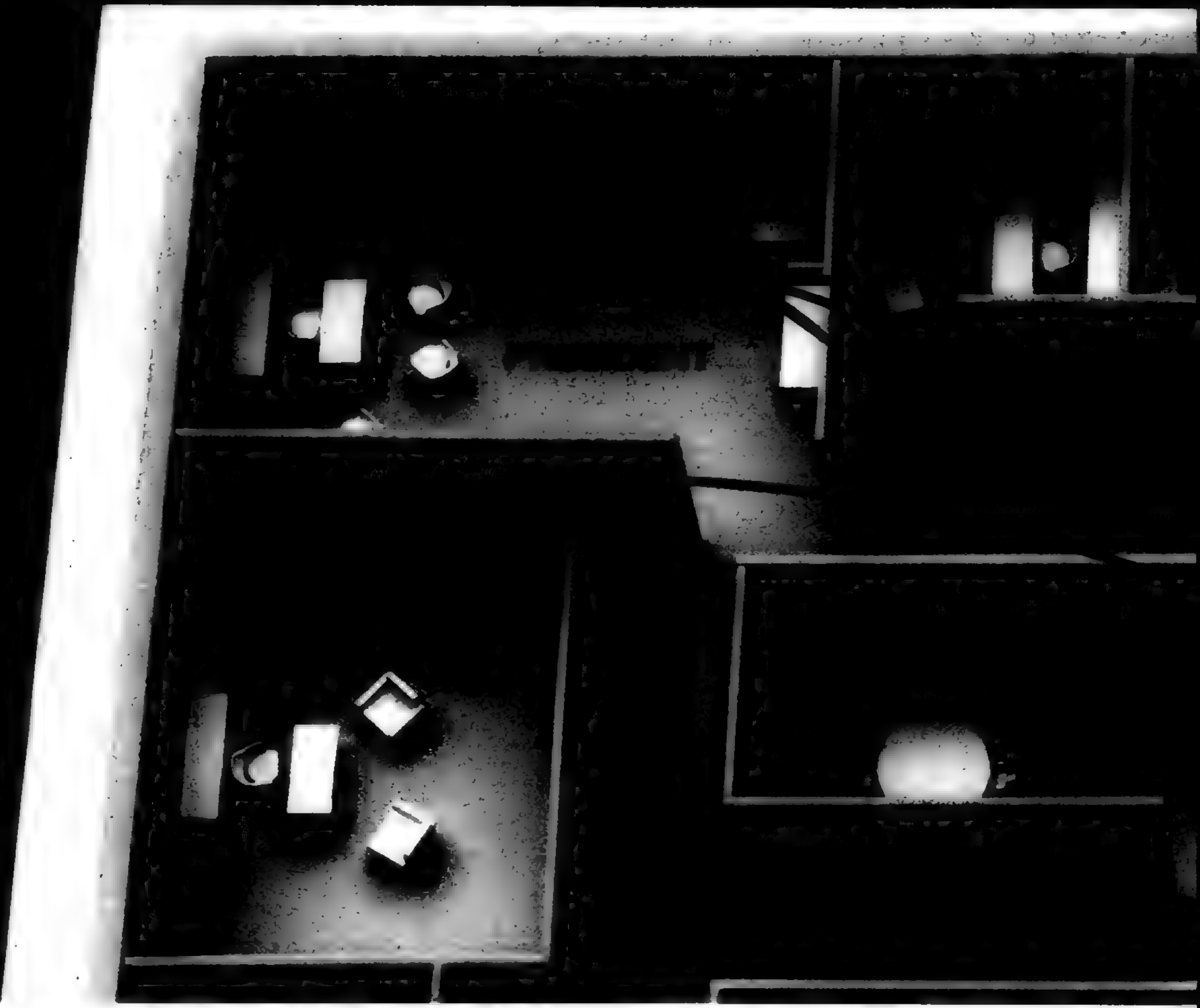

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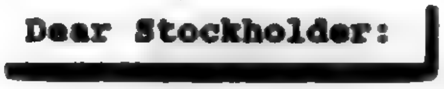

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ACTIVE ISSUES

Kathy Porteus

Fault-tolerant firms surge

Stratus Computer, Inc. (STRA — 32¼) and Tandem Computers, Inc. (TNDM — 57⅞) are among the star-studded cast that has made technology stock performances a hit this year.

But while some analysts continue shouting "Encore," others have tempered their enthusiasm, maintaining that current price levels of Stratus and Tandem adequately reflect their business outlooks.

Stratus and Tandem produce computer systems for on-line transaction processing applications, such as automatic teller machine networks or airline reservations.

Analysts agree that both companies are well positioned to grab a significant share of this market, the size of which is estimated to be $25 billion.

According to Jeffrey Canin, senior analyst with Hambrecht & Quist, Inc., Tandem's dramatic improvement in operating margins and Stratus's new high-end XA2000 computer system are fairly well assumed in each company's stock price.

"In a supportive stock market, these companies will do very well for the balance of the year," Canin says, "but the easiest money has been made."

> "IN a supportive stock market, these companies will do very well for the balance of the year."
>
> JEFFREY CANIN, HAMBRECHT & QUIST, INC.

Estimates bumped up

In mid-January, Tandem's stock surged over seven points when the company disclosed a 133% leap in earnings and a 40% jump in revenue for its first quarter ended Dec. 31.

The news also caused many analysts to raise estimates for Tandem's current fiscal year.

For example, David Wu, analyst with S. G. Warburg Co. of San Francisco, increased his earnings estimate to $2.35 from $1.90 per share.

Yet Wu recently shifted his recommendation of Tandem from a "buy" to a "hold." "With this major earnings surprise out of Tandem already," Wu says, "it's tough for me to see the company significantly beating the performance of other technology stocks." Wu recommends holding Stratus as well.

Hambrecht & Quist's Canin continues recommending purchase of both Tandem and Stratus, but as long-term investments. He estimates Tandem will earn $2.40 per share on $1.02 billion in sales in fiscal 1987, representing a 66% earnings and a 33% revenue improvement over fiscal 1986 results.

Canin estimates Stratus will earn $1 per share on $183 million in sales in its current fiscal year, ending Dec. 31.

Warm reception

According to Canin, Stratus's new high-end system was received warmly by investors because the company showed that its standard microprocessor-based system is not performance-limited and that it had achieved nearly a 50% improvement in the cost of transactions per second.

At least one analyst continues to aggressively recommend purchase of both Tandem and Stratus.

Jonathan Fram, computer analyst with Bear, Stearns & Co. in New York, says, "Some good news is clearly in the stock [prices], but good news about Stratus and Tandem keeps getting better."

According to Fram, so long as their earnings keep rising, Tandem and Stratus are "not more expensive than when valued on the next four quarters of earnings." Fram estimates Tandem will earn $2.40 per share in fiscal 1987.

He acknowledges that his earnings estimate for Stratus — $1.15 per share this year — is higher than the $1 to $1.15 per share that the company has encouraged.

But Fram is generally enthusiastic about the computer industry.

"This is a nine-inning ballgame for technology stocks," he says, "and we're still a long way away from the seventh-inning stretch."

MERGERS & ACQUISITIONS

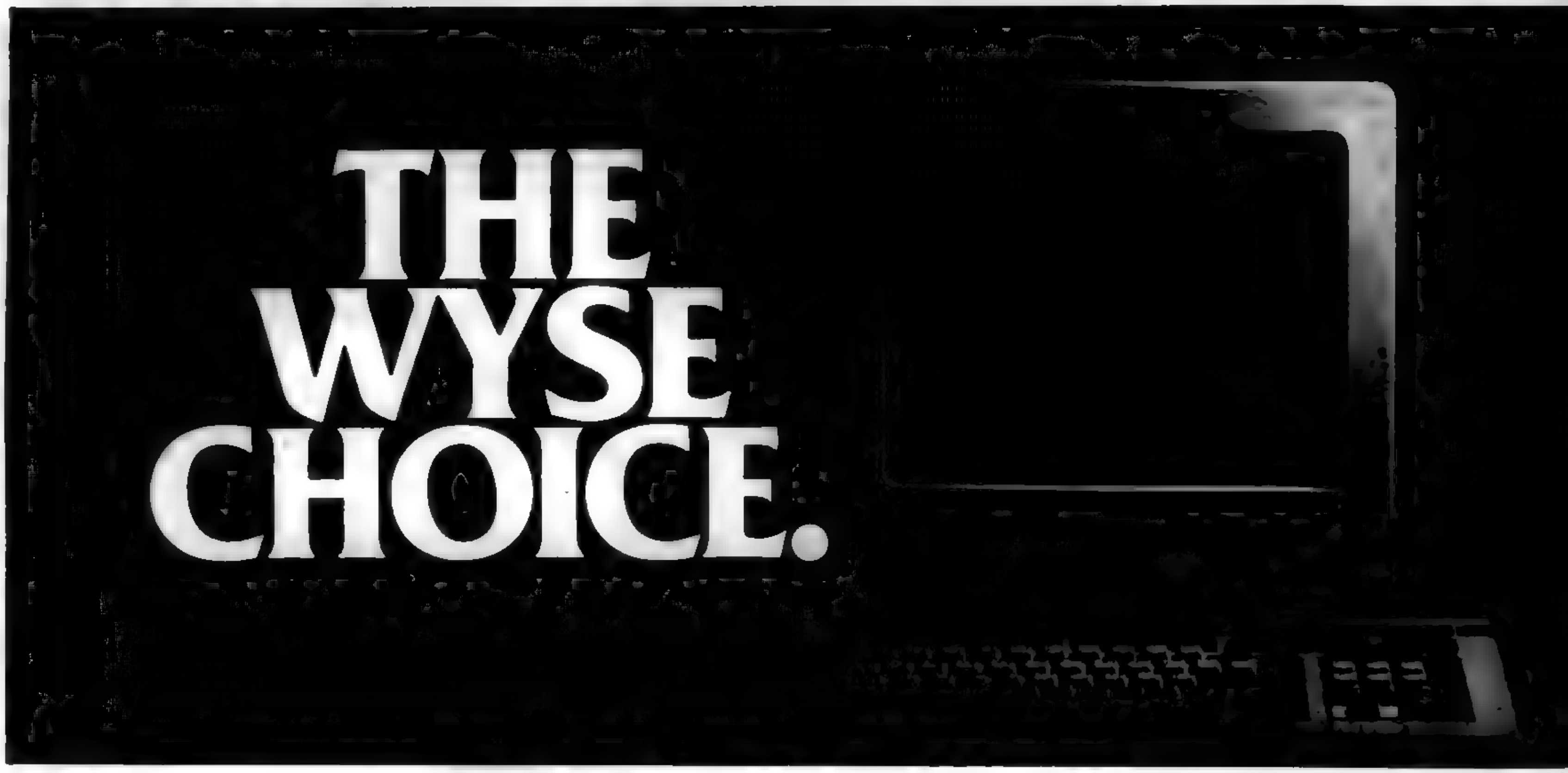
United States Leasing International, Inc. (USL) said that its United States Portfolio Leasing, Inc., subsidiary has acquired a 50% interest in **Hartford Financial Corp.**, an independent IBM computer dealer and lessor, which operates as **Hartford Computer Group.**

Headquartered in Inverness, Ill., Hartford specializes in short-term leasing of IBM computer peripherals and is also an active buyer and seller of used peripheral products.

The company has about 45 employees, and in 1985, it generated about $45 million in revenue.

DPCE, Inc., an independent computer maintenance organization headquartered in Norristown, Pa., has acquired **Systec, Inc.**, a like company, through the purchase of all outstanding shares.

DPCE is a wholly owned operating company of **DPCE Holdings PLC**, the largest international independent computer maintenance firm, with operating revenue in excess of $50 million per year.



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Japan

FROM PAGE 83

analysts say. More extreme measures, such as trade sanctions and duties, are needed to create fair competition.

"The problem won't be corrected until the U.S. imposes some stiff duties on a wide range of Japanese electronics goods," says Peter W. Kubiak, a semiconductor analyst with Kidder, Peabody & Co. in San Francisco.

"One possibility is the total shutdown of the importation of certain products into the U.S.," Rogers says.

"For example, no dynamic RAMs, for any reason, would be allowed into the country. If we really let them have it on one product, they would know they're going to have to change their behavior," Rogers states.

Being touted as a long-term solution to the problem is Sematech, the proposed government-industry consortium to assist the U.S. in chip manufacturing, in which Japan has the edge. The U.S. Department of Defense has voiced its support for the consortium, not wanting to rely upon foreign companies to supply the semiconductors for U.S. strategic weapons.

Years of development

Even if successful, however, Sematech would require several years of development before it could begin to make an impact.

In the meantime, the trade problems are expected to continue unless the U.S. government and industry can take appropriate action.

"Getting the industry together to cooperate on efficiency in manufacturing is most desperately needed," Kubiak says.

"But that will take a long time to get off the ground, and we need to plug the holes in the dike now," Kubiak maintains.

Although Sematech could provide some solutions in the long term, the government could put its funds to best use by supporting venture-capital investment and bolstering the level of silicon technology research and education grants, Rogers suggests.

Sorbus to supply IBM maintenance for GE

BY CLINTON WILDER
CW STAFF

FRAZER, Pa. — General Electric Co, recently selected the independent computer maintenance firm Sorbus, Inc. to be an authorized service provider for its IBM processors and peripherals.

Under a corporate master agreement, General Electric and RCA divisions, subsidiaries and affiliates will have the option to contract with Sorbus for maintenance on IBM mainframes.

The agreement applies to IBM's 3080 as well as to the midrange System/34, 36 and 38s.

Majority of maintenance

Currently, IBM provides the majority of computer maintenance to General Electric, according to a Sorbus spokesman.

Each General Electric business unit will be free to negotiate the length of time and extent of its maintenance contract with Sorbus.

Sorbus is a subsidiary of Bell Atlantic Corp. General Electric is one of the largest IBM users in the U.S., with the total value of its MIS installation ranked No. 2 in the U.S. by Computer Intelligence Corp.

Teleglobe Canada sold

Networking vendor seeks international presence

BY ELISABETH HORWITT
CW STAFF

MONTREAL — Moving to establish a presence in the international market, networking equipment vendor Memotec Data, Inc. has put in a successful bid for overseas telecommunications service provider Teleglobe Canada.

Memotec announced recently that the Canadian government has accepted Memotec's offer to purchase the communications carrier for $488.3 milbon.

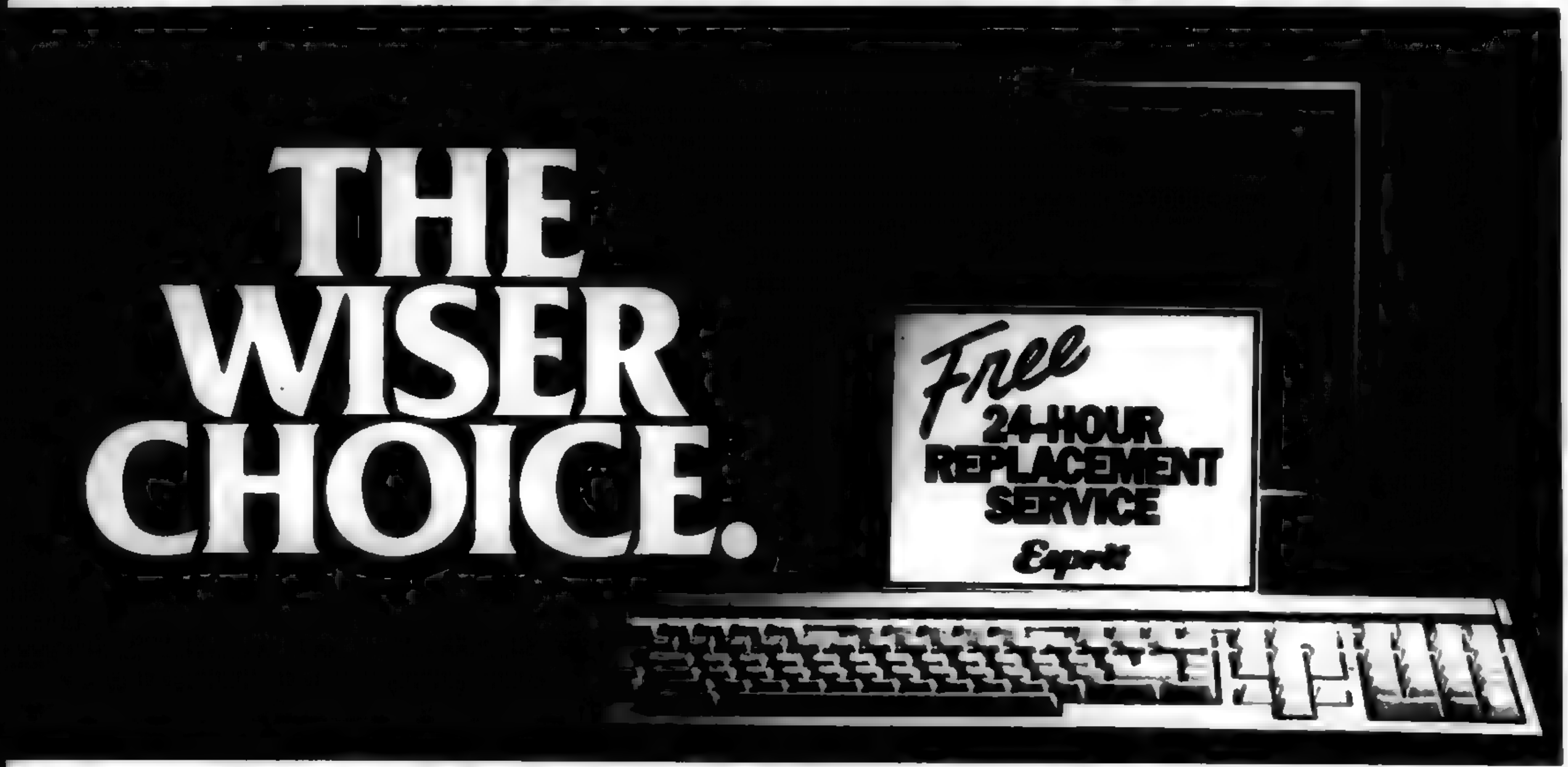
Teleglobe is the exclusive provider of telecommunications services between Canada and every country in the world except the U.S. and Mexico. Memotec, a publicly traded Montreal company, provides systems integration and computer services through its Data Processing Division, X.25 packet-switched networking solutions through its Data Communications Division and network control and management systems through its Infinet, Inc. division.

Infinet, formerly a privately held North Andover, Mass., company, was acquired by Memotec last July.

Teleglobe already uses Memotec's networking products to support its networking services. Although Memotec will not directly provide international distribution for Memotec's products, "their name is known internationally, so they could potentially provide us with international connections," said Infinet President Nicholas Papantonis.

With the acquisition of Teleglobe, scheduled for completion March 31, Memotec will possess total assets of $615 milbon. Teleglobe's assets, in combination with its established international presence, will allow Memotec to compete effectively in the international marketplace, the company claimed.

"The addition of Teleglobe to the Memotec group marks a significant milestone in the further expansion of Infinet's ability to provide products and services on an international scope," Papantonis said. The two companies will be working together to expand Infinet's product base to better serve Teleglobe's customer base, he added.



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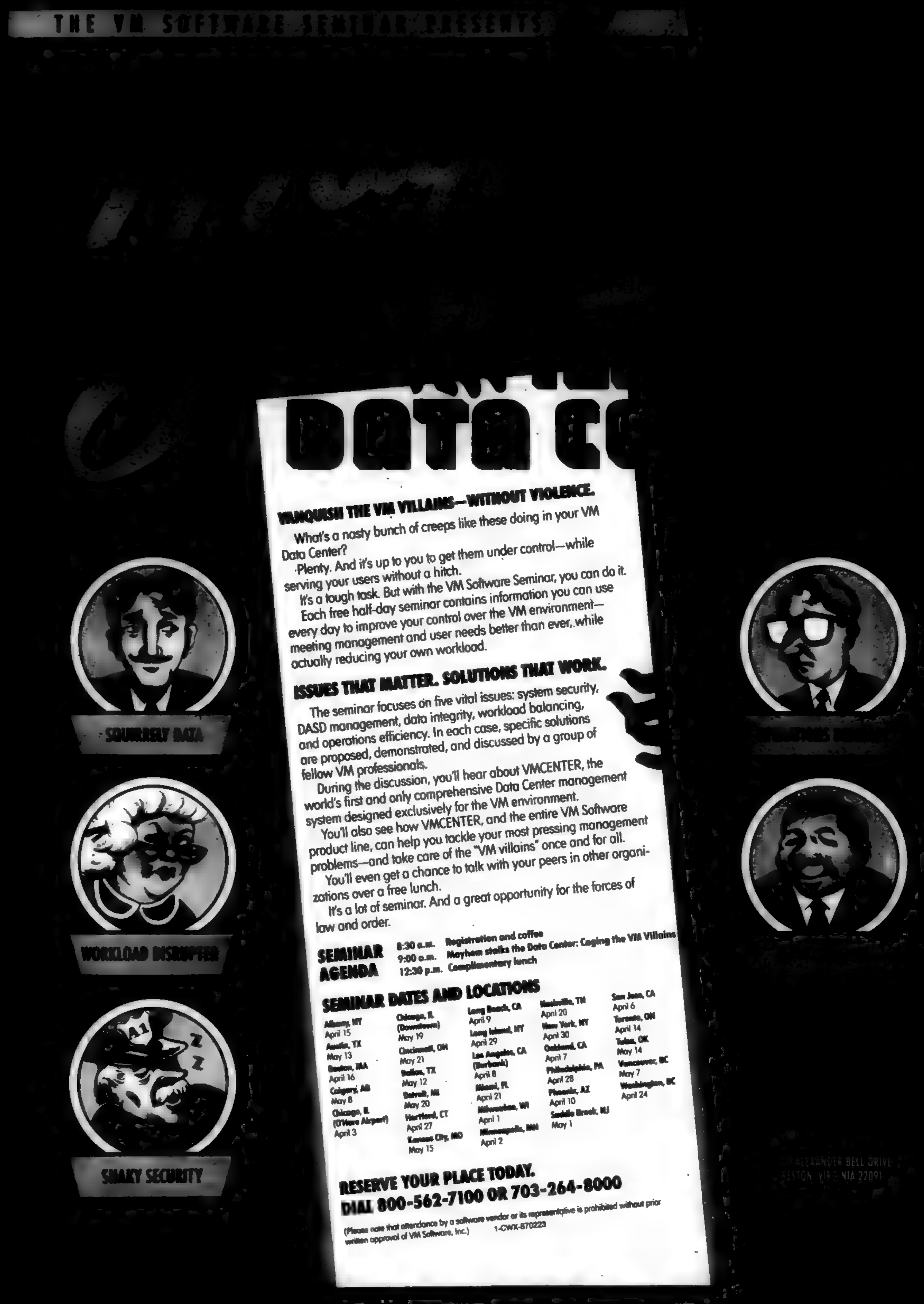

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May 21
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April 29
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April 21
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Memorex

CONTINUED FROM PAGE 83

tribution and service," he observed. "It's just a question of pumping more product through the channel."

Memorex's strategy is to take the best available product — whether manufactured in-house or purchased from another vendor — and tailor it to a particular customer's need. Mazza said there are a myriad of manufacturers of what he calls engines, such as head-disk assemblies, terminals or printers. The key, he said, is to interface these so-called engines within a systems architecture.

"What we do is provide a window into technology for the user of IBM-compatible equipment," Mazza said. "Since many customers are looking for an alternative to IBM, what we are doing is taking an engine, creating an interface and bringing it to the user so he has a choice."

While such a strategy may be well-suited to the communication products business, analysts said they believe that such an approech in the IBM plug-compatible disk-drive market may be more perilous. If Unisys has DASD manufacturing problems, Memorex may have difficulty lining up an alternate source.

DASD manufacturing for IBM and the plug-compatible vendors has always been fraught with difficulties, as the former Memorex can attest. For example, the firm was plagued with production problems throughout 1985 on its flagship IBM 3380-compatible drive.

Mazza said he believes Memorex is less vulnerable to potential manufacturing problems because it is now a distributor. While hoping the company will not need to turn to such a measure, Mazza suggested that Memorex has the flexibility to sign up Fujitsu Ltd. or Hitachi Ltd. as secoondary sources.

Mazza cited a predecent for that move. Memorex's European operation has, in the past, purchased Fujitsu head-disk assemblies and configured them with controllers when in-house manufacturing problems have surfaced.

'Keeping costs in line'

Because Memorex is Unisys's second largest customer — accounting for some $200 million in DASD revenue — Mazza predicted that the firm's former parent will work hard to meet Memorex's needs. "They want to keep their factory busy to keep their costs in line," he said.

Moreover, Unisys maintains an equity stake in the new Memorex, Mazza pointed out. Under terms of the $620 million buyout, Unisys put up $73 million.

"We're highly confident that Unisys will come through," Mazza said. "For Unisys to keep up with DASD technology, they have to keep a foot in the IBM world. They have every incentive and desire to do so."

In fact, the loss of DASD manufacturing should help Memorex regain profitability after last year's small loss. "If you strip out disk drive manufacturing, last year Memorex was essentially profitable," he contended.

Memorex is projecting pretax profits of $98 million for the current year on revenue of $984 million. By 1991, the firm expects to earn $185 million, on a pretax basis, on revenue of $1.2 billion.

To accomplish such lofty goals, Memorex will emphasize a broad mix of products and expansion of its third-party maintenance business, which has been highly successful in Europe. While large storage peripherals will account for 30% of revenue, DASD will represent only 10% of the firm's business. Memorex expects to derive 30% of its revenue from communications products, including terminals, while service and supplies will provide 20% each.

While it is more difficult in the U.S. to ply customers away from their suppliers, Memorex is hoping that the move in many DP shops toward multivendor environments will boost its market share. "We see our smaller market penetration in the U.S. as an opportunity," Mazza said. "We think there is no question we can be as successful in the U.S. as we are in Europe."

CAD firms Valid Logic, Telesis merge

BY CLINTON WILDER
CW STAFF

SAN JOSE, Calif. — Two players in the electronic computer-aided design industry consolidated recently when Valid Logic Systems, Inc. announced an agreement to acquire financially struggling Telesis Systems Corp. of Chelmsford, Mass., for approximately $22 million in Valid Logic common stock.

Following completion of the merger, Telesis's electronic design automation workstations will be marketed under the name of Valid Logic, a vendor of computer-aided engineering workstations. However, Telesis President and Chief Executive Officer W. Douglas Hajar has been named president and CEO of Valid Logic. Valid Logic's founder, Jared A. Anderson, will retire, and its president, Kenneth B. Fine, will resign.

The two firms plan to consolidate sales and marketing operations. In its third quarter ended Dec. 28, Telesis took a $2.4 million charge for restructuring costs associated with the merger.

Telesis lost $3.8 million in the quarter on revenue of $2.6 million. The firm had been marginally profitable in the first six months of fiscal 1987, following a loss of $7.6 million in fiscal 1986. Telesis has lost money every year since 1983.

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NICKELS & DIMES

Wyse Technology, Inc. announced revenue for the third quarter ended Dec. 31 of $69.8 million, compared with $44.3 million a year ago. Profits were $4.7 million, or 39 cents per share, compared with $3.5 million, or 33 cents per share, in the prior year.

Decision Industries Corp. announced revenue for the fourth quarter ended Nov. 30 of $56.3 million, compared with $46.3 million in the like quarter last year. Profits were $6.8 million, or 72 cents per share, compared with $1.4 million, or 15 cents per share, in the previous year.

Revenue for the year was $195.1 million, compared with $175.6 million in the previous year. Profits were $7.7 million, or 82 cents per share, compared with $7.8 million, or 86 cents per share, in the previous year.

Seagate Technology Corp. reported revenue for the second quarter ended Dec. 31 of $251.9 million, a 149% increase from the $101 million reported for the like quarter a year ago. Profits were $37.6 million, or 76 cents per share, compared with $4.6 million, or 10 cents per share, one year ago.

NBI, Inc. reported a net loss of $3.9 million, or 42 cents per share, in the second quarter ended Dec. 31, compared with net income of $279,000, or 2 cents per share, in the previous year. Revenue was $69.8 million.

Intellicorp, Inc. announced a net loss for the second quarter ended Dec. 31 of $501,000, or 7 cents per share, compared with net income of $447,000, or 8 cents per share, in the previous year. Revenue was $4.9 million, compared with $4.5 million a year ago.

Silicon Graphics Computer Systems reported revenue for the second quarter ended Dec. 31 of $18.4 million, a 105% increase over $9 million reported in the like period last year.

Discarding

CONTINUED FROM PAGE 83

comes wonderful.

Or look at IBM. IBM-bashing is in fashion. One widely read columnist recently took a large firm to task for choosing IBM over DEC as its office automation vendor. Why? Because "DEC has better products."

Never mind that the firm had just spent three months finding out that, for its needs, DEC didn't have better products. Today's fad is to bash IBM, so the columnist did.

Then there's Honeywell, Inc. Twenty years ago, a disgruntled ex-employee with a dramatic flair for writing used his newspaper column to put Honeywell down at every turn. Since then, "experts" have always predicted disaster for Honeywell users "next year."

While Honeywell has divested its computer business to a new corporate entity, its users have not been abandoned, and it doesn't appear they will be. NEC Corp. and Compagnie des Machines Bull would not have invested hundreds of millions with that intent, and the new company has no other businesses to fall back on. By now, the doomsayers should realize that using a Honeywell computer need not be a recipe for MIS failure.

Users pay for poor logic

Why don't they? Because it's "in" for consultants to knock Honeywell. It's illogical, but it's been there for a while and still is. Who suffers? Just users, who can be swayed by fads away from what would otherwise be their best choice.

Data General Corp. is another example. Two years ago, their OA focus was a "brilliant strategic move to position them for 1990." Then their technical users complained about being abandoned. All of a sudden, the brilliant strategic move turned into "abandoning their roots" and "overreacting to market shifts."

The truth lies somewhere in between. The fad pendulum swings from one extreme to the other.

It would be nice if we could reform the world. It would be nice if we could persuade industry advisory services to look at the facts objectively. It would be nice if we could stop advisors from taking the easy path by following the trends.

All these things would be nice, but they won't happen.

Since it won't happen, users must take matters into their own hands. Users should still engage consultants. They should read reference services. But they should listen to them with a large grain of salt wedged firmly in each ear.

Users should insist on hearing about the bad sides of the vendors the consultants like and the good points of the ones they don't. They should ask why someone might not follow the consultants' recommendations. They should demand meaningful points, not trivia.

Users must remember that the selection responsibility is ultimately theirs. They are the ones who will have to live with the outcome. Their decisions, whatever they are, whether they go with or against the current fads, must be ones they can live with.

Mallach is associate professor of computer science at the Boston College School of Management and a consultant to vendor and user executives.

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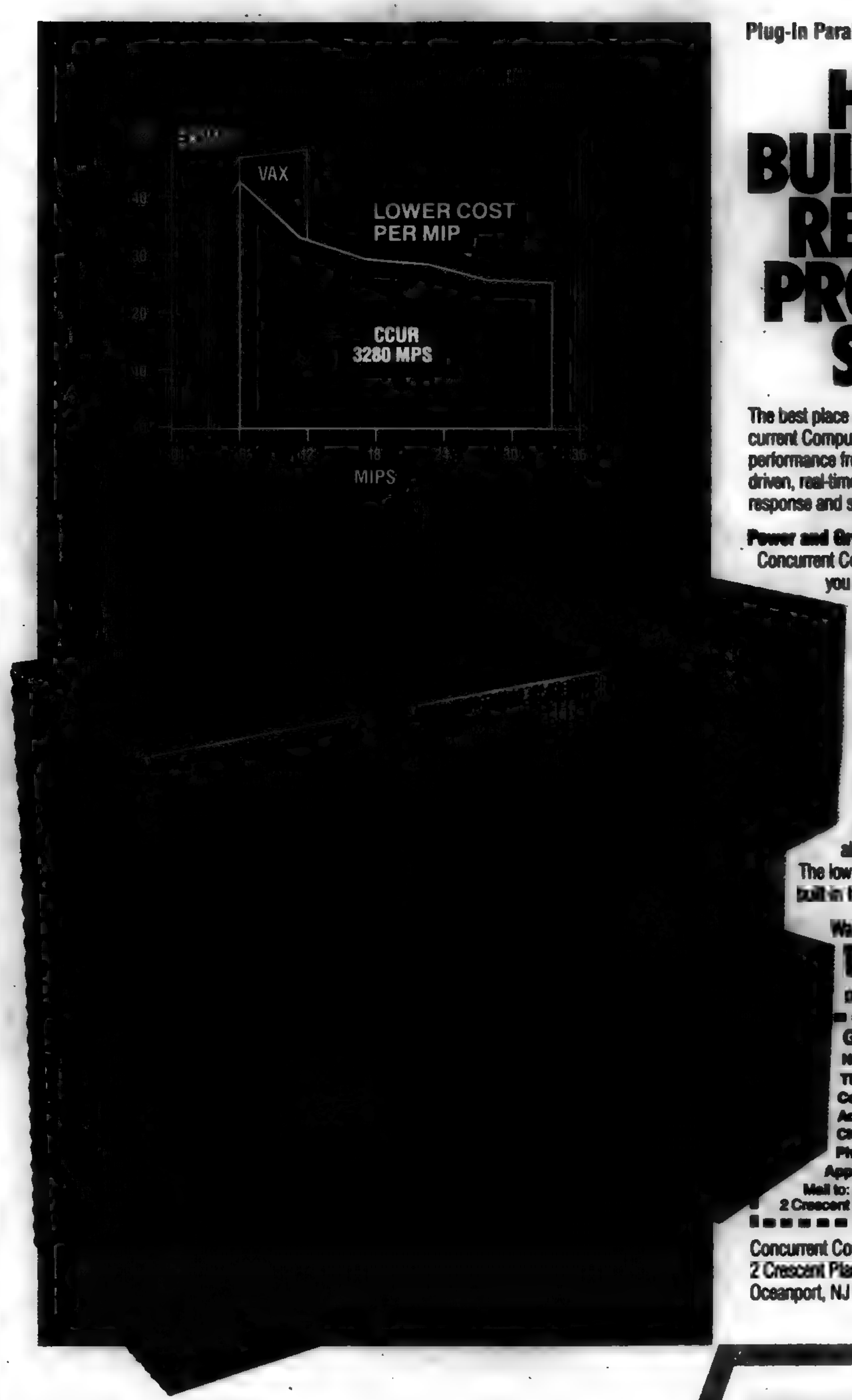

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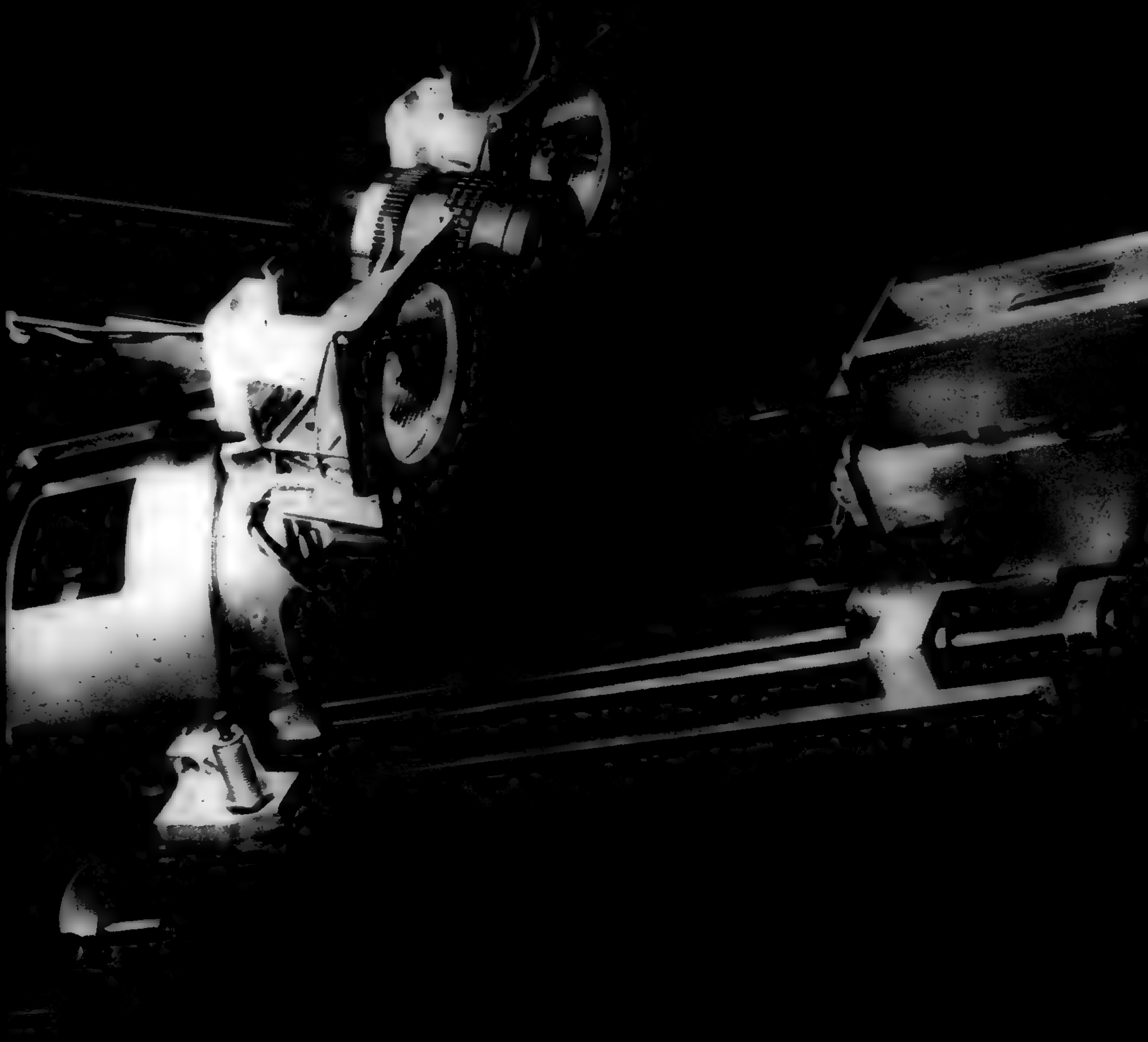

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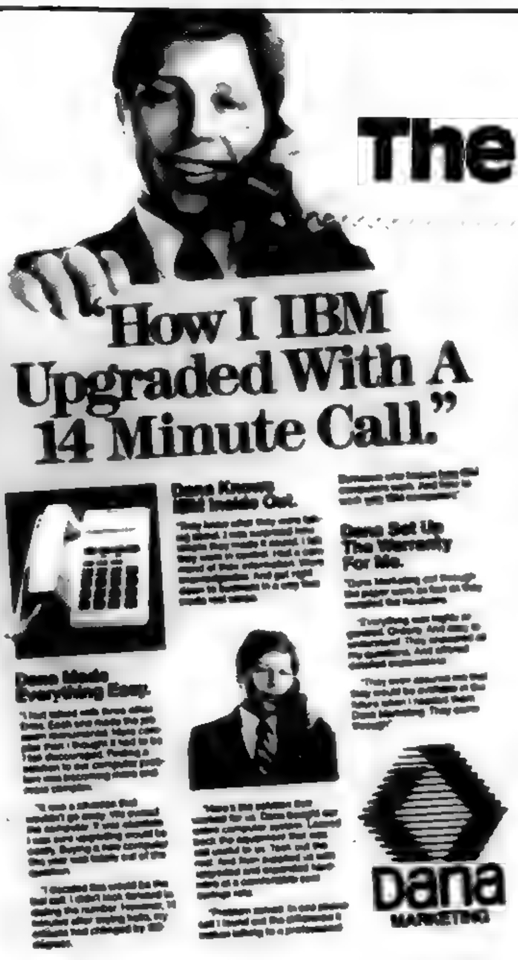
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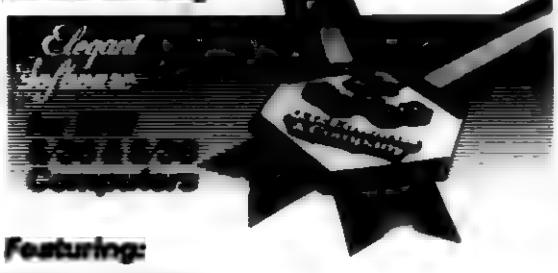

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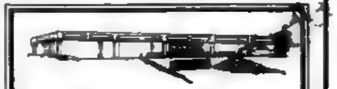

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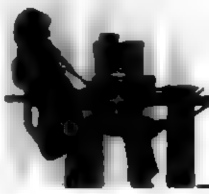

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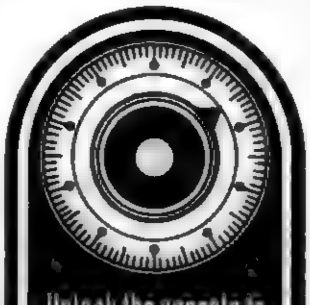

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Systems Programmer/Analyst: design, code, test, implement large scale online & batch systems using knowledge of computer science, IBM 3032, 4331 Hardware, Systems Software such as JCL, ISPF, TSO & IMS DB/DC, VSAM, COBOL, FORTRAN, ASSEMBLER, & MIS development, implementation, maintenance for meeting changing requirements. Evaluate specific pieces of optimizing performance. VIS-A-VIS operating system software, analyze software-related problems in application systems & correct software or suggest alternative solutions in the application systems, interface with technical staff in order to optimize application designs & troubleshoot applications software problems. BS in computer science plus 2 yrs. exp in the job offered or 3 yrs. exp as programmer/analyst using above hardware and software. 40 hr/wk., $33,000/yr. Resume to H. Block, Job Service, 18 South Ave., Rochester, NY 14604.

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Apply computer languages (Cobol, JCL, SPSS, Mark IV and DL/1) to Hospital Integrated Management System Database to provide employer with requisite management data and to formulate reports for employer's administrators and for positions connected with employer and for submission by employer to public agencies (including City and State Health Departments) and others. Bachelors Degree with major field of study in Computer Science, Mathematics, Statistics or Economics required. 1 year experience. Salary $32,000/year. 40 hours. D.O.T. Code 012167066. Mail resume to New York State Job Service, JO # 8012265, 485 Fifth Avenue, New York, New York 10017.

Systems Analyst - Analyze, design, develop and implement public assistance control system utilizing NATURAL, ADABAS software on IBM mainframes. High school graduate. 4 years experience. 40 hours per week. $42,000 per year. No calls, mail resume: NYS Job Service, JO #8010133, 485 Fifth Ave., New York, NY 10164. DOT 012167066.

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Our dynamic, state-of-the-art facility is currently seeking qualified individuals for challenging systems programming positions. Environment consists of an IBM 3090 and an IBM 3084Q operating under MVS/XA and VM/XA.

Requirements for all positions include a B.A. and 3-4 years of full-time programming experience, preferably in one of the following areas:

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Experienced in installation, maintenance and performance tuning of ADABAS and NATURAL in an MVS/XA environment. Knowledge of APAS and SAS desirable.

MVS
Experienced in installation and maintenance of MVS/XA and related software. Knowledge of SMP and SYSGEN required. Proficiency in Assembler highly desirable.

VM
Experienced in installation and maintenance of VM/XA, VM/HPO and CMS. Proficiency in use of CMS required. Some knowledge of VM internals desirable.

Performance and Capacity Planning
Systems programming background and experience with MVS performance tools (RMF, SMF, OMEGAMON). Knowledge of SAS desirable.

Network
Systems programming background and experience with ACF/VTAM, ACF/NCP, NPM, NCCF, etc. Knowledge of data communications hardware required.

If you are interested in a career which allows you to maximize professional and personal growth, send your resume, indicating position desired and salary history and requirements, to: Box CW-B4885, Computerworld, Box 9171, Framingham, MA 01701-9171

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For immediate consideration, please send your résume in confidence, indicating position and geographical preference, to: **Planning Research Corporation, Government Information Systems, 1500 Planning Research Drive, Department JA-43, McLean, Virginia 22102.** An Equal Opportunity Employer M/F/H/V

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NORTH CAROLINA MEMORIAL HOSPITAL

Due to program expansion, the Information Services Division of The North Carolina Memorial Hospital, a 650 bed teaching hospital located on the campus of the University of North Carolina - Chapel Hill, has available the following positions:

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Will be responsible for establishing all aspects of computer system project administration. In addition, this position will evaluate, recommend and implement project management standards and supporting software. The Project Administrator works closely with the project leader to establish the project management framework and conduct ongoing project monitoring. This position reports directly to the Associate Director of Development and requires excellent project management skills and extensive projects management experience.

PATIENT MANAGEMENT SYSTEMS MANAGER

Will be responsible for implementing and supporting the hospital's patient management systems. Included is the hospital's recent implementation of the SMS Independence systems. These systems facilitate the hospital's clinic appointments, ADT and patient accounting. This position will be directly responsible for six programmer/analysts and will report to the Associate Director of Development. Excellent project management skills and extensive experience with large system installations are required. Experience with SMS systems is desirable.

Both positions require a Baccalaureate degree and minimum 5 years progressive data processing experience. Graduate degree and university teaching hospitals experience preferred. Salary open. Interested candidates should send a current resume to:

Chuck Kerstein
Associate Director, Information Services
North Carolina Memorial Hospital
First Floor Anderson Pavilion
Chapel Hill, North Carolina 27514

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COMPUTER SYSTEMS ANALYST

Slippery Rock University is seeking a Computer Systems Analyst who will interface with financial managers and staff personnel to integrate the on-line financial management and accounting system with the business practices of a University. This person will be responsible for the continuing evolution of the financial system into a strategic financial information reporting system.

Five years experience in programming and systems analysis is desired. Must have recent systems analysis experience with on-line financial management systems. Experience with IBM 4300 mainframe systems will be beneficial. Bachelor's degree required with major or minor in accounting or finance. Women and minorities are especially urged to apply.

Salary Competitive.

Send letter of application, resume, and three (3) recent letters of recommendation to:

Mr. W. Gary [illegible]
Slippery Rock University
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To insure consideration, applications must be received by April 1, 1987

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SENIOR IBM SYSTEMS ENGINEER

Responsibilities include evaluation and implementation of new facilities, maintenance and tuning of the system and associated system level support software, and support for the development of new applications using PANVALET, CICS/VS 1.7, and ADABAS.

Qualifications include an M.S. in Computing or related field and three years of experience as an IBM MVS systems programmer with in-depth knowledge of MVS and JES2 internals and associated support software.

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Responsibilities include implementation of new facilities, maintenance and tuning of the system and associated system level support software, and support for the development of new applications using PANVALET, CICS/VS 1.7, and ADABAS.

Qualifications include a B.S. in Computing or related field and two years of experience as an IBM MVS systems programmer. Additional experience and knowledge of MVS and JES2 internals, CICS/VS, TSO/E, ISPF/PDF, and VTAM desirable.

We offer competitive salaries, excellent fringe benefits including a tuition waiver. Interested applicants may forward resumes with salary history to:

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Systems Analyst

to analyze business procedures and problems in order to refine data and convert it to programmable form for electronic data processing. Determine specific requirements including breakouts, degree of data summarization, format for management reports. Develop new systems. Prepare programs for computer use. Requires BS in Bus. Info. Systems or equivalent (Equivalent may be in related field (Computer Science, Engineering, Statistics etc.) accompanied by completion of computer course work, or where all computer course work has been completed towards BSBIS.) Sal $35,000/yr. Job site/interview: Sacramento. Send this ad and your resume to:

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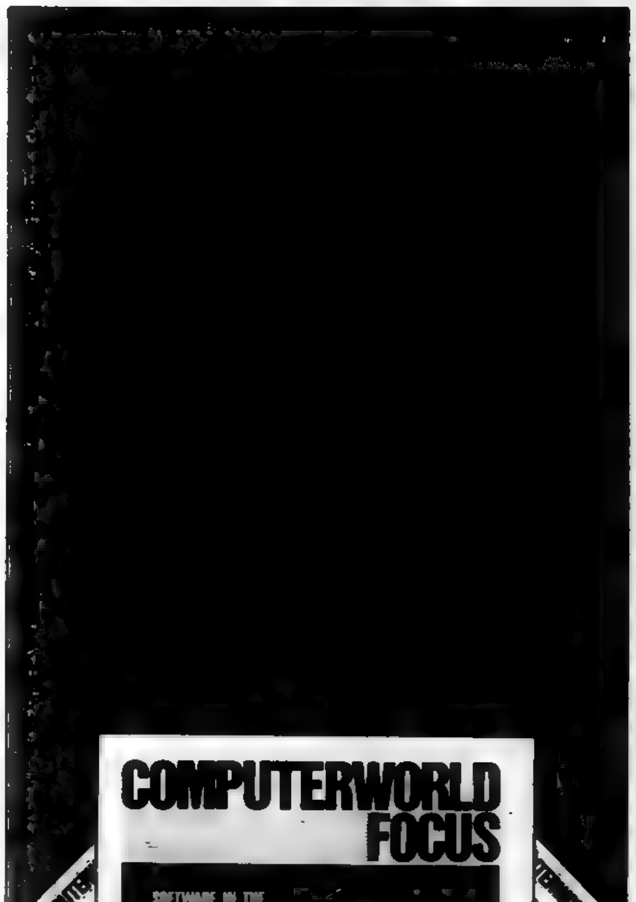
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SENIOR SYSTEMS PROGRAMMER to perform all systems programming functions in an independant manner.

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The ideal candidate will possess a strong background in accounting, with 5+ years of developing accounting applications, using structured COBOL. A familiarity with prime hardware and data communications would be a definite plus, as would experience in the retail/distribution industry. Preference will be given to candidates with a degree in either Computer Science or Accounting.

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Duane Dudley

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To apply for the position, send resume to the Personnel Department, ASU, Tempe, AZ 85287. Computing services positions are considered sensitive and require a criminal record check of successful candidates. Competitive benefits. Please state job title. Interviews will be arranged. An equal opportunity/affirmative action employer.

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Candidates must have in-depth experience with installing (MVS Express or CBIPO) operating system software for MVS-SP or MVS-XA in a 430X, 308X, or 3090 mainframe environment. Knowledge of supporting program products is also required for JES2, SDSF, SMPE, TSO/ISPF, DF-SORT, and ICF catalogs. Working knowledge or experience with VM/VS1, ACF2, UCC1, UCC7 and graphics is highly desirable. Position involves installing and maintaining operating systems, troubleshooting and dump debugging, installing support products and interfacing with domestic and international users.
(Reference CW-1).

Lead Analyst - Teleprocessing Support
(3-7 years experience)

Candidates must have good working knowledge of VTAM, NCP, SNA, and SDLC. Experience with TP monitors such as CICS, ENVIRON/1, TIS-DC, DATACOM/DC, IMS-DC, etc. is required. Work will encompass installing NCP software from a CBIPO using SMPE, tailoring VTAM and NCP macro definitions, maintaining ENVIRON and TIS-DC TP monitors, tuning and performance analysis, microcode generations for 3274 control units, troubleshooting and dump reading. Good personal communication skills for interfacing with domestic as well as international users are required.
(Reference CW-2).

Senior Analyst/Programmer Application Development

Interacts with users to determine requirements, then designs and implements appropriate IBM mainframe systems for use in Dallas and overseas. Candidates must have minimum of five years experience, with emphasis in large scale on-line business systems. Knowledge of petroleum marketing and refining operations a plus. Data base expertise also desirable.
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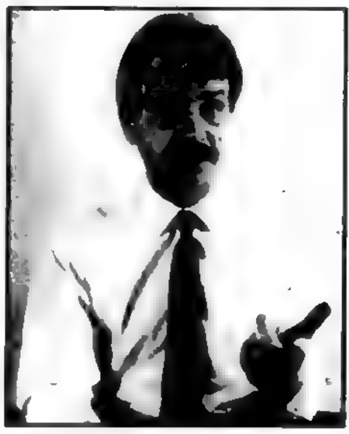

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Austria: Manfred Weiss, CW Publikationen Verlagsgesellschaft m.b.H., Josefstadter Strasse 74, A-1080 Wien, Austria. Phone (011) 43 222486 5910. Telex (847) 115 542 (SCHV A).

Brazil: Ney Kruel, Computerworld do Brasil, Rua Alcindo Guanabara, 25-11 andar, 20.031 Rio de Janeiro RJ Brazil. Phone (011) 55 21 240 8225 Telex: (391) 21 30838.

Denmark: Preben Engell, Computerworld Danmark A/S, Tovegade 52, 1400 Copenhagen K, Denmark. Phone: (011) 45 1955 696. Telex (855) 31566.

France: Jean-Louis Rendon, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, France. Phone (011) 33 (1) 4 747 1272. Telex (842) 613234 F

Hungary: Dezso Futasz, Computerworld Informatika Co., Ltd. H-1536 Budapest, Pf 386, Hungary. Phone: (011) 36 1 228 458. Telex (861) 22 6307 (KSHP H).

Italy: Dr. Bruno Fazzini, Computer Publishing Group S.R.L., Via Vida 7, 20127 Milano, Italy. Phone: (011) 39 02 2613432 Telex (843) 335318.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone (011) 81 3 551 3882. Telex (781) 252-4217 (Computerworld Japan only)

Steven Yamada, Tokyo Representative Corp., Sanshin Kogyo Jimbocho 3F, Chiyoda-ku, Tokyo 101, Japan. Phone (011) 81 3 230-4117/4118. Telex (781) J26860 (reps for all CWCI publications except Computerworld Japan)

Mexico: Henry Morales, Computer Mexico S.A. de C.V., Oaxaca 21 2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Phone (905) 514-4218 or 6309 Telex (383) 177 1300 (ACHAME).

The Netherlands: Wout Berends, CW Communications B.V. van Eeghenstraat 84, 1071 GK Amsterdam, The Netherlands. Phone (011) 31 20 646426 Telex (844) 18242 (CWCOM NL)

New Zealand: Reg Birchfield, CW Communications Ltd., 13 Maidstone St., Grey Lynn, Auckland 1, New Zealand. Phone (011) 64 9 768 993 Fax (011) 64 9 780 244

Norway: Morten Hansen, CW Norge A/S, Hovinveien 43, P.O. Box 2862 Toyen, 0608 Oslo 6, Norway. Phone: (011) 472 647725 Telex (856) 76476 (CW NOR N)

People's Republic of China: Chen Mingxun, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Phone: (011) 47 814 8174 Telex (716) 222214 (CCW CN)

Spain: Francisco Zabala, Computerworld Espana, Rafael Calvo 18 4B, 28010 Madrid, Spain. Phone (011) 34 1 419 4014 Telex (831) 47894 (CW E)

Sweden: Bengt Marnfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Phone (011) 46 8 67 91 80 Telex (854) 14904 9 (NOVACW).

Switzerland: Gebhard Osterwalder, CW Publikationen AG, Witikonerstrasse no. 15, Postfach 253, CH-8030 Zurich, Switzerland. Phone (011) 41 1 55 10 77 Telex (845) 816 710

Taiwan: Leora Wang, ACE Media Agency Co. Ltd., P.O. Box 26-578 Taipei, Taiwan, R.O.C. Phone (011) 02 751 3636 Telex (785) 14142 (ACE GROUP) (Representative for all CWCI publications)

London: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WC1 8UT, United Kingdom. Phone (011) 44 1 831 9252 Telex (851) 262346

United Kingdom: Euan Rose, Boere Hobson & Associates, 34 Warwick Road, Kenilworth, Warwickshire CV8 1HE, United Kingdom. Phone (011) 09 26 512424 Telex (851) 311951 (BEEHOB) (Representative for all CWCI publications)

Venezuela: Kalman von Vajna Nagy, CW Comunicaciones C.R.L. Torre Maracaibo, Piso 13, Oficina H, Av. Libertador, Caracas, Venezuela. Phone (011) 58 2 72 76 30

West Germany: Eckhard Utpadel, CW Publikationen Verlagsgesellschaft mbH, Rheinstrasse 26/28, Postfach 40 0429, 8000 Munchen 40, West Germany. Phone (011) 49 89 360860. Telex (841) 5215350 (COMW D)

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Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: (617) 879-0700, **Telex**: 95-1153, **FAX**: (617) 879-8931

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ADVERTISERS INDEX

Adobe Systems 82
ADR 3
Alloy Computer 30
Applied Management 21
Artificial Intelligence 43
AT&T 45,76,88-89

Bridge Communications 72

California Software Products 57
Cambex 38
CGI Systems 65
Chen 34
Cincom 62
Codex 40
Compaq 70-71
Concurrent Computer 95
Communication Networks '87 54
Cullinet 40/41
CW Circulation 63
CW Corporate 51
CW Testimonial 110
CXI 52

Data Design 55
Data General Corp. 26-27
DCA Network 20-21
Duquesne 69

EMC 68
Esprit 86-87

First Boston 79
Flagstaff Engineering 20

Group Operations 12

Hewlett-Packard 66-67
H&M Software 115
Honeywell 58-59

ICCP 6
Information Dimensions 24-25
Informix 31
Innovation Data Processing 7
Intellogic Trace 34
Interface Group 80
Interlink 92-93
Intermec 46
ITT 56

JDS Microprocessing 45

Local Data 81
Lotus Development Corp. 32-33

McCormack & Dodge 116
Michaels Ross & Cole Ltd 48
Micro Data Base Systems,Inc. 64
Microsoft 36-37,42

National Advanced Systems 91
NCR 39
NEC 84-85
Novell 60

On-Line 13
Oracle 9,19,29

Radio Shack 94
Rapid 49
Realia Inc. 74
Relational Technology 18
Robert Half 44

SAS Institute 22-23,41
Sequent Computer 35
Soft Switch 10
Software Technology & Research (STAR) 38
SPSS 78
Storage Technology 96-97
Syncsort 5

Teknowledge 11
Telex 28
Texas Instruments 14,48-49
Tone Software 54

Uccel Corp. 13
Ultimate Corporation 73

VM Software 90

Walker Interactive 15

Xerox 50

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DDM holds

FROM PAGE 1

nent of a distributed relational DBMS, which IBM said it is working on, is a way to keep track of file locations across the network so that DDM software running on each node will know where to send data requests. The most effective solution to this problem is a global data dictionary, Dzubeck asserted, adding that IBM has promised — but not yet delivered — one for DB2.

Before it introduces a global data dictionary for DDM, however, Dzubeck said, IBM is likely to provide an intermediate solution: a distributed file directory in which different systems on the network keep each other apprised of file additions and relocations.

The current DDM product family requires a programmer to manually set up each directory and key in updates when files are added or moved, "which is not a problem with a typical order-entry system but is when you have a volatile system," IBM's Fisher explained. "IBM is working on this problem," he added.

Another important task for IBM, according to Dzubeck, is to extend full distributed data base functions down to the PC and "let DDM handle communications between data bases." The current DDM/PC product allows IBM PCs to initiate source DDM functions that access applications and files on target DDM nodes; however, it does not allow PCs to run target DDM software that provides applications to other systems on the network, IBM said.

DDM/PC enables the PC user to transparently access files and applications on any IBM host running a target DDM program, via LU6.2 peer-to-peer networking protocols. IBM has previously announced DDM releases for the System/36, System/38 and 370/CICS hosts.

DDM/PC does not provide a user's "plug-and-play" solution but rather a programmer's build-your-own applications kit. The product enables multiple PC users to access files across different IBM hosts, but first, someone must write an unspecified amount of code so that new or existing PC applications can interface with the DDM system, IBM admitted.

Simplifies interfacing

DDM/PC significantly simplifies the task of interfacing applications with LU6.2's peer-to-peer networking functions, Dzubeck observed. DDM/PC interfaces directly with IBM's LU6.2, allowing applications to bypass IBM's PC-DOS operating system and saving users from the need to "get intimate with IBM's Applications Programming Interface [API] and with the LU6.2 networking environment," Dzubeck explained.

"DDM talks to API, which in turn talks to LU6.2." Without DDM, a programmer would have to write API hooks into an application — a much harder task, an IBM spokeswoman asserted.

Companies that are already converting their existing applications and communications systems to LU6.2 should not find DDM conversion to be that much additional work, Dzubeck said.

However, customers may have a long wait before they can use existing PC software packages, such as Ashton-Tate's Dbase III, to access host files via DDM, Dzubeck claimed. "Ashton-Tate will have to come up with a DDM-compatible Dbase or something," he said.

"The problem is that DDM provides no complete application," commented Atul Kapoor, vice-president of Haworth, N.J., consulting firm Kaptronix, Inc. "It may not be such a big deal to restructure mainframe CICS files to conform to DDM formatting. There are utilities to do this. But on the PC side, IBM provides the foundation and expects you to develop the software to call DDM."

IBM's Fisher said that the user, systems integrator or software vendor will "have to encode some things" before an existing software package can access remote or local files through DDM/PC. He did not say how much code would be needed.

The current DDM offering works particularly well in a distributed order-entry environment, according to Fisher, since it enables users in various branch offices and warehouses to call up a customer file, for example, on one host system and a pricing file on another, process the order on a PC and then update the files. DDM's record locking feature allows multiple users to concurrently update different records on the same file, he added.

DDM allows the user to bypass many of the steps required for Systems Network Architecture-based communications, such as designating a file's location and setting up a host session for each record access.

One potential obstacle both to DDM support for existing PC-DOS applications and to full participation of PCs in a DDM network is the fact that PC-DOS does not support a record-oriented file interface.

"The PC sees data as one long stream, while DDM handles two-dimensional, record- and field-oriented files," Fisher said. An API component within DDM/PC performs translatious between the PC's data stream-oriented architecture and the host system's record-oriented file systems, he added.

DDM/PC is priced at $395 and scheduled for availability in the third quarter. DDM for the System/36 and 38 is available now; the 370/CICS release is scheduled for release in March.

Novell challenges 3Com with E-Net adapter card

BY PATRICIA KEEFE
CW STAFF

SALT LAKE CITY — Novell, Inc. last week launched an assault on rival 3Com Corp. with the unveiling of a low-cost Ethernet adapter card. Although Novell currently distributes two 3Com Ethernet cards, the relationship between the networking foes appears doomed.

The company also introduced a developer's kit for its Netware Message Handling Service (MHS) and made public its purchase of Softcraft, Inc. The announcements were made at Novell's third annual Netware Affiliates Developers Conference, held here last week.

The Novell $495 E-Net adapter is a half-size card that uses CMOS chip technology to reduce power consumption.

'Variety of choices'

"Part of our strategy is to supply a wide variety of choices for the many Netware customers who use Ethernet local-area networks," said Craig Burton, Novell's vice-president of corporate marketing and development.

But these choices will no longer include Ethernet adapter cards from 3Com, according to Burton. Novell is unlikely to renew that contract, which expires this month, he said.

Features on the E-Net adapter include National Semiconductor Corp.'s DP8390 Network Interface Controller, 8K bytes of random-access memory for buffer storage and direct-memory access to and from the Intel Corp. 8088-based machine. E-Net also uses string I/0 in Intel 80286-based machines for fast data transfer to the host's memory.

E-Net is available for network file servers and local-area network (LAN) workstations and is compatible with all other Ethernet adapters offered by Novell today. Despite using a different software driver, E-Net can coexist with the other Ethernet boards on the same Netware network.

The initial release of MHS will target asynchronous communications, but Novell has promised to provide future support for standard message and connection protocols such as X.25, IBM's Systems Network Architecture and Professional Office Systems and Digital Equipment Corp.'s All-In-1.

Slated for release next month, the MHS software provides message transfer and routing services between different LANs, minicomputers and mainframe computers throughout a wide-area network.

Novell. also announced the signing of a definitive agreement to acquire Austin, Texas-based Softcraft in exchange for 130,400 shares of Novell common stock.

Softcraft, which has 18 employees and $2 million in sales, will retain its name and operate as a wholly owned subsidiary. The acquisition will be accounted for as a pooling of interests.

Softcraft is a developer of high-performance programming tools and is best known for its Btrieve data base utility for developing applications programs. Novell is said to be working on a data base file server with IBM and Microsoft Corp.

Softcraft Chairman and Chief Executive Officer Tom Reinertson said Btrieve has an installed base of more than 8,000 users and 10,000 units sold.

Recovery features to improve CICS uptime

BY CHARLES BABCOCK
CW STAFF

RYE BROOK, N.Y. — IBM last week announced Version 2.1 of CICS for the MVS/XA operating system, including special recovery features to improve the availability of its on-line teleprocessing monitor.

The new version will be available in the fourth quarter this year, but the recovery features will not be available until the first half of 1988, and then on a "managed availability" basis to IBM customers meeting certain planning and technology requirements, said Paul Neuman, spokesman for the IBM Information Systems Group in Rye Brook, N.Y.

"This appears to be a substantial new release based only on the recovery capabilities," said Rick Holtmeier, executive vice-president of CICS systems house On-Line Software International in Fort Lee, N.J.

The version adds an additional flavor of CICS to the previous releases geared to work with OS, DOS and MVS/SP operating systems, Holtmeier noted.

Version 2.1 includes the capability to detect system failures and quickly intervene to transfer CICS operations to an alternate CICS system running on the same processor, the IBM programming announcement said. A similar transfer can be effected to CICS on a different processor but requires the intervention of an operator rather than occurring automatically, according to the announcement.

Although it was not clear whether all transactions could be saved in such a transfer, Holtmeier said tasks that are in flight are likely to be backed out or dropped from active status in the transfer to maintain data integrity.

IBM also said the transfer could be necessitated by a failure in the processor, the MVS/XA operating system or in CICS components. CICS users complain that the most common system failure stems from storage violations that taint CICS control code and cause crashes once they are invoked.

Another recovery feature of the planned CICS Extended Recovery Facility is the automatic switching of remote VTAM/Systems Network Architecture terminals to another system without loss of end-user sessions, IBM's programming statement said.

The monthly license charge for Version 2.1 will be $2,485.

Recovery for IMS/VS

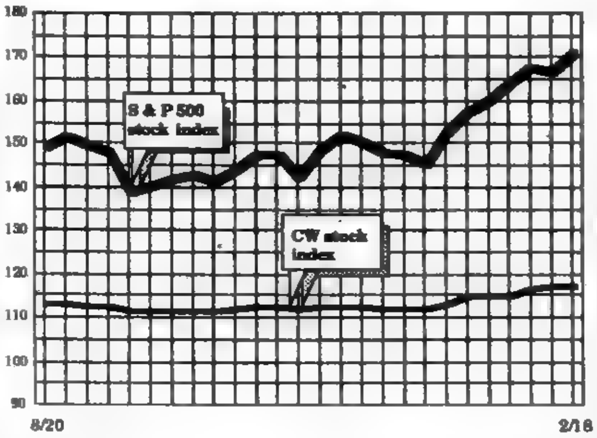
IBM also announced Extended Recovery Facility for IMS/VS users, including IMS Fast Path customers. It is available on a managed availability basis in the second half of this year. Prospective customers will face a technical assessment, and IBM warns that Extended Recovery Facility requires detailed and careful preinstallation planning.

Large customers, such as banks and insurance companies, have been waiting for the recovery features to guarantee recovery of their high-transaction systems, and IBM has acknowledged in the past that producing those features has posed a greater technical challenge than it anticipated.

IBM appears to be expecting a slow and careful shakedown of the product. Its customer information letters warn, "If the order rate exceeds build-up rate, orders may be subject to extended scheduling."

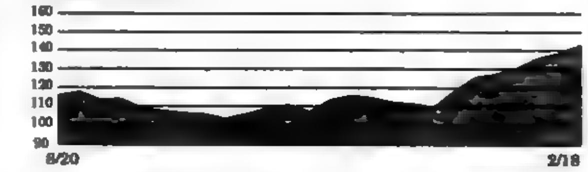
The Extended Recovery Facility for IMS will be included in the existing charge for IMS Version 2.

STOCK TRADING INDEX

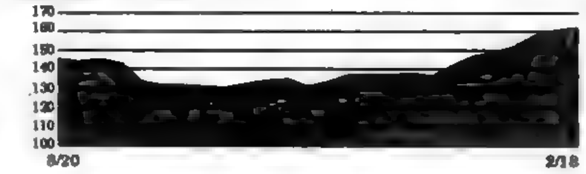


Indexes	*Last Week*	*This Week*
Computer Systems	138.1	**142.5**
Supplies & Accessories	160.8	**161.7**
Software & DP Services	131.3	**132.2**
Semiconductors	106.3	**106.1**
Peripherals & Subsystems	127.6	**129.7**
Leasing Companies	117.2	**121.1**
Composite Index	116.8	**117.2**
S&P 500 Index	166.0	**170.7**

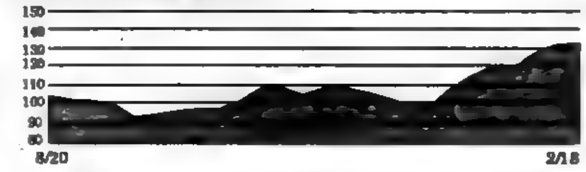
Computer Systems



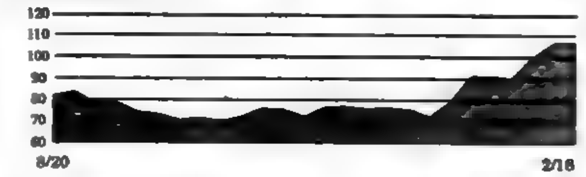
Supplies and Accessories



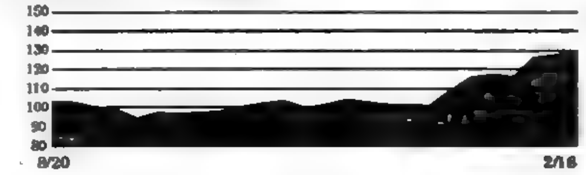
Software and DP Services



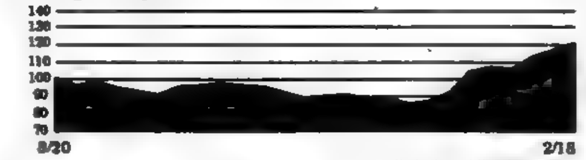
Semiconductors



Peripherals and Subsystems



Leasing Companies



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Stock trading summary

CLOSING PRICES WEDNESDAY, FEBRUARY 18, 1987

Computer Systems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 18 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4.50	+0.1	+2.9
O	ALTOS COMPUTER SYS	19	10	17.13	+1.6	+10.5
A	AMDAHL CORP	40	14	38.75	+4.1	+11.9
O	APOLLO COMPUTER INC	23	9	21.50	+0.5	2.4
O	APPLE COMPUTER INC	67	24	63.50	+7.0	+12.4
N	AT&T	28	21	23.50	0.4	1.6
O	C P T CORP	7	3	4.13	+0.5	+14.8
N	COMPAQ COMPUTER CORP	35	12	31.88	+2.6	+9.0
A	COMPUTER CONSOLES INC	12	6	10.25	1.0	8.9
O	CONCURRENT COMP CORP	25	11	15.00	+0.1	+0.8
N	CONTROL DATA CORP	31	20	30.00	+0.5	1.7
O	CONVERGENT TECH	13	4	[illegible]	+0.3	2.4
N	CRAY RESH INC	121	65	117.50	1.5	1.3
O	DAISY SYS CORP	18	8	[illegible]	0.1	[illegible]
N	DATA GEN CORP	46	25	37.63	+1.6	4.5
N	DATAPOINT CORP	9	4	5.13	0.5	8.9
N	DIGITAL EQUIP CORP	158	76	155.00	+4.6	+3.1
N	FLOATING POINT SYS INC	46	11	15.38	+0.4	+2.5
N	GOULD INC	30	15	20.00	0.3	1.2
N	HARRIS CORP	40	27	39.00	+1.1	[illegible]
N	HEWLETT PACKARD CO	60	36	56.75	+3.6	6.8
N	HONEYWELL INC	84	58	64.00	+2.0	+3.0
N	IBM	162	116	136.00	+4.0	[illegible]
O	IPL SYS INC	4	2	2.50	0.4	17.6
N	ITT CORP	64	41	63.00	+1.1	[illegible]
N	M/A COM INC	19	12	11.88	0.3	1.8
N	MATSUSHITA ELEC INDL LTD	136	64	127.00	+4.1	3.4
O	MENTOR GRAPHICS CORP	29	11	27.75	3.4	+13.8
N	NBI INC	14	8	10.63	+0.1	1.2
N	NCR CORP	63	40	62.25	3.6	6.2
N	PRIME COMPUTER INC	28	16	22.38	+0.3	+1.1
O	STRATUS COMPUTER	34	17	32.75	1.8	5.6
O	SYMBOLICS INC	15	4	4.38	0.4	[illegible]
O	TANDEM COMPUTERS INC	61	22	59.00	+2.3	+4.2
N	TANDY CORP	55	31	53.38	-2.5	4.9
N	TEXAS INSTRS INC	161	103	159.63	0.6	-0.4
A	ULTIMATE CORP	35	13	23.13	2.4	9.3
N	UNISYS	113	58	111.38	8.4	+8.1
A	WANG LABS INC B	22	11	15.13	0.3	+1.7
A	WANG LABS INC C	22	11	15.50	-0.4	+2.5
N	XEROX CORP	75	49	73.13	+4.1	+6.0

Supplies & Accessories

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 18 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	30.75	+1.1	+3.8
N	BARRY WRIGHT CORP	25	14	18.88	1.4	6.8
A	DUPLEX PRODS INC	23	18	20.50	0.3	1.2
N	ENNIS BUSINESS FORMS INC	34	22	32.63	+0.1	+0.4
N	3M CO	140	95	132.75	+1.8	+1.3
N	MOORE LTD	28	20	24.88	+0.5	+2.1
O	STANDARD REGISTER CO	50	32	44.75	+2.5	+5.9
N	WALLACE COMPUTER SVCS	50	37	44.88	0.5	1.1

Software & DP Services

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 18 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	4.25	0.3	5.6
N	ADVANCED SYS INC	21	12	20.38	-0.6	-3.2
N	AGS COMPUTERS INC	37	17	35.25	-0.9	-2.5
O	AMERICAN MGMT SYS INC	31	13	28.75	0.3	0.9
O	AMERICAN SOFTWARE INC	23	9	22.75	-1.8	[illegible]
N	ANACOMP INC	7	3	6.00	0.4	5.9
O	ANALYSTS INTL CORP	11	4	10.88	-0.9	-8.8
O	ASHTON TATE	30	10	27.00	1.0	3.8
O	ASK COMPUTER SYS INC	17	9	16.88	0.8	4.7
O	ASTRADYNE COMP IND	3	1	1.88	+0.0	1.6
N	AUTOMATIC DATA PROC	47	29	45.38	2.4	+5.5
O	BOOLE & BABBAGE INC	11	4	9.50	1.0	11.6
N	COMPUTER ASSOC INTL INC	44	17	39.88	2.4	5.6
O	COMPUTER HORIZONS CORP	14	10	14.13	1.0	+7.6
O	COMPUTER NETWORK TECH	10	4	5.19	0.2	3.5
N	COMPUTER SCIENCES CORP	54	30	52.25	1.5	+3.0
O	COMPUTER TASK GROUP INC	19	11	16.75	0.3	1.5
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	16	10	14.75	+0.6	+4.4
N	CULLINET SOFTWARE INC	17	6	10.63	0.5	4.5
O	CYCARE SYS INC	17	7	8.88	0.1	1.4
O	DUQUESNE SYS INC	33	18	45.50	+1.0	+2.2
N	GENERAL ELEC CO	104	71	102.38	+3.0	+3.0
N	GENERAL MTRS CORP	50	24	37.25	+0.5	+1.4
O	HOGAN SYS INC	15	7	13.63	0.1	0.9
O	INFORMATION SCIENCES INC	4	1	1.00	0.1	11.1
O	INFOTRON SYS CORP	19	7	9.75	0.3	2.5
O	KEANE INC	16	5	8.75	+0.0	+0.0
N	LOGICON INC	38	22	26.13	+1.1	+4.2
O	LOTUS DEV CORP	76	23	73.00	0.5	0.7
O	MANAGEMENT SCI AMER	21	11	19.63	1.3	6.0
O	MCI COMM CORP	13	5	5.25	0.4	6.7
O	MICOM SYS INC	20	10	16.25	0.8	4.4
O	MICRO PRO INTL CORP	5	2	4.19	+0.2	+4.7
O	MICROSOFT CORP	78	26	71.75	+0.0	+0.0
O	NATIONAL DATA CORP	27	16	25.38	+0.0	+0.0
O	ON LINE SOFTWARE INT	19	10	18.50	+0.0	+0.0
O	ORACLE SYS CORP	38	13	37.50	+6.3	+20.0
N	PANSOPHIC SYS INC	42	25	39.88	+1.1	+2.9
O	POLICY MGMT SYS CORP	30	15	28.75	-1.8	-6.5
O	PROGRAMMING & SYS INC	11	6	9.00	0.3	2.7
O	REYNOLDS & REYNOLDS CO	42	27	35.25	+0.0	+0.0
O	SCIENTIFIC COMPUTERS INC	8	4	7.88	+0.0	+0.0
O	SEI CORP	28	15	24.25	+1.0	+4.3
O	SHARED MED SYS CORP	53	30	41.50	7.8	[illegible]
O	SOFTWARE AG SYSTEMS INC	22	10	16.00	0.8	4.9
O	SOFTWARE PUBG CORP	14	5	12.88	+1.5	+13.2
A	STERLING SOFTWARE INC	21	10	12.25	0.4	3.0
N	SUNGUARD DATA SYSTEMS	20	10	19.75	0.1	0.6
N	UCCEL CORP	34	17	33.75	+2.6	+8.4
N	URS CORP	20	11	20.00	+1.5	+8.1
O	VM SOFTWARE INC	39	12	36.25	+1.1	+3.0

Semiconductors

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 18 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	34	13	23.13	+0.6	+2.8
N	ANALOG DEVICES INC	25	14	22.13	0.5	2.3
O	ANALOGIC CORP	15	10	12.00	+0.0	+0.0
N	APPLIED MAGNETICS CORP	25	13	23.75	+0.8	+3.3
O	AVANTEK INC	23	14	18.00	-0.3	-1.4
O	HADCO CORP	6	3	4.50	0.5	10.0
O	INTEL CORP	39	16	37.00	1.1	3.0
O	MICRO MASK INC	7	2	5.00	+0.0	+0.0
N	MOTOROLA INC	51	34	50.00	+0.6	+1.3
N	NATIONAL SEMICONDUCTOR	16	8	15.38	-0.1	0.8
N	TERADYNE INC	30	16	23.25	0.1	0.5

EXCH: N - NEW YORK, A - AMERICAN, P - PACIFIC, B - BOSTON, L - NATIONAL, M - MIDWEST, O - OVER THE COUNTER, S - SPLIT

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(1) TO NEAREST DOLLAR

Peripherals & Subsystems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 18 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	[illegible]	[illegible]	14.8
A	ANDERSON JACOBSON INC	[illegible]	[illegible]	[illegible]	0.1	2.9
O	AST RESH INC	[illegible]	[illegible]	16.75	0.1	[illegible]
O	AUTOTROL CORP	[illegible]	5	4.00	0.3	2.9
O	AVANT-GARDE COMPUTING	[illegible]	[illegible]	4.00	0.0	0.0
O	BANCTEC INC	[illegible]	[illegible]	11.88	1.5	12.1
N	BOLT BERANEK & NEWMAN	[illegible]	[illegible]	57.50	4.4	8.2
A	CETEC CORP	[illegible]	[illegible]	[illegible]	0.3	4.3
A	COGNITRONICS CORP	[illegible]	[illegible]	[illegible]	0.0	0.0
N	COMPUGRAPHIC CORP	[illegible]	[illegible]	[illegible]	0.5	[illegible]
N	COMPUTERVISION CORP	[illegible]	[illegible]	21.88	0.1	0.6
N	CONRAC CORP	18	[illegible]	[illegible]	[illegible]	[illegible]
A	DATAPRODUCTS CORP	16	[illegible]	14.50	0.0	0.0
A	DATARAM CORP	16	[illegible]	[illegible]	1.8	[illegible]
O	DATA SWITCH CORP	[illegible]	[illegible]	[illegible]	0.5	[illegible]
O	DATUM INC	[illegible]	4	[illegible]	[illegible]	[illegible]
N	DECISION INDS CORP	[illegible]	8	[illegible]	[illegible]	[illegible]
[illegible]	ENDATA INC	[illegible]	[illegible]	[illegible]	0.3	2.8
[illegible]	EMC CORP	[illegible]	[illegible]	[illegible]	4.0	4.3
O	EVANS & SUTHERLAND	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	FLOATING POINT SYS INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	GANDALF TECHNOLOGIES	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	GENERAL DATACOMM IND	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	HAZELTINE CORP	[illegible]	16	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	INFORMATION INTL INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	INTECOM INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	INTERLEAF INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	MEGADATA CORP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A	MSI DATA CORP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	NASHUA CORP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	NETWORK SYS CORP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	NORTH AMER PHILIPS CORP	48	35	[illegible]	[illegible]	[illegible]
N	NORTHERN TELECOM LTD	45	27	[illegible]	[illegible]	[illegible]
O	NOVELL INC	47	14	[illegible]	[illegible]	[illegible]
N	PARADYNE CORP	[illegible]	4	[illegible]	[illegible]	[illegible]
A	PENRIL CORP	[illegible]	4	5.88	[illegible]	[illegible]
N	PLESSEY PLC	36	24	[illegible]	[illegible]	[illegible]
O	PRINTRONIX INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	QMS INC	[illegible]	10	[illegible]	[illegible]	[illegible]
[illegible]	RAMTEK CORP	[illegible]	3	[illegible]	[illegible]	[illegible]
N	RECOGNITION EQUIP INC	[illegible]	10	[illegible]	[illegible]	[illegible]
[illegible]	SCAN TRON CORP	[illegible]	11	[illegible]	[illegible]	[illegible]
N	SCIENTIFIC ATLANTA INC	[illegible]	[illegible]	14.88	[illegible]	[illegible]
O	SEAGATE TECHNOLOGY	42	9	[illegible]	[illegible]	[illegible]
N	STORAGE TECHNOLOGY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	SUN MICROSYSTEMS INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A	T BAR INC	8	5	[illegible]	[illegible]	[illegible]
A	TAB PRODS CO	18	12	[illegible]	[illegible]	[illegible]
O	TANDON CORP	8	[illegible]	[illegible]	[illegible]	[illegible]
A	TEC INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
N	TEKTRONIX INC	49	[illegible]	41.63	[illegible]	[illegible]
O	TELEVIDEO SYS INC	4	2	2.63	[illegible]	[illegible]
N	TELEX CORP	91	54	[illegible]	[illegible]	[illegible]
N	TIMEPLEX INC	36	14	[illegible]	[illegible]	[illegible]
N	TITAN CORP	12	6	[illegible]	[illegible]	[illegible]
O	VISUAL TECHNOLOGY INC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	WYSE TECH	28	13	27.50	2.4	[illegible]

Leasing Companies

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 18 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	27	15	27.00	2.5	10.2
N	CONTINENTAL INFO SYS	14	7	13.00	2.5	[illegible]
O	FINALCO GROUP INC	5	2	3.00	[illegible]	[illegible]
O	PHOENIX AMER INC	8	3	6.75	[illegible]	[illegible]
O	SELECTERM INC	12	5	5.50	0.1	[illegible]
N	U S LEASING	[illegible]	[illegible]	48.63	0.1	[illegible]

HP suffers setback

Stock drops after financials revealed; IBM, CIS post big week

Traditional blue-chip stock Hewlett-Packard Co., which has generally ridden the crest of the current bull market, received a setback last week after announcing lackluster first-quarter results.

HP climbed 2½ points to a 52-week high of 58¾ in last Tuesday's record 54-point surge in the Dow Jones industrial average but fell 3¾ to 53⅛ Thursday after announcing its financials. Investors apparently reacted to HP's statement that its U.S. order picture remains sluggish.

HP was the New York Stock Exchange's third most active issue that day with volume of more than two million shares.

IBM advanced 3⅞ to 138⅞ points in Tuesday's session, but the increase was more attributable to the surging overall market tide than to Big Blue's product announcements.

It was a big week for Continental Information Systems Corp. (CIS), a leading independent computer leasing firm in Syracuse, N.Y. After a favorable article on CIS appeared in *Barron's* financial newspaper, CIS stock climbed more than 15% Tuesday, gaining 1¾ points to 13¾.

CLINTON WILDER

AT&T annoints Microsoft as Unix king

BY ALAN ALPER
CW STAFF

NEW YORK — AT&T and Microsoft Corp. last week joined forces to create a standard implementation of the Unix operating system for Intel Corp. 80386-based microcomputers.

Under terms of the agreement, Microsoft will develop a version of Unix that will combine Microsoft's Unix derivative, Xenix System V 386, and AT&T's Unix System V Release 3. Applications developed for both Unix implementations will run under the new version without modification, the two firms [illegible].

"The goal of Microsoft and AT&T is to create a merged product that is a binary standard for 386-based systems," said Bill Gates, chairman and founder of Microsoft. "The merged product would be a subset of the standard created in Xenix 386."

The merged implementation of Unix for 386-based machines is scheduled for availability by the first quarter of next year, under the Unix trademark, both companies said. In the meantime, AT&T will continue to market Unix System V Release 3, while Microsoft will offer Xenix System V 386, a release that is expected to be available by the end of this quarter.

As partners, AT&T will chart the strategic course of the Unix operating system in implementations for Intel microprocessors, and Microsoft will do the development work, the firms said.

Both firms said the arrangement will end the fragmentation of the low end of the Unix marketplace, a segment where a number of Unix derivations — such as University of California at Berkeley's Unix 4.2, Xenix and Unix System V — have vied for attention as the Unix standard.

The new version of Unix will consolidate 80% of the Unix market under one standard operating environment, said Vitorrio Cassoni, senior vice-president of AT&T's Data Systems Division.

Microsoft's Gates said the merged product will take less than 10% additional memory space than Xenix 386. "There would be no speed penalty in using the merged product," he added.

The merged Unix operating system for 386-based systems will include VP/IX, a program developed for AT&T by Interactive Systems Corp. and Phoenix Technologies, Inc., which enables Microsoft MS-DOS applications to run as tasks under Unix.

Gates declined to say whether new versions of DOS will provide the ability to coexist with Unix.

"Today is not the day to speculate about new releases of DOS," he said.

'286 DOS

FROM PAGE 1

plans. "We are not making any product announcements, and we are not describing any products in detail," said Adrian King, director of operating systems, regarding the seminar that was held after press time.

What Microsoft did commit to was a general explanation of its systems software strategy. A chief item on the agenda was a discussion of 286 DOS, Microsoft's operating system that allows applications to run in protected mode and address up to 16M bytes of random-access memory (RAM). Existing applications that are constrained by the so-called 640K-byte limitation run in real mode.

According to Gates, Microsoft will release 286 DOS in three phases. The first, which sources say may come as early as the first or second quarter, will be a release for software developers. Next will be a version to be beta-tested by end users, followed by the final release. DOS-based applications that take full advantage of 286 DOS-class machines will probably not arrive until the middle of next year — four years after IBM announced the original IBM PC AT.

Users who expect that 286 DOS will quickly solve a host of problems may be disappointed. The 286 DOS will not provide multitasking for existing real-mode applications, according to Gates, who said the operating system will run only one real-mode application at a time. Protected-mode applications will take advantage of the operating system's multitasking capability, Gates said.

Perhaps the most important point of confusion concerns reports that IBM will market a version of the operating system that will be incompatible with the versions made available to IBM's competitors. Last week, Gates shrugged off that notion. "There are always those reports," he said, "and it gets a little different flavor; sometimes it is with an 8086 machine, sometimes it is 286, and it is never going to go away."

King said Microsoft has received a bad rap for the delays in the release of 286 DOS. In addition to the operating system, the firm is working on a version of Windows, networking products and development tools, companion work that makes the overall development more complex.

In addition, developing an operating system that provides compatibility with existing applications, as well as up to 16M bytes of RAM for the next generation of applications, is difficult given the constraints of the chip itself, Microsoft said.

It is these microprocessor constraints that have prompted Steve Ballmer, vice-president of systems software, to call the 80286 chip "brain damaged." According to Ballmer, the chip contains a real mode, which is used to run existing applications, and a protected mode, which allows applications to outgrow the 640K-byte RAM limitation. These modes are inherently incompatible, and much of Microsoft's development time has been spent trying to work around the chip's limitations.

INSIDE LINES

But do they do Windows? IBM is reportedly showing a graphical interface that is widely impressing even vendors who are tired of interface offerings. IBM's new entry is neither Topview nor Microsoft Windows but includes some characteristics of each, such as multiple, bit-map, graphical windows that run different applications. An analyst familiar with the interface said it is compatible with both Windows and Topview. He speculated that IBM may unveil it in April — the latest forecast for a hardware announcement date.

Mature outlook. It's not just the micro software houses that are riled up about the recent legal assault Lotus launched against two makers of 1-2-3-like software. John Cullinane, head of Cullinet Software, said he thinks "it's an absolutely lousy lawsuit, and I hope they lose." At a recent meeting of the Massachusetts Software Council, he was asked for his opinion on the Lotus controversy, and the Cullinet chairman made it clear that he believes it could negatively impact all software development. "The lawsuit is a terrible thing. If Dan Bricklin took that position with Visicalc, there might not be a 1-2-3," Cullinane added.

Sign me up, boss! IBM salesmen say they are being offered incentive bonuses to win competitive bids against five major non-plug-compatible competitors, according to an industry source. The competitors include DEC, Unisys and three other manufacturers. The terms of the bonus may vary from region to region, the source said.

Where's the finish line? The race for distributed data base management, already heated among Unix and VAX software vendors such as Oracle and Relational Technologies, is gaining momentum in the IBM software arena as well. IBM mainframe software vendors such as Cullinet, ADR and Software AG are working on distributed data base management products that will support IBM's LU6.2 peer-to-peer networking protocols but not IBM's recently announced Distributed Data Management system, according to Frank Dzubeck, president of Communications Network Architects. However, several users interviewed by *Computerworld* have said they won't consider such products until vendors come up with an easier way to ensure consistency of data and keep track of file locations throughout a distributed system.

One-way street. DEC is about to start shipping a little-noticed product that makes a first step toward a VAX distributed data base system. Called VAX Data Distributor, it automates the distribution of relational data among multiple VAX processors. Data Distributor works with DEC's RDB relational data base management system and VIDA, the DEC VAX-to-IBM mainframe link. So far, it operates only one way, distributing data from a host data base but providing no provision for updating.

You thought presidential politics were bad . . . One of the most announced unannounced products in the history of computing is finally set to make its official debut late next month when ETA Systems introduces its ETA-10 supercomputer. The first ETA-10 shipped to a field-test customer has been running at Florida State University in Tallahassee for two months. ETA Systems has announced several other sales and has kept the world posted for several years as to developments of their first major product since they were spun off from Control Data.

Salt Lake beats Seattle. Novell will be busy between March and year's end. At Novell's developers' conference last week, company Vice-President Craig Burton said users can expect Advanced Netware/386 network software in either the third or fourth quarter, while a 386 file server could make an appearance as early as March.

No tubes in this set. A Zenith sales representative hinted to attendees at a recent users group meeting that the firm later this year may upgrade its Z-181 portable with greater speed — it currently runs at 4.77 MHz — and a hard disk drive. The company may also incorporate the Flat Tension Mask monitor it showed at Comdex/Fall '86, which offers flat screens with higher resolution.

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COMPUTERWORLD

INSIDE

In Depth — Managers learn to master change. **Page 51**

Iran scandal probe keyed into Profs message system. Page 2.

Hewlett-Packard offers lower cost laser printer and high-end departmental system. Page 4.

Issco users wooed by Computer Associates chief. Page 8.

Computer industry rallies around bill to move data base oversight away from military. Page 10.

DEC jumps on the publishing bandwagon. Page 92.

Galaxy from Lotus picks up where Jazz limped off. Page 29.

A little-known company's DB2 dictionary is in use at a New York investment bank. Page 19.

Travelers Corp. MIS sails to Ireland for software development and maintenance. Page 57.

Microsoft promises 286-DOS tool kit within six months. Page 6.

BULLETIN:
Datapoint Corp. Friday announced a 37% reduction in its U.S. work force, in addition to overseas cuts. Reporting a second-quarter loss of $65.8 million on revenue of $74.3 million, the firm said the severance of 786 employees, write-offs and reserves for products no longer deemed strategic will cost $56 million.

NEWSPAPER

NCR builds 8-MIPS Unix Tower

BY ALAN ALPER
CW STAFF

NEW YORK — In a thrust into the mid-range of IBM's and Digital Equipment Corp.'s product line, NCR Corp. last week boosted its Tower family of multiuser Unix-based systems to performance well beyond traditional supermicrocomputer levels.

The Tower 32/800, which the company rated at about 8 million instructions per second, will be positioned against the IBM 9370 and DEC VAX 8300, according to Charles E. Exley Jr., chairman and president of NCR.

Like NCR's 9800 transaction processor, the Tower 32/800 system is based on multiple processors in a loosely coupled architecture.

Users can expand the system incrementally by adding plug-in processors to specifically handle application processing, file storage, terminals and printers, wide-area communications and local-area networks.

Under the modular architecture, segments of the Unix operating system are distributed to the specific processor responsible for that activity. This reduces system overhead on the applications processors and lowers system bus communications, NCR said.

The 32-bit system supports up to 64M bytes of main memory, 850M bytes of fixed-disk storage and 128 physical devices. In its largest configuration, the system offers a 14-fold performance increase over the entry-level Minitower, NCR said.

"At the same price point, the 32/800 delivers 1½ to two times the computing power of the 9370 — or conversely, the 9370 is 35% more expensive," noted

Continued on page 6

Data base makers rush to distribute

But path to speedy development is strewn with technical obstacles

BY ELISABETH HORWITT
and CHARLES BABCOCK
CW STAFF

A wave of distributed data base product announcements is approaching as nearly every major data base vendor competes to exploit the potential of tying together data on disparate hardware systems.

However, many technical challenges remain before users will find themselves equipped with fully distributed capabilities, experts warn, and true data distribution is probably at least two years away.

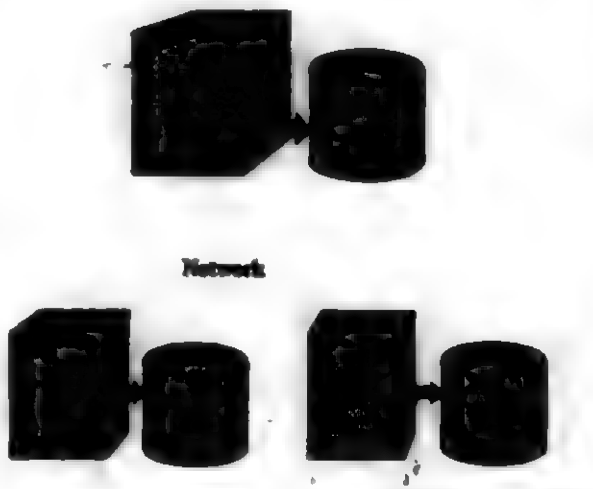
Theoretically, distributed data base technology permits processing to occur at a point close to where the data is being used. Once implemented, it could better employ the processing power on personal computers and, in some cases, on minicomputers without becoming divorced from the central data processing function.

Some software vendors, such as Cullinet Software, Inc., Oracle Corp. and Relational Technology, Inc., say they believe distributed data bases will provide the bridge to link IBM mainframes to Digital Equipment Corp. VAXs on factory floors and in departmental settings.

Computer Corporation of America has been developing a relational DBMS in Ada with distributed capabilities since 1985; Applied Data Research, Inc. expects to see its Datacom/DB on IBM 370 family of processors tied to a relational product on personal computers through an SQL interface; Software AG of North America, Inc. hopes to have a working prototype of its forthcoming distributed product, Adanet, by the end of this year; and Cincom Systems,

Continued on page 92

Future of distributed data bases



CW CHART MITCHELL J. HAYES

Few doing Windows

User, developer apathy plagues year-old interface

BY PEGGY WATT
CW STAFF

Little more than a year after Microsoft Corp.'s release of its Windows interface, as many as four out of five copies are still stuck in the evaluation room or shelved until applications appear.

Users and developers are at a standoff. Users say they will not adopt Windows until they have applications; software vendors say they want proof of Windows' acceptance before they plunge into development.

In addition, some vendors claim a love-hate relationship with the Windows concept and its proponents. They complain about pressure from Microsoft to develop for its pet project or say that writing to Windows is too difficult to be done quickly.

Even those in the industry who say they like the idea of a universal graphical interface are not certain the winner is Windows.

The result is a lull in Windows activity. Infocorp, a market research firm in Cupertino, Calif., estimates 85,000 to 100,000 copies of Windows are actually in users' hands. That is only 20% of the 500,000 copies Microsoft claims to have shipped, including OEM-licensed copies and runtime versions bundled with Windows applications.

"It's a catch-22," says Tim Bajarin, president of market research firm Creative Strategies Research International in San Jose, Calif. "Developers, including Microsoft, have to get the applications out. But a lot of developers tabled it.

Continued on page 14

Mac ripens as business alternative

BY PEGGY WATT
CW STAFF

LOS ANGELES — With today's scheduled introduction of two open-architecture models of the Macintosh that also read Microsoft Corp. MS-DOS and Unix files, Apple Computer, Inc. said it intends to finally deliver the hardware that backs the company's pitch of the Macintosh system as a viable corporate alternative to the IBM Personal Computer.

In a show of support for Apple's new "open Mac" policy, a host of third-party developers this week also are scheduled to announce software that takes advantage of the systems' new color and capabilities and add-on boards that were previously not

Continued on page 94

IN THIS ISSUE

Micro/mainframe office: DEC ties publishing on Vaxmate MS-DOS to VAX/VMS with VAX Integrated Publishing, and Computer Associates' Superimage, a graphics editor and drawing system for PCs, offers file transfer between micro and mainframe.
Pages 8, 92

NEWS

4 IBM readies support of 4.5M byte/sec. channels for 3090 series.

4 HP delivers high-output, low-cost laser printer.

6 Microsoft developer's tool kit for 80286 MS-DOS ready soon.

8 Issco users warm up to firm's acquisition by Computer Associates.

8 Vendors fabricate 4M-bit dynamic RAM chips.

8 Symantec's Q&A 386 package optimized to run on 80386-based machines.

9 3Com proposes implementation of IEEE 802.3 standard.

9 3Com's 3+ network operating system features internetworking capability.

10 Users endorse bill to stop militarization of data security policy.

12 Potential IBM 9370 users can't see direction of departmental mini.

12 IBM speech-recognition system called 'impressive leap forward.'

12 DG announces support of E-mail standard.

13 Microport schedules April delivery for its version of Unix System V.3.

13 Aetna policyholders now able to access benefits data via PC-based system.

13 User organization charges FCC order allows unauthorized access to customer information.

92 DEC's desktop-to-mainframe solution addresses publishing environment.

92 IBM forms marketing agreement with Sterling Software's financial group.

92 Louisiana judge tosses out shrink-wrap legislation.

94 Macintosh Ethernet and Unix networking products expected from Apple.

SOFTWARE & SERVICES

19 Concurrent provides processor users with remote, distributed facilities.

19 Start-up develops data dictionary for IBM's DB2.

MICROCOMPUTING

29 Forecast Master users say statistical software package aids understanding.

29 Renewed commitment to Macintosh spurs Lotus to offer Jazz successor.

NETWORKING

35 AT&T announces availability of IDSN terminals.

35 Gateway releases generic, high-speed LAN-to-LAN remote bridge.

35 Geographically distant Phonemail users can exchange voice messages.

35 Improved connectivity between Decnet and Netbios-based networks possible.

SYSTEMS & PERIPHERALS

41 Software house eagerly awaits enhanced IBM RT PC.

41 IBM unveils lower cost terminals, controllers for mid-range, large systems.

41 Masscomp adds support to low- and high-end scientific systems.

MANAGEMENT

57 Penney's uses DP, networking, cable television for home shopping service.

57 Managers not confident with own data security safeguards, survey finds.

57 Irish eyes are smiling as U.S. firms consider setting up operations overseas.

57 Users say they will increase information systems budgets.

COMPUTER INDUSTRY

67 Rodime patent infringement lawsuit meets with skepticism.

67 Telebit splits from DCA micro division.

67 Paperback Software asks court to dismiss suit.

67 Matsushita admits micros violate IBM BIOS chip copyright.

EMPLOYMENT TODAY

78 DP turnover spurned by technical challenge and career growth.

IN DEPTH

51 Mastering change: Have someone teach you the tricks of the trade.

OPINION & ANALYSIS

17 Wohl stands up for the marriage of Perot and Jobs.

29 Zachmann keeps an eye on Wyse.

41 Hamilton weighs the effects of Sun/Apollo debate.

57 Beeler ponders the lack of a DP ethics code.

67 Wilder calls 1387 the 'Year of the Lawyer.'

DEPARTMENTS

16 Editorial

65 Calendar

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Profs system gave clues in probe of Iran scandal

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A mother lode of dozens of electronic mail messages from the National Security Council's (NSC) computer system proved crucial to the presidential commission investigation of the White House scandal over aid to Iran.

The Special Review Board appointed by President Reagan, known as the Tower Commission, reported last week that the messages were sent on an IBM Professional Office System (Profs) running on an unspecified IBM mainframe. The system is run by the White House Communications Agency for the NSC.

"The Profs messages were conversations by computer, written at the time events occurred and presumed by the writers to be protected from disclosure. They provide a first-hand, contemporaneous account of events," the commission said.

"All NSC officers have personal passwords which enable them to send and receive messages to each other from terminals at their desks," the report said in a footnote.

IBM and White House officials contacted refused to fully describe the NSC system.

According to press reports last week, investigators alleged that NSC aide Lt. Col. Oliver North and his secretary, Fawn Hall, had shredded and altered the printouts of certain computer messages as part of a cover-up. That effort was in vain, the press reports said, because originals were stored in a central computer archive.

The commission's report contains many verbatim passages from Profs messages, including exchanges among North, John M. Poindexter and former national security advisor Robert McFarlane.

The Tower Commission said it did not have evidence that documents were destroyed but did say that "the board found indications that Lt. Col. North was involved in an effort, over time, to conceal or withhold important information."

Society pulls out of NCC

ACM says withdrawl will help AFIPS

BY DAVID A. LUDLUM
CW STAFF

In an unexpected move, directors of the Association for Computing Machinery (ACM) voted to turn over the group's interest in the National Computer Conference (NCC) to the American Federation of Information Processing Societies (AFIPS).

In an unscheduled vote during a recent meeting, the directors of the ACM voted 15-to-4 to turn over the group's 15% interest in NCC to AFIPS, which manages the conference and owns half of it.

The NCC partnership agreement requires any share given up by an owner to be distributed among the other owners according to their shares; ACM directors said they hope the other owners will agree to give the ACM interest to AFIPS.

The agreement also states an exchange of ownership cannot take effect until the end of the fiscal year following the one in which notice is given, in this case, Sept. 30, 1988.

ACM will still indirectly help sponsor the annual conference, which will be held in Chicago in June this year, because it is one of the 11 organizations that make up AFIPS.

Adele Goldberg, the ACM director who proposed the move, said its purpose is to strengthen AFIPS by giving AFIPS the profits generated by ACM's share in NCC. Earnings from the conference, the chief source of income for AFIPS, have fallen in recent years as the show has drawn fewer attendees and exhibitors.

Bryan Kocher, a Cambridge, Mass., consultant and the ACM council's Northeast regional representative, who voted against the move, said he felt the one good argument for it was that NCC may not be profitable in coming years and that ACM could lessen its share of any loss. However, the first show that ACM's withdrawal can affect is the one in 1989, and the conference could be returned to profitability by then, Kocher said.

ACM's share of NCC has not required the group to help finance the conference because NCC has been self-supporting, with earnings from one year's show funding the following year's and generating profit.

Rolland Arndt, chairman of the NCC board, called the ACM move "sort of a goodwill gesture" toward AFIPS and said it will not affect the conference..

The president of AFIPS, Jack Moshman of Moshman Associates, Inc. in Bethesda, Md., said the move, which surprised him, appears positive.

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HP revamps Laserjet Plus, adds high-end unit

BY JEFFRY BEELER
CW STAFF

CUPERTINO, Calif. — Hewlett-Packard Co. is slated to introduce today a laser printer that provides better output quality and costs $1,500 less than the existing Laserjet Plus, according to company officials.

In addition to the desktop Series II, which connects to personal computer and workstation clusters, HP is also scheduled to formally announce the departmental Laserjet 2000. The 2000 is designed for departmental settings with output requirements as high as 70,000 pages per month. It works with mini- or supermini-class systems.

In a related move, HP also complemented the Series II with the announcement of a laser scanner. In a typical desktop publishing application, a paper document bearing a line drawing or other image is placed on Scanjet's flat-bed scanning surface and is scanned at a rate of 20 sec. per page. The picture is then reproduced on a PC's screen, where it can be reduced by up to 50% or enlarged by up to 200%.

Although HP will continue selling its Laserjet 500, reduced in price by $500, as well as the Laserjet Plus, both devices will go into retirement within six months. "Most customers no longer demand the kinds of functionality that those two products represent," said Steve Simpson, business manager for office printers at HP's Boise Division.

Laserjet days numbered

Since the two models first appeared in May 1984 and August 1985, respectively, more than 300,000 Laserjet units have found their way into user sites, according to HP estimates.

One enhancement on the Series II is increased storage. Although the Series II and Laserjet Plus run the same software and print at an identical rate — 8 page/min. — the former incorporates up to nine times more memory than the latter.

A standard Series II is configured with 512K bytes of random-access memory (RAM) and comes with an expansion slot that holds 1M to 4M bytes of memory.

At Security Pacific National Bank in Los Angeles, where a 2.5M-byte configuration of the Series II has been undergoing beta tests for a month, the device's edge in storage capacity has benefited the user's desktop publishing applications.

'Enormous' memory

"One of the advantages of having a desktop publishing system is the ability to beautify the pages of a document by changing fonts," said Security Pacific systems analyst Jean Harber. "But a laser printer needs an enormous amount of memory before it can be loaded with different fonts."

Expanded memory also doubles full-page graphics resolution to 300 dot/in., Simpson said. With the Laserjet Plus, by contrast, a full page of output produces a concentration of 150 dot/in.

Other Series II enhancements include:

- Fifty percent fewer moving parts and 30% lighter weight than the Laserjet Plus.
- A print cartridge that has a life of 4,000 pages, compared with 3,000 for its counterpart.
- The presence of two font cartridges, compared with just one on the Laserjet Plus.
- A front control panel that replaces the dual in-line pin switches that earlier Laserjet models used for configuring font types, page lengths, number of copies and other print variables.
- Support for 32 soft fonts, which can be downloaded from a PC's hard disk.

The Series II also comes with an optional I/O slot that can be used to support Imagen Corp.'s Document Description Language, which HP announced its intention to offer with its Laserjet line last August.

A basic Series II costs $2,495. The Laserjet 2000, which holds 1.5M to 5.5M bytes of RAM, starts at $19,995. When equipped with a factory-installed option that allows it to print on both sides of a sheet of paper, the 2000 sells for a minimum of $24,995. Scanjet sells for $1,495.

Shipments of all three products are scheduled to begin immediately.

IBM channel uprade expected soon

Competitive pressure from Amdahl, NAS may cause change

BY JEAN S. BOZMAN
CW STAFF

IBM is readying its support of 4.5M byte/sec. processor channels for the IBM 3090 series, according to industry analysts, who say they expect announcement of the feature within the next few months.

Analysts and users alike had expected the improvement in channel speeds — a 50% boost above the current 3M byte/sec. throughput rate — to be announced in the first quarter, but analysts say they believe IBM has pushed back the announcement because of software problems.

The higher channel speed, which users say IBM salesmen have hinted about for two years, is expected to be accompanied by the announcement of a new IBM 3880 disk controller with cache memory and possibly a new series of high-capacity disk drives, according to Dale Kutnick, executive vice-president of research at the Gartner Group, Inc. in Stamford, Conn.

The technical change, the first boost in channel speeds in several years, is also the stuff of competitive pressures, as IBM prepares to respond to Amdahl Corp. and National Advanced Systems, Inc. (NAS), its two plug-compatible mainframe rivals.

"It didn't happen as early as the industry expected because of some technical snags," says Bob Djurdjevic, president of Phoenix-based Annex Research, Inc. "But they're working on it now, and it should come out in the next several months."

Both Amdahl and NAS have announced channel speeds higher than 3M byte/sec. Amdahl announced a 4.5M byte/sec. channel speed in September that it said will ship this spring. NAS announced an effective 6M byte-/sec. channel speed in early January, an option that it said will ship in April.

IBM ups bandwidth

IBM is expected to provide an implementation similar to Amdahl's, raising the channel speed by increasing the bandwidth of data transmission from 3 to 4.5 MHz. That differs from NAS's solution, which is to make the existing IBM-compatible channels bidirectional — raising the effective channel speed to 6M byte/sec. However, NAS did not elect to push the channel to 6 MHz.

Hitachi Ltd. engineers discovered that IBM was not implementing support for both buses on the mainframe channel, according to an NAS official. "What we discovered is a way in which we could send data down both buses at 3M byte/sec. and get the controller to receive data at 6M byte/sec.," says Minh Le, director of worldwide peripherals marketing for NAS.

IBM, Amdahl and NAS are all looking to higher channel speeds to help boost throughput and to reduce I/O bottlenecks. "A channel speed of 4.5M byte/sec. should raise throughput by 22% to 33%," says Don Feinstein, manager of storage systems marketing for Amdahl. A channel speed of 6M byte/sec. would double throughput, but achieving that speed by increasing the bandwidth of the channel to 6 MHz is not considered possible without fiber-optic channel technology, he adds.

And while both Amdahl's and NAS's solutions rely on solid-state disks to catch the higher flow of data, IBM is said to be relying on a large cache memory within the disk controller to act as the intermediary with standard rotating disk drives.

"The easiest way to implement a higher channel speed is to do it in such a way that users can continue to operate their current disk drives," says Jim Porter, editor of "Disk/Trend Report" in Los Altos, Calif. "Otherwise, making such a change would require users to buy new disk drives, new controllers and new channels — all at the same time."

An important consideration, Porter says, is that if the upgrade is easy to install, it will promote a ready cash flow from sales to end users.

But the higher speeds from Amdahl and NAS are linked to the use of special solid-state storage devices. For Amdahl's solution, users must buy a $320,000 Amdahl 6680 Electronic Direct Access Storage and a $20,000 Amdahl 6880 controller. The 4.5M byte/sec. channel speeds, priced at $25,000 per four channels, will be shipped sometime in the second quarter, Amdahl says.

NAS's higher channel speeds are limited to the simultaneous use of the $382,000 NAS 7900 solid-state device and $87,750 NAS 7970 controller. NAS provides the 6M byte/sec. channel option at no charge on the mainframe.

'Can't go that fast'

The solid-state peripherals must be used, Feinstein says, because the current generation of IBM and IBM-compatible rotating devices cannot keep up. "The rotating devices just can't go that fast," he says, "And there would also be synchronization problems with rotating devices to assure that the data arrived at the right time."

IBM currently does not offer any solid-state devices, which would mean that any increase in channel speed would probably be accompanied by the introduction of a disk controller with a large cache memory.

"We think that IBM will compensate for the lack of a solid-state device by doing more with cache memory," NAS's Le says.

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Main Editorial Office
Box 9171, 375 Cochituate Road
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New Dimensions in Software Productivity.

Tools for 286 DOS promised soon

Microsoft says package includes early DOS for developers, DP

BY DOUGLAS BARNEY
CW STAFF

REDMOND, Wash. — A developer's tool kit for the long-awaited version of MS-DOS designed for Intel Corp. 80286-based machines will be generally available to software developers and data processing shops within six months, Microsoft Corp. has announced.

The tool kit will contain a beta-test version of the operating system that will include the functionality of the final version but will not have the same level of performance and will not be bug free, according to Adrian King, director of operating systems for Microsoft. "It will be a complete set of development tools and a beta release of the systems software component," King said.

The tool kit will include debuggers, compilers, languages such as assembler and a C compiler that developers can use to create new applications. There will be other languages available for the operating system, but King would not disclose what those languages will be.

However, the final version of the operating system, dubbed 286 DOS, may be as much as a year away, and developers said they believe that major new applications will not start appearing until six to 12 months later.

According to King, a key advantage of the beta-test version of the operating system will be its ability to allow developers to begin testing applications. Final testing, however, cannot be done until the final version is released. "We are still in the stage of doing testing and performance tuning, so you would expect bugs to be eliminated and the product to get faster," King said.

Eagerly awaited

Developers last week welcomed the precursor to the long-awaited operating system, which has been in the works for 3½ years. "There are hundreds of companies that are anxious to get their hands on it," said Robert Carr, chief scientist for Ashton-Tate. "When Microsoft releases it, that is the starting gun [for developing applications]."

Without the tool kit, the wait for applications would be even longer. "This will enable applications developers to begin serious efforts on developing new applications for the protected-mode world," Microsoft's King said. Protected mode refers to the ability of applications to address up to 16M bytes of random-access memory on 80286 processors.

Unlike beta-test versions of the operating system, which are currently available only to a small number of software developers, the tool kit will be generally available and, as a result, will be distributed to interested data processing shops, according to King. "It will be a general release," he said.

"The one thing you won't be able to do with the developer's tool kit is go into your final testing period, but I think you will be able to use it for all your useful development work," Ashton-Tate's Carr said.

The liberal distribution of the tool kit will allow any interested software developer to exploit the operating system's capability and should lay to rest some of the criticism directed toward Microsoft's limited distribution of beta-test copies of the operating system.

King defended Microsoft's beta-test version distribution policy. "Although there are people working with versions of the product, those people have had to invest expensive development resources in helping us," he said. "They are working with very early versions of the code. There are bugs in it at that stage, there are aspects that we are changing. It is not as if they have been given something with which they can go and do serious work without being in a continual interchange of information with us and be prepared to take new releases at the drop of a hat."

According to King, the tool kit will provide all interested parties with the ability to compete in what will become a new market. "This general release to developers will be the first point at which we believe we have a product that is sufficiently full in terms of functionality and support that people can really begin serious work on applications."

One advantage of the wide availability of the tool kit will be input from developers. "I think that every developer should get their hands on the thing so we can find out if there are any real problems," said Daniel S. Bricklin, founder of the Software Garden and co-author of Visicalc, the original microcomputer spreadsheet program.

"The most significant thing about the developer's tool kit is that it is a publicly available release," Carr said.

Advanced DOS, bigger, more costly

BY PEGGY WATT
CW STAFF

Microsoft Corp. still will not give the final name or exact ship date of the next version of MS-DOS, but it tells of a bigger, more costly operating system that will only run on Intel Corp. 80286 and 80386-based microcomputers.

Bill Gates

In selected cases, however, users are said to have the ability to upgrade Intel 8088-based machines through the use of 80286 or 80386 expansion boards.

But machines need at least 2M bytes of random-access memory to run the operating system, which disqualifies some expansion boards, according to Microsoft Chairman Bill Gates.

The next MS-DOS, dubbed 286 DOS, will have 189 function calls, compared with 95 in current versions, and will handle those calls differently, according to Adrian King, director of operating systems.

Today, MS-DOS uses the software interrupt; in the future, it will have a set of subroutine calls, he said.

The new MS-DOS will take up some 700K bytes of memory, compared with the approximately 40K bytes used by the current MS-DOS 3.X line, King added.

The MS-DOS will contain some of the technology of the upcoming 80386 version, sources said.

Microsoft's systems software group is developing both concurrently, but the 80386 version will not ship until well after 286 DOS is in the hands of users, he added.

Microsoft Windows and network support will also be integrated into the next operating system, but will not necessarily always be bundled with it, Gates said.

The operating system's final configuration remains the decision of the hardware manufacturer who licenses it from Microsoft, he added.

NCR builds

FROM PAGE 1

Hugh Lynch, vice-president and general manager of NCR's General Purpose Systems Development and Production Division. "The same comparisons hold true of DEC."

Although not scheduled to be available in small configurations until the spring and in large configurations in the fall, approximately 40 sites have received some 80 beta-test units, NCR noted. About 20 customers are already using the system, including Chrysler Corp.

Unix dearth

Analysts last week said they were impressed with the ease of configurability and the power of the 32/800.

Many, however, said NCR would face an uphill battle against IBM and DEC in both the office and departmental processor markets because of what they termed a glaring lack of Unix application software.

However, NCR said approximately 700 applications packages currently run on Tower processors, of which approximately 25,000 have been shipped since the system's inception 4½ years ago. Software developed for the 32/400 and 32/600 will run on the new system, NCR said.

NCR tower

High-end addition to NCR's line

	Mini-tower	XP	32/400	32/600	32/800
Maximum Users	8	16	16	[illegible]	[illegible]
MIPS[1]	0.5	[illegible]	2.1	2.1	[illegible]
CPU[2]	68010	68010	68020	[illegible]	[illegible]
Memory Range (bytes)	1M-2M	1M-8M	1M-8M	1M-16M	[illegible]
Price (memory)	$9,450 (1M byte)	$12,870 (1M byte)	$14,995 (1M byte)	$22,170 (1M byte)	[illegible] (4M byte)

1 Millions of instructions per second, based on CW estimates.
2. Motorola, Inc. microprocessors

CW CHART

While older family members are not field-upgradable to the 32/800, they can work in conjunction with the new system via a LAN attachment, according to Van Aggelakos, director of product management engineering and manufacturing. NCR offers a variety of communications processors for the 32/800, a proprietary LAN and connections to IBM SNA and X.25 networks.

'Tough sell'

"In the office environment, companies tend to be loyal to existing software. It will be a tough sell for NCR," noted Chris Hallgren, an analyst with International Data Corp. in Framingham, Mass. "While they might hope to compete with DEC and IBM, where they probably will do well is against other Unix vendors."

Base-level pricing of the system is $87,000 and includes one application processor, one file processor, one terminal processor, 4M bytes of memory, 170M bytes of fixed-disk capacity, a streaming tape drive for backup and an operating system.

An expanded system priced at about $250,000 would include three application processors, two file processors, 12 terminal processors, 24M bytes of main memory, 850M bytes of disk, a streaming tape and an operating system.

Processor combinations

Up to five different types of plug-in processors can be incorporated in the 32/800 in a variety of combinations, including:

- An application processor handles user applications and non-I/O functions in the system.
- The file processor handles disk and tape I/O and features 1M byte of memory.
- A terminal processor handles all operations of printers and terminals attached to the system. Each terminal processor has 1M byte of memory.
- A communications processor handles all exchanges between the system and wide-area networks.

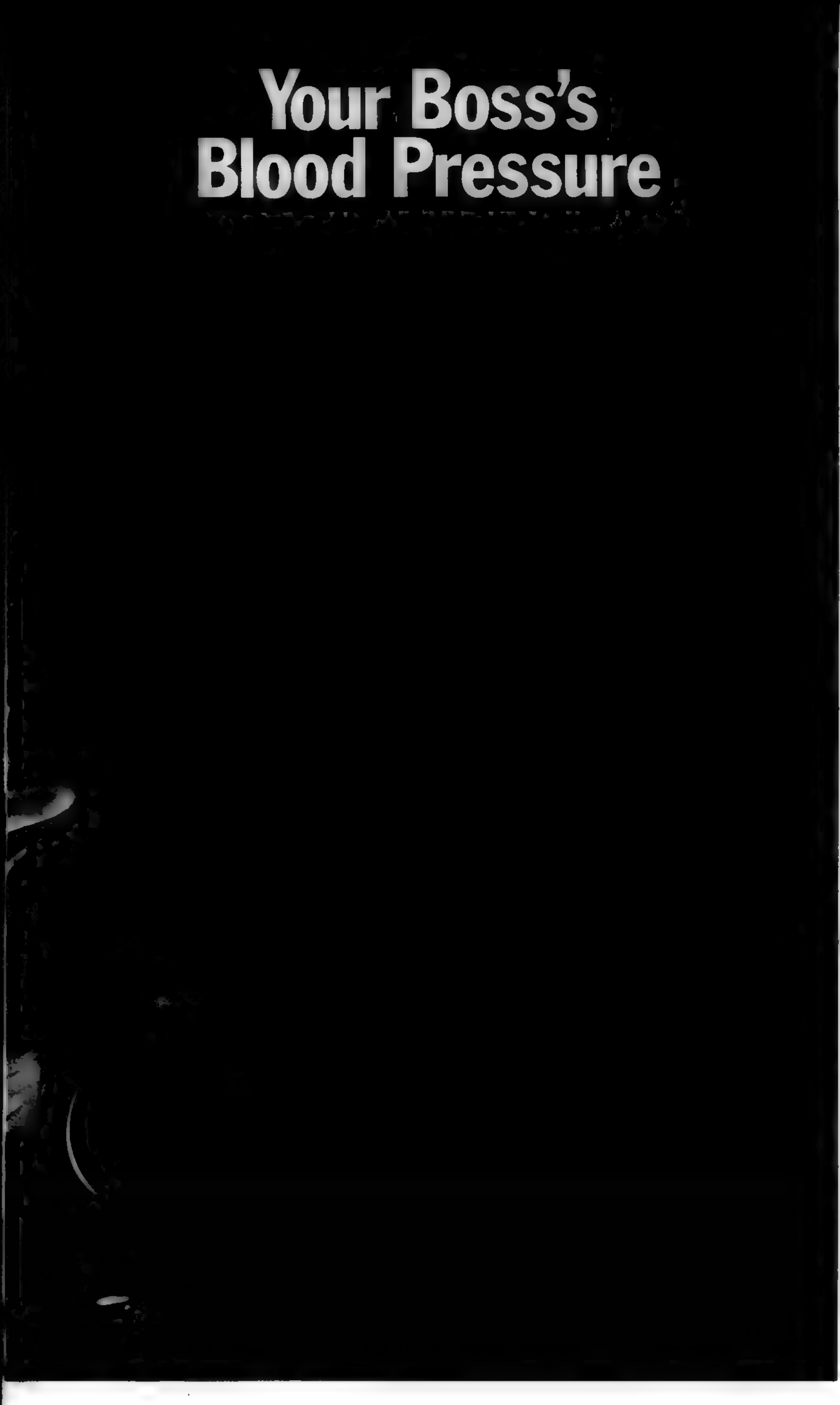
The 32/800 can communicate in local and remote networks. For non-Tower networks, interfaces to SNA and X.25 are offered.

Ethernet link

The LAN processor, featuring 1.25M bytes of memory, manages connection to an Ethernet Channel and runs Towernet systems software, according to the firm. Other LAN topologies such as IBM Token-Ring will be supported in the future, the firm added.

NCR is offering a power backup unit with the 32/800. Using the unit, any power interruption of less than 10 seconds will not affect processing, while longer outages will result in a controlled system shutdown, according to NCR.

New systems tools offered with the 32/800 include Visual Administrator, a menu-driven systems administrator and Activity Analyzer, which provides status reports on system work load, utilization and problems.



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Issco users breathe sigh of relief

BY JAMES A. MARTIN
CW STAFF

LOS ANGELES — The frosty reception by users of Integrated Software Systems Corp. (Issco) products to that company's seemingly sudden acquisition two months ago has warmed considerably.

The 12th annual Issco users conference here last week drew some 700 users, many of whom were initially skeptical and uncertain of the San Diego-based company's future after being acquired by Computer Associates International, Inc.

There were, for example, concerns that the larger company would neglect Issco users and, even worse, take lightly that company's reputation and popularity for strong IBM mainframe graphics applications.

Soothing words

Although it is still too early to tell how the acquisition will ultimately be regarded, Computer Associates' actions and words at the conference apparently eased some of those concerns for the present time.

In remarks at the conference opening, Computer Associates Chairman and Chief Executive Officer Charles Wang stressed the importance of Issco's graphics technology and said visual information packages will remain a major priority. Wang also promised that the Issco users conferences would continue meeting as usual.

In addition, Computer Associates announced Superimage, a graphics editor and drawing system developed by Issco for IBM Personal Computers and compatible machines.

Superimage is said to offer file transfer between a microcomputer and Issco's mainframe-based Tellagraf and Disspla graphics applications packages (see story this page).

'A lot of concerns'

"We had a lot of concerns initially," said Jeffrey Booker, systems consultant for the Southern Co. in Atlanta.

Charles Wang

"We worried whether Computer Associates would continue to support both the user group and the quality of Issco's graphics," Booker continued. "I think Wang's presentation shows that they will continue to offer support and that they will integrate the two product lines as well, which could be a benefit to Issco users."

Wang's comments were also welcomed by Richard Dym, executive vice-president of Interchart Software, Inc. in Princeton, N.J.

"It was a relief to hear the commitment Computer Associates is making to the graphics products," Dym said.

"We were worried that Computer Associates was interested only in Issco's technology, but their commitment to the users seems genuine."

'Tap dancing'

The fact that Computer Associates is not "tap dancing around the issues" concerning Issco users was a relief to Bert Congdon, systems manager for Polaroid Corp. located in Cambridge, Mass.

However, Congdon said long-term questions of Computer Associates' direction and strategy regarding Issco products were still being pondered in many users' minds.

"Basically, I have a wait-and-see attitude," he added.

Firm folded in

Issco, which was acquired by Computer Associates for some $70 million in December, has been folded into the Garden City, N.Y., firm's Application Products Division in San Diego.

Computer Associates previously had a limited presence in mainframe and minicomputer applications.

However, the company spent about $100 million late last year to acquire both Issco and Software International Corp. and, in the process, build a stronger applications base.

"It's a very strategic move on our part," Wang said. "But to us, software is software. We don't see it as PC software or Digital Equipment Corp. software. We see it all connected in one way or another."

Computer Associates rolls out PC-host graphics link

BY JAMES A. MARTIN
CW STAFF

LOS ANGELES — Computer Associates International, Inc. announced a microcomputer-based graphics editor and drawing system last week that is said to offer file transfer between IBM Personal Computers and compatibles and Integrated Software Systems Corp.'s (Issco) mainframe graphics applications packages.

Superimage is the first in a multimodule graphics system for microcomputers developed by Issco, the San Diego mainframe graphics applications firm acquired in December by Computer Associates. The product was unveiled at the Issco users conference held here last week.

Available this month, Superimage is said to offer the functionality of Lotus Development Corp.'s Freelance program but "with the ability to transfer files between the microcomputer and the mainframe without leaving the system," the company said.

Superimage reportedly enables the user to transfer graphics and data files between the micro and the Tellagraf and Disspla mainframe packages without leaving the system.

The link is accomplished with a communications software utility that resides on the mainframe and is included in the Superimage package as well as a menu-driven interface on the micro software. Traditional micro-to-mainframe hardware links, such as coaxial cable and a terminal emulation card, are required.

With a Lotus-style user interface, Superimage will be positioned as a complement to Issco's Tellagraf mainframe graphics application package and as an add-on product to the Lotus 1-2-3 spreadsheet package. It will sell for $495.

Micro-mainframe link

The company also announced CA Planlinks, a micro-to-mainframe link that connects Computer Associates' Superproject Plus, a micro-based project management package, with Issco's Tellaplan project management software on mainframes and minicomputers.

CA Planlinks is said to give Superproject Plus users the ability to upload data to Tellaplan, which in turn can combine a variety of data into charts and diagrams.

Available for shipment in early summer, CA Planlinks will cost $99 per copy and will connect micro users to Tellaplan under IBM MVS/TSO and CMS/VM operating systems and Digital Equipment Corp. VAX systems.

Computer Associates also announced Version 4.21 of Megacalc, an IBM mainframe spreadsheet program that allows file sharing with Supercalc4, an integrated spreadsheet package for IBM Personal Computers.

The enhanced Megacalc is said to allow users to both upload and download all spreadsheet data, labels, formats and formulas. Available now, Megacalc 4.21 costs $7,800.

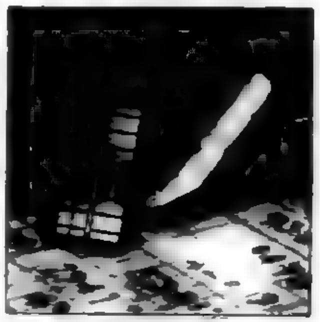
IBM, others show 4M-bit RAM chips; production use planned for next year

BY JAMES CONNOLLY
CW STAFF

NEW YORK — IBM and several other vendors drove past the 1M-bit memory level last week with announcements that they have fabricated high-speed, 4M-bit dynamic random-access memory (RAM) chips on existing production lines.

Engineers from companies including IBM, Mitsubishi Electric Corp. and Hitachi Ltd. described the design of CMOS chips at a New York semiconductor conference.

Meanwhile, Nippon Telegraph & Telephone Corp. (NTT) announced that it has developed circuit technologies and a prototype for a 16M-bit dynamic RAM chip providing four times the storage capabilities of IBM's chip. The Japanese communication company claimed its test device is composed of 40 million circuit elements on an 8.9mm by 16.6mm chip substrate with an I/O speed of 80 nsec.



IBM's 4M-bit chip, *pictured with tip of fountain pen.*

The developments were announced through technical papers presented at the Institute of Electrical and Electronics Engineers, Inc. International Solid-State Circuits Conference.

IBM said its 4M-bit dynamic RAM was developed by engineers at its Yorktown Heights, N.Y., and Essex Junction, Vt., semiconductor facilities and fabricated on the Essex Junction production lines.

IBM engineer Richard Parent reported that the chip occupies an area of silicon 35% larger, at 78 sq mm, than IBM's existing 1M-bit chip while storing four times as much data. Parent claimed the chip has an access time of 65 nsec, compared with the 80 nsec access time of the current 1M-bit chips used in products such as the IBM 3090 mainframes.

The chip is IBM's first CMOS-based dynamic RAM. Earlier chips used N-type metal oxide semiconductor (NMOS) technology. The CMOS chip operates on a 3.3-volt power supply, compared with a 5- volt supply in NMOS technology.

One analyst reported that the 4M-bit chips are likely to appear in finished products late next year. "We expect samples to start coming out in the first part of 1988, but we don't expect any real production to begin until late 1988," said Victor de Dios, senior industry analyst for Dataquest, Inc., a San Jose, Calif.-based market research firm.

De Dios said 1988 deliveries would keep IBM and other vendors on what has proven to be a three-year cycle. IBM announced it had fabricated its 1M-bit chip in April 1984, installed those chips in its 3090 mainframes two years later and announced the 4M-bit chip at the end of the three-year cycle.

He said he expects the three-year cycle to continue with 16M-bit chips.

Q&A to tap 386 power

Symantec Corp. early this month is expected to announce Q&A 386, a version of its data base and word processing package optimized to run on Intel Corp. 80386-based machines.

"This is not the be-all and end-all, but it is an optimized 80386 version," a Symantec source said.

The package, expected to sell for as much as $495, takes advantage of the Intel Above Board memory board and the Lotus/Intel/Microsoft Expanded Memory Specification. This allows users to address up to 3.5M bytes of expanded random-access memory. Q&A does not currently utilize extended memory. While the package, which is slated to ship in May, is upwardly compatible with the current version, it will only run on 80386-based machines.

3Com seeks twisted-pair Ethernet standard

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. last week said it is developing technology to deliver IEEE 802.3-standard 10M bit/sec. Ethernet over unshielded twisted-pair wiring and plans to push it as an international standard.

As interest in this area builds, other vendors are expected to announce similar plans. Leading the pack is AT&T, which two weeks ago announced it had signed an agreement with Synoptics Communications, formerly Astranet, to develop an 802.3 implementation in a star topology running at 10M bit/sec. on AT&T's Premises Distribution System.

No standard exists today for implementing the 802.3 protocols over twisted-pair wire. But 3Com officials revealed plans to submit design specifications to the IEEE 802.3 standards committee for consideration.

Incompatible standards?

Acknowledging that 3Com's proposal might not be accepted as the standard, 3Com Chairman and Ethernet co-inventor Robert Metcalfe said that nonetheless, he would be disappointed if multiple, incompatible implementations of 802.3 on twisted pair emerged.

3Com appears to be spearheading a drive to create a single standard — its own or another. "We've talked with some people in the industry about a standard [twisted-pair Ethernet], and we all agree we should go to a standards committee [with this issue]," said Reinier Tuinzing, 3Com's manager of transmission products.

He attributed 3Com's decision to issue a "statement of direction" about its efforts in this area to pressure from customers seeking to exploit their installed bases of twisted-pair wiring.

The benefit to twisted-pair Ethernet lies mainly in reducing wiring costs by alleviating the need to pull coaxial cable throughout a building. Ethernet is available today in broadband and baseband, or coaxial, implementations, both of which require special cable.

"There is a big demand for [twisted-pair Ethernet], especially in places like New York City, where buildings are so jammed with wire, there isn't room to pull new cabling, even if you wanted to," Tuinzing said. The cost savings realized from using existing telephone wire should enable many users to link even more desktop systems to their networks.

The disadvantages include distance limitations and degradation from noise as unshielded twisted pair is more likely to radiate and be susceptible to radio-frequency emissions.

Target users of Ethernet over twisted-pair wires are considered to fall into two groups: scientific or engineering users who want to migrate Ethernet to their office systems; and users who may want 10M bit/sec. speed but are wedded to using twisted-pair cable for networking.

3Com is targeting this summer for the release of its product. 3Com's hardware-only approach should allow a standard Ethernet controller to be connected to personal computer networks utilizing 3Com's 3+ network software while running over unshielded twisted pair.

Bridge to Netbios in 3+ Upgrade

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. has enhanced its 3+ network operating system with internetworking capability for IBM Netbios-based software.

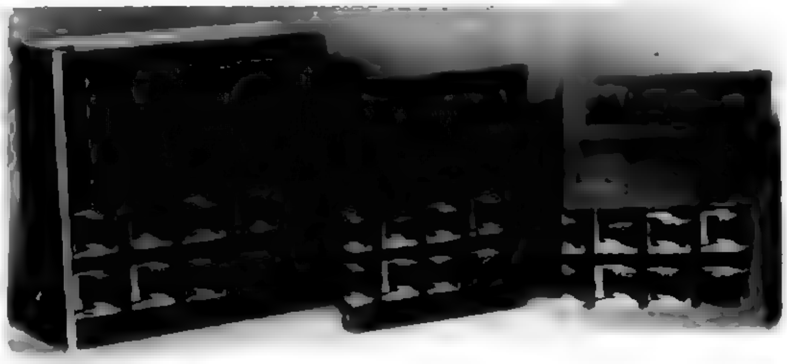
Users of Netbios applications on 3Com's Ethernet and 3Com or IBM's Token-Ring can now share data and resources transparently through remote modems or internetwork bridges, 3Com said. This reportedly eliminates the need for costly and separate gateways on each network.

Network applications for IBM Personal Computers and compatibles are written to either DOS or Netbios. 3Com already provides internetworking for DOS-based applications. Netbios is a standard interface that allows applications more control over message transmission but does not feature internetworking.

Available at the end of this month, Version 1.2 of 3+ integrates Netbios into its Xerox Networking Standard (XNS) communications drivers to provide internetworking, the vendor said.

Version 1.2 also provides users with access to network applications that previously would not run under 3+. These packages include IBM's Asynch Server, PC Network Program and PC 3270 Emulation Program; Hayes Microcomputer Products, Inc.'s Smartcom II; and Digital Communications Associates, Inc.'s Crosstalk XVI and Irmalan, among others.

Suggested list price for 3+ 1.2 is $1,059 for a one- to five-user network. The cost for an unlimited number of users of either PC Servers or 3com's 3server is $2,100. An upgrade path will be provided for current 3+ users.



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That means you'll be able to design and code programs faster, because you won't start each program from scratch. And you'll be able to debug them faster, because half of the code will come from other programs that have already been tested and debugged.

2. Examples To make it easier for you to master the complexities of CICS, these books are chock-full of examples...from syntax summaries for CICS commands to schematic illustrations that show how various CICS elements work. But more important, these books give you complete design and code for 16 CICS programs (5 in *Part 1* and 11 in *Part 2*).

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Move afoot to scuttle data base oversight

Groups endorse transferring authority of data from NSA to NBS

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Diverse segments of the computer community last week endorsed the transfer of authority of nondefense computer security programs from the National Security Agency (NSA) to the National Bureau of Standards (NBS).

Legislation sponsored by U.S. Rep. Jack Brooks (D-Texas) would, if enacted, have the practical effect of overturning the controversial National Security Decision Directive 145 (NSDD 145), which placed the NSA and the Department of Defense in charge of data security for all federal agencies and of assisting the private sector with security standards and information.

At a two-day hearing chaired by Brooks, critics of NSDD 145 said the change is necessary to prevent the militarization of information policy. Witnesses noted that the military's tendency is to overcontrol information.

Supporters of the bill's general intent included the Computer and Communications Industry Association, the American Bankers Association, Electronic Data Systems Corp., Software AG of North America, Inc., the Information Industry Association, the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and the American Library Association.

Witnesses from the private sector concluded that the NBS should assist computer security efforts at nondefense agencies and should develop standards with the private sector, while the NSA should handle only the defense community. "We favor a clean division of responsibilities," said John M. Richardson, spokesman for the IEEE.

Cheryl W. Helsing, testifying for the American Bankers Association's data security committee, said the business community is more comfortable dealing with the NBS, which is part of the Department of Commerce. She claimed the NBS understands the private sector's need for cost-effective security, whereas the NSA tends to favor high-level security fixes regardless of cost.

An important feature of Brooks' bill — entitled the Computer Security Act of 1987 — is the establishment of an advisory board that would include private-sector computer security experts, added Helsing, vice-president of corporate security for the Bank of America in San Francisco.

NSDD 145, signed by President Reagan in 1984, created a new category of information called "sensitive but unclassified" information that should be protected from foreign spies, terrorists and criminals.

The controversy heated up last November when that sensitive category was given a broader definition covering technical, economic and personal data and when Pentagon officials said they would place unspecified controls on commercial electronic information services [CW, Nov. 17 and 24].

Donald C. Latham, an assistant secretary of defense, and Lt. Gen. William E. Odom, director of NSA, defended the NSDD 145 program and opposed Brooks' bill, although they hinted at possible compromises to increase the role of NBS.

Top-notch technical expertise

Odom said his agency's National Computer Security Center has developed top-notch technical expertise, and he argued against splitting the standards-setting process between civilian and military agencies. Latham asserted that much of the criticism is based on misunderstandings, and he stressed that the civilian agencies have a major role in policy formation.

Critics at the Brooks hearing faulted NSDD 145 on grounds that it was developed in secrecy and gives military agencies too much control over computer security policies.

"Unless halted, this militarization of the information process threatens the free flow of public information, scientific inquiry, competitiveness of the information industry and open government," testified Jerry J. Berman, chief legislative counsel for the American Civil Liberties Union [CW, Jan. 12].

A contradiction in terms

Several critics stated that the concept of "sensitive but unclassified" information is faulty and perhaps a contradiction in terms. Rep. Glenn English (D-Okla.) noted that information is either sensitive national security information that ought to be classified and well protected, or it is not.

English commented that NSDD 145 appears to be based on the so-called "mosaic theory," which holds that the combination of unclassified data elements can permit the deduction of classified information.

Carried to its logical conclusion, however, the theory would justify the censorship of virtually all information that adversaries could use.

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Mid-range buyers trip on IBM strategy

BY STANLEY GIBSON
CW STAFF

ANALYSIS

NEW YORK — Despite IBM's recent statements of strategic direction regarding its mid-range products, some potential buyers of the new 9370 departmental minicomputer say they still see no clear path to follow.

One such potential customer, who has been looking at the 9370 as a building block for a nationwide network of automobile dealers, said he will not be able to use the 9370 unless an asynchronous interface is offered. But he said IBM has given him no assurance that this would be forthcoming.

Another prospective 9370 buyer said that, having made a decision to purchase Digital Equipment Corp. machines as departmental processors, he is delaying the acquisition in order to examine the 9370. Although he expressed doubt about selecting the 9370 due to a lack of application software available now, he said his senior management, committed to buying from IBM, is requesting consideration of the departmental processor.

The users' comments came at an IBM conference here that was sponsored by The Yankee Group, a Boston-based research firm.

IBM needs to clearly state a direction for intermediate systems, said Thomas Henkel, a Yankee Group industry analyst. "There's more doubt after the mid-range announcement than there was before," he said, alluding to IBM's recent statement of equal reliance on System/36 and 38 and 9370 architectures.

"The 9370 is an extremely mysterious product for users and for the entire industry," offered George Colony, an analyst with Forrester Research, Inc., based in Cambridge, Mass.

Henkel said he believes the System/36 and 38 machines will take a backseat to the 9370 as departmental processors despite IBM's statement of equal emphasis on both.

But despite the 9370's strategic importance, its utility to users hinges on connectivity features that will tie it into their corporatewide systems. One potential customer offered that the 9370 would not be valuable to him until an application-to-application IBM VM 9370-to-IBM MVS host connection is possible.

A long way to go?

Anthony Percy, director of product planning at Applied Data Research, Inc., said the use of the 9370 as a data base machine is in doubt. He claimed that IBM is just now beginning to understand data base applications on mainframes and said it has even farther to go before mastering distributed data bases — the most likely data base use of the 9370.

In addition, he pointed out that VM is not good for distributed use and said IBM's VSE would be better for a distributed data base system. But if that were used, Transparent Services Access Facility (TSAF), the only peer-to-peer communications facility announced with the machine, could not be used, because TSAF requires the VM operating system.

Colony said IBM's DB2 software package is the company's strategic data base product.

But DB2 is MVS-based, Colony pointed out, so it could not be used with a peer-to-peer VM TSAF 9370 network.

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DG unveils X.400 link

BY ELISABETH HORWITT
CW STAFF

WESTBORO, MASS. — Data General Corp. last week joined the swelling ranks of big-system vendors that have announced support of the CCITT X.400 electronic mail standard. The company unveiled DG/X.400, which allows users of its Comprehensive Electronic Office software system to exchange electronic mail with any other vendor's system supporting the X.400 protocols.

The announcement was made just in time for the X.400 interoperability demonstration, scheduled to be held at the Hanover Fair in West Germany next week. Computers from 14 manufacturers, including Digital Equipment Corp., Hewlett-Packard Co., DG and several leading European vendors, are slated to exchange documents via X.400 protocols. All 14 vendors reportedly are using the demonstration to test interoperability among their X.400 implementations.

Despite growing X.400 support, the standard's potential for providing multivendor connectivity will not be realized until different vendors' implementations have been certified as interoperable by an independent party, according to David Terrie, president of Boston-based Newport Consulting. The Corporation for Open Systems reportedly is working on such a testing facility.

DG/X.400 prices range from $660 for the DS/7500 system to $10,450 for the MV/20000. Shipping is to begin in July.

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Unix version for 386 bows

Microport beats AT&T, Microsoft to punch in booming field

BY PEGGY WATT
CW STAFF

SCOTTS VALLEY, Calif. — Microport Systems, Inc. last week announced a version of Unix System V.3 for Intel Corp. 80386-based personal computers, hoping to gain a foothold before AT&T and Microsoft Corp. ship their recently announced 80386 implementations.

The new Microport Runtime System V/386 is scheduled to ship in April and is slated to include many features of its existing port of Unix for the 80286 microprocessor, Microport President Chuck Hickey said.

But one analyst, while applauding Microport's bold jump into the 80386 market with a System V.3 release, cautioned that Microsoft will be hefty competition, even with a delayed product.

'Time to carve a niche'

"Microport may have a head start, but the race is not always to the swift," said Brian Boyle, director of research for Novon Research Corp. in Berkeley, Calif., a firm that focuses on the Unix marketplace. "The smart money bets on the strong. But Microport has time to carve out a niche."

Hickey said Microport plans to promote 80386-based systems running its Unix as scientific workstations in competition with Sun Microsystems, Inc. in Mountain View, Calif.

"Unix is going to become a commodity market," Hickey said. He predicted price and feature wars will result as the market grows and that every player's share will increase.

Microport's Unix reportedly will run Microsoft MS-DOS applications, with MS-DOS running as an application itself under Unix through the Merge utility from Locus Computing Corp. in Santa Monica, Calif. Locus developed the equivalent Simultask for AT&T.

System manager version in works

Microport is also assembling an 80386 version of System Vision, a system manager now available for its 80286 Unix that includes Xwindows and Sun's Network File System plus some features of University of California at Berkeley's Unix 4.2 used by Sun.

A software development toolbox and text processor similar to those available for Microport's 80286-based products will also support Microport Runtime System V/386, Hickey said.

Microport Runtime System V/386 costs $299, which Hickey said he hopes will underprice competition from Microsoft and other upcoming System V-compatible Unix systems.

Merge priced proportionally

The development toolbox and text processor cost $199 each, and Hickey said the Merge function will be priced comparably to its 80286 version, which is priced at $149.

Hickey said System Vision is scheduled to be available by the end of the year. However, he declined to release the price of System Vision.

Hickey said Microport ships approximately 300 units of its 80286-based version monthly.

Group claims FCC measure won't protect customer info

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A recently issued Federal Communications Commission order fails to protect the customer network data held by divested Bell operating companies from disclosure to Bell equipment sales personnel, a major user organization has charged.

The International Communications Association (ICA) argued that information about multiline customers, such as their local service and usage data, is proprietary and should not be disclosed without written consent from the customer.

The issue concerns an FCC order issued Jan. 12 that allows the divested Bell operating companies to integrate their customer-premise equipment sales units with their network services operations instead of requiring separate subsidiaries.

'Unrestricted access'

The FCC order established procedures for protecting customer proprietary-network information, but the ICA said the procedures allow Bell equipment sales personnel "free and unrestricted access to customer proprietary-network information unless the customer takes affirmative measures to request confidential treatment of the information."

The ICA complaint was made in a petition asking the FCC to reconsider its customer proprietary-network information decision and to adopt a requirement for prior written consent.

When the FCC first proposed the order in March 1986. it required the kind of prior written consent the ICA and other users groups wanted.

Shares ruled insignificant

But the divested Bell operating companies argued — and the FCC agreed in its final order — that the Bell companies have such small shares of the equipment market that they cannot abuse network information.

Users groups are concerned that the divested Bell operating companies could use customer proprietary-network information to identify potential customers for their equipment offerings and could favor buyers of their equipment in providing or maintaining access to the network.

The ICA said that users should control the dissemination of proprietary data to any customer-premise equipment vendor, especially the divested Bell operating companies, which have monopoly power over local exchange services.

PC-based insurance system goal to ease access to benefit data

BY ROSEMARY HAMILTON
CW STAFF

BOSTON — Aetna Life & Casualty Co. recently announced plans to market a personal computer-based system that would enable clients to access benefits data stored on Aetna's mainframes.

The system, a prototype of which was demonstrated here last week, is intended to lessen the work loads of Aetna representatives and benefits managers at clients' sites as well as provide easy and immediate access of data to employees.

Aetna officials said the system was tested within the company late last year and will be generally available in the second quarter. The system will offer one model for employee use and one for a benefits manager. The software was developed with Interactive Images, Inc.'s Easel graphics programming tool. It will be packaged either with an IBM Personal Computer AT — the benefits manager model — or within a large kiosk structure for employees.

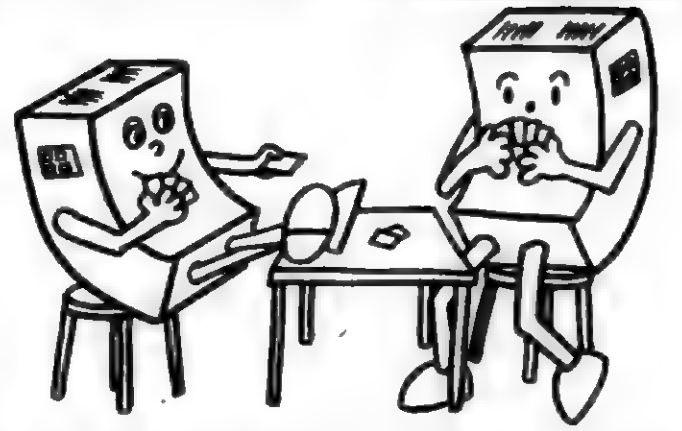
Aetna has offered a few other software packages to managers at client sites for inquiry purposes, but those packages have required programming knowledge and training, according to Lory Oliver, Aetna development supervisor on this project. The new system, based on a touch-screen, menu-driven format, will enable end users to access Aetna data easily, she said.

Customers will have the option of getting direct access to the Aetna Employee Benefits Division mainframe or requesting monthly downloads of benefits data. Specifics on the direct-access method are being ironed out, Aetna said, but customers will probably be required to set up a direct leased line to Aetna's Hartford, Conn., headquarters.

Whether a user has direct access or receives monthly downloads, the actual interaction with the Aetna computer is limited to requests. In the case of a direct access, an employee can directly request benefits data, which will be downloaded to the on-site Aetna system.

At that point, users can initiate transactions, such as transferring funds, as well as perform "what-if" analyses on their accounts.

Aetna said each system will require customization, a part of the overall cost that the company would not release. The hardware and software portions of the product will cost $10,000 for the personal computer version and $13,000 for the kiosk version.



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Windows

CONTINUED FROM PAGE 1

They're going to wait and see if others develop Windows applications."

Infocorp analyst William Higgs says Creative Strategies' estimate of sluggish Windows use does not mean the proposed standard has been rejected.

"You really can't expect Windows to have very heavy volume shipment until you have Windows applications," he says.

However, Microsoft is clearly holding its breath. "The timing for major applications is right now," says Tandy Trower, director of retail marketing for Microsoft's systems software group.

Trower adds that Windows sales are in line with projections.

Trower says he expects Windows applications to at least double in the next year, joining applications from approximately a dozen pioneer developers that have products out now.

Borland's Kahn

The major players in personal computer software remain lukewarm or noncommittal. Lotus Development Corp. says it will develop at least one new application to run under Windows but will not change its flagship 1-2-3 for the graphical environment.

Ashton-Tate says only that it is reviewing the various operating environments and that Windows appears to be the best.

Even Microsoft has failed so far to release any of its business applications developed under Windows. Microsoft applications, like other vendors' products, take over the entire screen when they run with Windows.

"You'd think Microsoft. . . would make all their applications run under Windows," says Renee Plummer, information center manager at AT&T in New York.

Microsoft has promised to ship programs that take advantage of the multiple-window environment. A Windows implementation of its Excel spreadsheet, now an application for Apple Computer, Inc.'s Macintosh, is expected late this year.

In the meantime, many corporations are evaluating copies of Windows and are waiting for applications.

"The acceptance [of Windows] is kind of spotty," Plummer says. She estimates that of the nearly 1,000 users the information center supports, only 35 utilize Windows.

Other users have complained of technical problems. "A lot of programs crash under it," says Sandra Jones, an automated systems analyst who oversees end-user computing in the finance department of Northrop Corp. located in Hawthorne, Calif.

Because Windows demands control of memory, heavily random-access memory (RAM)-resident programs clash and may never adapt to the interface, Microsoft's Trower says. Microsoft has built some common RAM utilities into Windows, including a notepad, calendar, card file and calculator.

Philippe Kahn, president of Borland International in Scotts Valley, Calif., is among the most vocal critics of Windows.

"People are afraid Microsoft is going to take control of the operating system," Kahn says. He declines to disclose his company's plans to become Windows compatible.

Borland and other developers, includ-

Status report:

Some two dozen Windows applications have already hit dealers' shelves, and Microsoft Corp. is waving a list of more than 120 independent software vendors that have signed up to develop or adapt applications to run under the Windows interface.

But even Microsoft Windows evangelist Steve Ballmer, vice-president of the systems software group, acknowledges that he still has to lobby.

"We'll know Windows has made it when we meet with an independent software vendor and he doesn't worry about whether a user has Windows yet, and whether the user will have to buy it to run their application," Ballmer says. Microsoft licenses runtime versions and offers bundling options to allay those concerns.

Dozens of marketing pacts

Microsoft has marketing agreements with two dozen other vendors, some of which have enhanced Windows as part of an OEM contract. Among the U.S. resellers are AT&T, Hewlett-Packard Co., Digital Equipment Corp., Wang Laboratories, Inc., Zenith Data Systems Corp. and Tandy Corp.

Overseas, Microsoft has a handful of vendors in Europe and Japan.

Independent vendors' products now shipping include In-A-Vision computer-aided design and Windows Draw presentation graphics from Micrografx, Inc. in Richardson, Texas; PC Image, an image processor for use with scanners from Datacopy Corp. in Mountain View, Calif.; PC Scan Plus and Publish Pac from Dest Corp. in Milpitas, Calif.; Actor, an object-oriented programming language from The Whitewater Group in Evanston, Ill.; and Nexpert Object, an

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ing Microsoft, say applications development for Windows is too difficult to be done quickly. Although Windows might share many characteristics of Apple's Macintosh interface, the structure is quite different.

"Porting over applications is not as easy as it might sound," says Dave Winer, president of Living Videotext, Inc. in Mountain View, Calif. "Our interest in Windows as a market is waning."

Microsoft says more than 100 vendors have publicly committed to developing Windows applications. However, some of those developers say privately that they are working slowly, only to be ready to ramp up if Windows picks up in popularity.

"Expending a lot of money on Windows for a smaller company like us is a gamble," says Vern Raburn, chairman of Symantec Corp. in Cupertino, Calif. "We don't hear anybody asking for it."

But, as Infocorp analyst Higgs points out, Microsoft has made some Windows converts among small developers that were willing to leap on new technology.

Many observers are also waiting for IBM's statement on Windows. So far, IBM's only reaction has been to place Windows on its vendor label sales list, to sell to customers who request it, according to an IBM spokesman. IBM also markets Windows rivals, such as GEM from Digital Research, Inc. and IBM's window interface, Topview.

Steve Ballmer

"We knew Windows would be a slow-burn process," comments Steve Ballmer, vice-president of Microsoft's systems software group.

Several corporate developers say Windows may become more useful as they get more Intel Corp. 80386-based systems. They also point to emerging graphics coprocessors from Intel and Texas Instruments, Inc. that will speed Windows, even on 80286-based systems.

"I think Windows is the one that can make it, down the line, with the 80386-based systems," says a systems developer at a major manufacturing firm that is developing Windows applications to interface with mainframes, minis and a personal computer network.

Todd Greeno, manager of office technology for Pfizer, Inc. in New York, agrees. "We sort of looked at Windows before, and it was such a memory hog, there wasn't much value in running it on a smaller machine," he says.

Infocorp's Higgs suggests Microsoft might have asked for too much too soon in pushing for a Windows standard.

"Windows is not a product for today's environment, and even Microsoft is looking at it that way," he says.

Microsoft acknowledges that the Intel 8088-based machines, which are still heavily in use, are not fast enough for Windows to perform well.

"Now you have a reason to buy an IBM Personal Computer AT," Microsoft Chairman Bill Gates said when Windows was released.

Gates has called Windows strategic to Microsoft's success and part of his goal to put a PC on every desk and in every home.

"But if Windows died, Microsoft would still be in good shape," Ballmer says.

Microsoft's Windows promoters do not deny they still face hurdles.

"It's not a time to sit back and take it easy," Trower says. "We're still just starting. No one said the race would be won in the first lap."

believers

expert system shell from Palo Alto, Calif.-based Neuron Data.

The most significant recent release is Aldus Corp.'s Pagemaker, which ushered in a desktop publishing flood on Apple Computer, Inc.'s Macintosh. Its use of Windows' built-in drivers and fonts "points up the advantages of writing to Windows," says William Higgs, analyst with the market research firm Infocorp in Cupertino, Calif.

Broad appeal needed

But Windows applications need broad appeal, notes Tim Bajarin, president of Creative Strategies Research International, a San Jose, Calif.-based market research firm. "If the first major product out under Windows was a mass market product, then it would have an impact," Bajarin says.

Paperback Software International President Adam Osborne recently said his company will release a line of applications that run under Windows, and Micropro International Corp. said its upcoming desktop publishing package will be designed for the Windows interface.

Several vertical market programs are available, including high-end instrumentation interfaces from HP-Genenchem in South San Francisco and two legal expert systems generating tools from Legal Ware, Inc. in Toronto. Mindscape, Inc. in Northbrook, Ill., is selling a game, Balance of Power.

Windows has also gleaned hardware support from Intel Corp., which bundles Windows with its memory-expanding Above Board. In addition, several manufacturers of monitors, pointing and output devices have developed Windows drivers for their products.

PEGGY WATT

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CW 3/2/87

EDITORIAL

DOS and don'ts

WHAT A BEFUDDLING time to be evaluating major microcomputer purchases.

This situation is being brought to you by a diverse cast, including Microsoft Corp., IBM, a couple of thumbnail-size silicon chips called the Intel Corp. 80286 and 80386 and a host of software developers who are probably pretty confused at this point.

To put the situation into perspective:

- IBM announced a high-speed microcomputer called the Personal Computer AT 30 months ago, and roughly two million of them are on desks in businesses across the U.S.
- To date, there is no widely accepted operating system that begins to tap the potential of the AT, which is based on the 80286 chip. Specifically, users cannot economically exceed the 640K-byte main memory barrier and cannot get the AT to perform multiple tasks simultaneously.
- Microsoft, which has been known to miss a deadline or two, now hints that a commercial version of 286-DOS, which can perform the above functions, is now in doubt before the end of this year.
- Meanwhile, a new generation of micros, based on the 386 chip — which can support multiple operating systems in native mode — are coming on stream. Any sort of DOS specifically made for the 386 is two years off, Microsoft says.
- *But*, within a year users may see a Microsoft Xenix-AT&T Unix marriage giving birth to a multitasking, multiuser Unix release for 386 machines. Want to run packages written for the old generation of micros? Just load MS-DOS on the 386 along with the new Unix, and away you go.

So software developers, which bring you all those applications, must be wondering just which operating system they should invest time in writing applications.

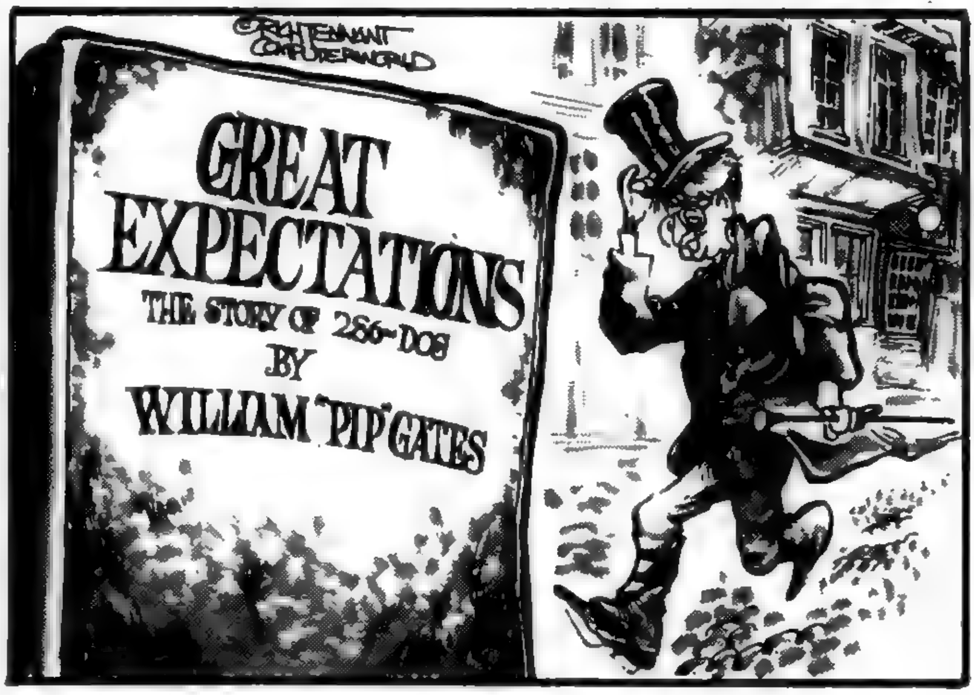
WHEN YOU LOOK AT THIS and other data, you have to first wonder why anyone, including Microsoft, would bother with the 286, the AT engine.

The answer is that Microsoft is being paid handsomely by IBM to do so by virtue of a long-term development agreement the two hatched in 1985. IBM made certain tacit commitments to its customers who bought those two million ATs, commitments saying it would provide the software to exploit the machine some day.

But now we see Microsoft looking to Unix and elsewhere for future operating system development. And why not? Unix was developed as a portable, multitasking, multiuser operating system. The 386 chip was developed with the same criteria in mind.

Further, there is a lot of Unix potential in the user marketplace. A recent *Computerworld* survey of 700 business sites indicates the support for Unix or Xenix during the next two years will grow 200%, while support for Microsoft MS-DOS and IBM PC-DOS will drop dramatically.

All and all, the 386 machines look better all the time.



LETTERS TO THE EDITOR

Ethical perceptions

Thanks for your article, "Criminal past of IEEE officer went undisclosed" [CW, Feb. 16], the revelation of Stanley Mark Rifkin's criminal past.

I call attention to the quotation from National Bureau of Standards security specialist Stuart Katzke: "People who make amends for their past mistakes deserve a second chance and shouldn't be hounded for the rest of their lives."

The activity for which Rifkin was convicted and sentenced was not an error or fault in judgment. He was convicted of deliberate theft through knowledge and a position of trust. To equate such action with a spelling error is an exercise in the lowest form of semantics.

For one in a position of trust who knew of Rifkin's felonious activity to conceal that knowledge from a voting constituency is a mistake of some magnitude. Katzke's perception of ethics is certainly questionable.

Those who bandy the words "professionalism" and "ethics" should take heed to the consequences of loose interpretations. Be advised that the codes of ethics of the Data Processing Management Association (DPMA) and the Institute for Certification of Computer Professionals (ICCP) strictly prohibit membership and certification, respectively, of convicted felons.

To reward a miscreant with membership, and office, in a professional association implies that the professionalism and ethics of the association's members are of questionable substance and value. Katzke owes IEEE leaders and members an apology.

Robert R. Cromer
Irving, Texas

Cabling vs. diskettes

As a vice-president of a 3½-in. floppy disk drive manufacturing firm for personal computers and compatibles, I respectfully disagree with William Zachmann's article, "Bridge tool a winner" [CW, Feb. 2], in which he states that a cabling system is the easiest and most convenient solution to the problem of transferring data between 3½-in. diskette-based laptop and 5¼-in. disk-based desktop computers.

This analysis misses the main incongruity between laptops and cabling systems. Laptops are designed for portability and operation in the field. The main advantage of the 3½-in. diskette is its size and durability — it can easily be mailed or carried in a shirt pocket.

Relying on a cabling system to transfer data from a laptop to a desktop computer means the user is forced to transport the laptop to an office, which is clearly an unnecessary restriction. Carrying the 3½-in. diskette is far easier.

Computer users aren't looking for cables when they buy a laptop computer. They're looking for portability. Given the need to download information to a desktop system, only a 3½-in. disk drive system for their desktop can guarantee them that portability.

Michael D. DeLapa
Vice-President
Manzana Microsystems, Inc.
Goleta, Calif.

This week in history

March 7, 1977:
The Social Security Administration succeeds in penetrating the security system designed to protect the computerized records of millions of Medicare patients.

March 1, 1982:
The U.S. Supreme Court grants a deaf lawyer permission to use a CRT terminal when he argues a case asking a school system to provide a deaf student a sign-language interpreter. The decision marks the first time the Supreme Court has allowed the presence of any recording system other than its own during arguments.

Managerial catering

Kudos to senior editor Glenn Rifkin and the Computerworld staff for the Executive Report on users groups, "The users group explosion: Do they really have influence?" [CW, Feb. 9].

Our group — the Microcomputer Managers Association (MMA) — differs from others in that our efforts are neither product-specific nor oriented primarily toward end users. The MMA caters to microcomputer managers and provides different forums for the discussion, demonstration and development of microcomputer technology and microcomputer management. We also throw a few good parties.

Readers interested in learning more about the MMA should call Annie Zdinak at 800-237-0316; in New Jersey, 201-569-6919.

Alex Kash
President
MMA
Englewood Cliffs, N.J.

What's love got to do with it?

AMY WOHL

An unexpected wedding occurred recently. H. Ross Perot, superpatriot and superentrepreneur, having left General Motors Corp. bloody (but $750 million richer) and certainly unbowed, married another superentrepreneur, Apple Computer, Inc. founder Steven Jobs.

Jobs has been teasing the computer community, keeping us fairly in the dark about his new company, Next, Inc. Oh, we've seen showy announcements about how they designed their clever logo. And we've had little hints of direction and purpose. (For the record, Next is a start-up company developing a workstation for the educational community.) But real information as to what, how and when has been pretty scarce.

Suddenly, with no hint that Jobs was looking for additional funding for Next (and he probably wasn't), comes the news that Perot has made a major investment in the start-up (one that puts the company's value in the $100 million ballpark) and joined its board of directors.

I stifle a giggle imagining the first board meeting at which they don't agree. What will be the subject of their first falling out — and what the result?

Fruit-juice bill

Imagine Jobs' laid-back California style and Perot's hard-driving, aggressive manner colliding. Maybe it will be over the fruit-juice bill. (The Macintosh development team is reputed to have drunk $100,000 of the stuff a year.) Actually, that's unlikely; Perot is known for his strong support of employees, and all that fruit juice was a great investment for Apple. (Just assume that each dollar of orange energy kept a programmer working just 10 more minutes.)

Maybe the collision will be caused by product design. Let's assume history is a good predictor.

In that case, Jobs is sure to go for a unique design, optimizing technology but demanding that a new market be built around a new standard. Perhaps Jobs' success with the Macintosh will attract development investors faster — or perhaps the knowledge that Apple agreed to add IBM compatibility to its Macintosh line will make them wait.

Perot, on the other hand, is sure to argue for accepting and taking advantage of standard environments. His Electronic Data Systems Corp. succeeded by simply knowing everything about Big Blue's hardware and software and supporting it better and faster than IBM could.

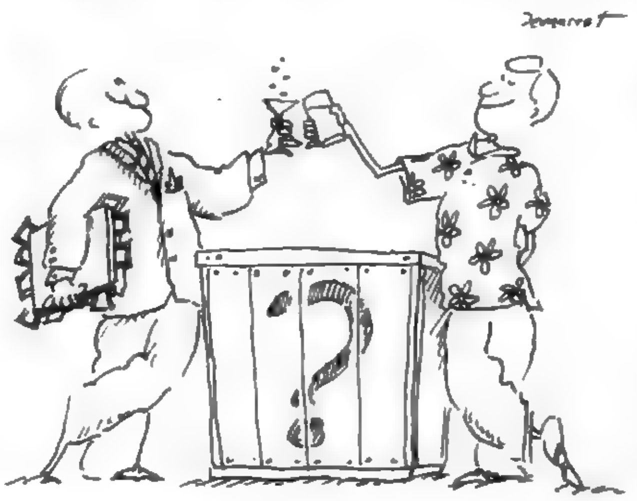
Where will they compromise? In this case, timing is probably the issue. Next is likely to be pretty far along by now. Industry sources expect some type of public product disclosure by the end of this year.

So Perot has no doubt agreed that he likes it — whatever it is — and his advice will initially be directed to the business of getting the product to market, the business of running the business and the business of what the next Next product will look like.

Perhaps their disputes will be focused on style. For instance, the announcement: Perot would vote for a slick hotel in San Francisco with phalanxes of pin-striped vice-presidents glad-handing university presidents over pate and champagne. Jobs might go for orange juice and tofu with the graduate students in some Silicon Valley hangout where T-shirts and Nikes are de rigueur. But Jobs has been known to don a suit when the occasion demanded (albeit an off-the-wall designer's style) and Perot surely knows the value of making the customers happy. Maybe they'll divide the announcement day responsibilities and each meet with their natural constituencies.

A real question — not yet answered or obvious — is exactly what this relationship is all about. Is this Perot simply making an investment (small, given his resources) and looking for something to do while he plans his next move? Or is Jobs looking for a new father figure to replace his previous relationship with John Sculley? Clearly Perot represents success, authority and the possibility of approval, but Jobs seems to have matured since leaving Apple and Perot seems too clear headed to invest in emotion rather than "significant upside potential," as my broker likes to say.

In the end, what Next is doing (that is, what the product is doing) is probably more important to its success or failure than Steve Jobs, Ross Perot or our speculations about the reason for this surprise nuptial. If it's a great product, properly timed, positioned and priced, it will work. If one of those all-important variables is off a little or a lot, it probably never mattered anyway.



Jobs has a lot riding on Next — the need to prove Apple wasn't just a fluke, an accident of timing or something that succeeded in spite of, rather than because of, his efforts. Perot would like to prove his business acumen is as sharp as ever, and that GM was a fool to allow cloudy thinking and the need for unnecessary control to lead it to divorce the best businessman on the board. Perot will very much want such a visible investment to visibly succeed.

But that may, in fact, be the point. Perot's investment is in itself an indication that he thinks Jobs is sitting on something good. And the groom was willing to bring a considerable dowry to the marriage to ensure its financial success and to ally himself with a new and likely winning team.

We've all known strange marriages that go on and on while friends and relatives ask, "What do they see in each other? They're so dissimilar." The answer usually lies not in the fact that opposites attract, but rather in that the bride and groom share attitudes and interests that observers haven't noticed.

In this case, Jobs and Perot have a lot in common: They're both successful businessmen; they care a lot about the people who work for them; and they have a reputation for being opinionated and passionate about what they believe. That's more than a lot of successful marriages have going for them.

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

How to succeed in the CIO business

Help the customers the CEO cares about

FREDERIC WITHINGTON

Some organizations have chief information officers, though they are rarely called that. Whatever their titles, they can be distinguished from ordinary data processing managers in three ways.

First, CIOs are invariably vice-presidents or another type of officer. Second, they report directly to the president or at least to a senior vice-president of operations, never to a staff or departmental VP. Perhaps most important, the CIO is part of the management cadre responsible for the organization's future; indeed, the CIO is often responsible for all strategic planning, in addition to all matters pertaining to information technology.

Many data processing managers would like to be promoted to CIO. However, creation of such a new officer-level position requires action by the directors as well as the chief executive officer; they must believe the promotion is justified.

How do CEOs and directors feel about data processing managers? In most cases they view them as the people who:

- Get the paychecks and bills out
- Provide office machines
- Provide telephone service.

These functions are important — even essential — but they have little to do with the organization's strategic direction. So, the CEO and directors are not about to see the reason to appoint a CIO. (This point is overstated. In many organizations, the DP manager is recognized as a key contributor to productivity and efficiency of operations. Nevertheless, the job is perceived as a staff one, outside the core of the business.)

How can the DP manager change the CEO's perception?

Not by providing integrated office automation. These systems rarely produce a demonstrable benefit equal to their cost; the benefits must be taken on faith. Besides, CEOs tend to look on office employees as necessary evils.

Cost related to revenue

The cost of salesmen, customer service and manufacturing employees can be directly related to revenue. Even product designers, acknowledged to be essential, must regularly re-prove themselves.

And not by providing decision support systems to the CEO. His decisions, mainly about personnel appointments and gambles for the future, are necessarily based primarily on intuition and faith.

The limited amount of relevant factual information a CEO needs can usually be presented in a simple summary with little need for fancy personal computer graphics.

The thing to do is provide systems that help the people the CEO cares about. The most important of these are the customers. Some information systems help the customers and also serve the organization's interests. Automated teller machines please depositors and also reduce personnel costs; reservation systems increase responsiveness and also permit more precise planning; on-line order entry permits both customer and supplier to reduce inventories.

The CEO also cares about the employees who produce the revenue. Dispatching, computer-integrated manufacturing, integrated customer information and source data entry systems are examples of systems that help employees by providing better information to support their activities and at the same time increase efficiency. Generally speaking, any organization that has appointed a CIO is one that is heavily into the kinds of systems mentioned above.

Management's perception

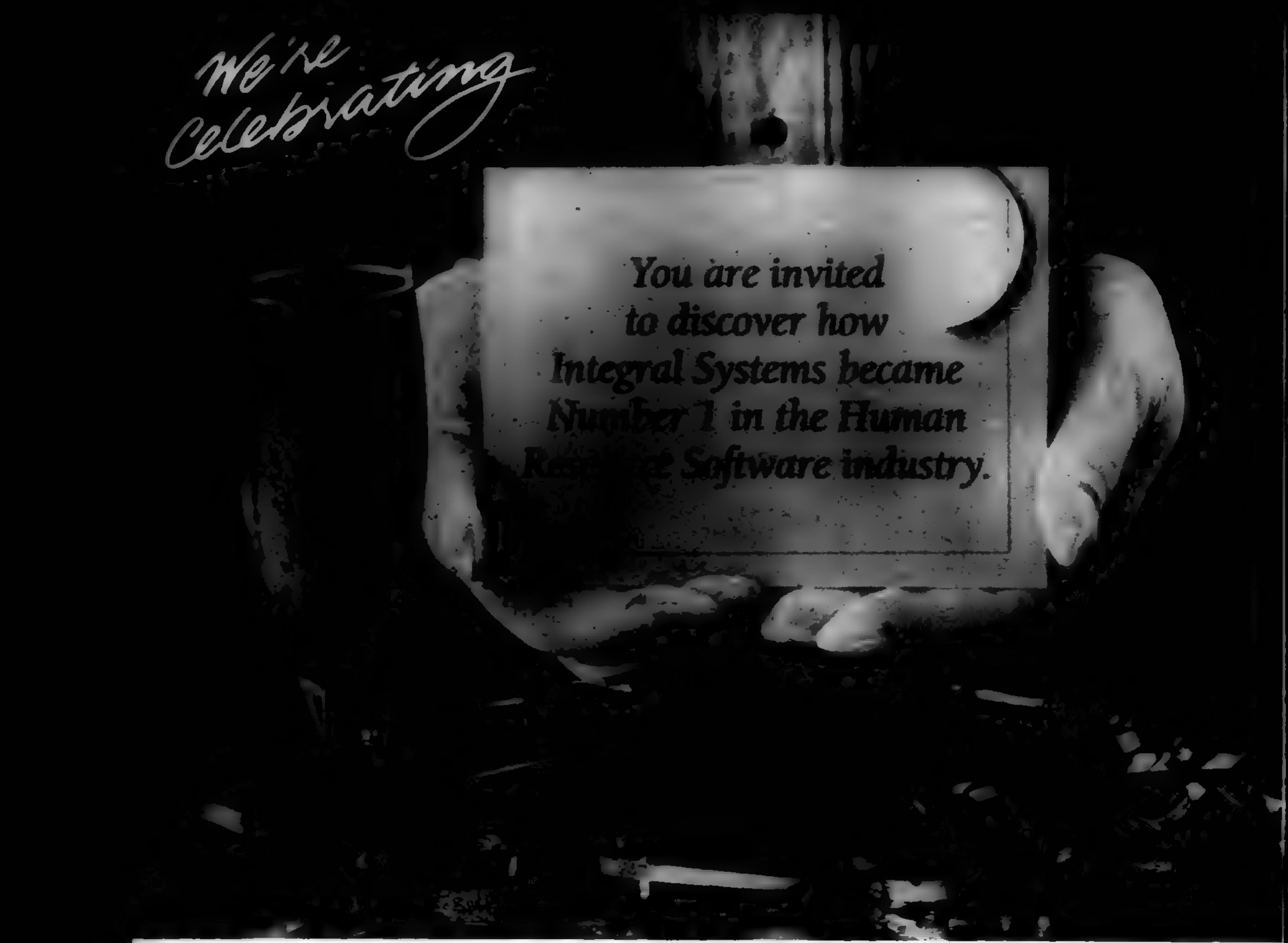
So if you want to become a CIO, don't stay in your office listening to vendor salesmen talk about inwardly directed networks with vague purposes. Get out among the customers and line employees. Think up systems that will simultaneously improve their jobs and help your company, and you'll be surprised at the change in management's perception of your value.

If you can't think up such a system, your organization may simply be insufficiently information-intensive to justify a CIO, at least at present.

If you can think of such a system but can't sell it to management, either you don't understand management's values or you haven't learned to communicate properly.

In any case, you will have learned something about becoming a CIO, some time, somewhere.

A 30-year veteran of the computer industry, Withington was a vice-president of Arthur D. Little, Inc. and is now an independent consultant. He has written four books and more than 60 articles and papers.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SOFTWARE & SERVICES

SOFTWARE NOTES

Laptops gain disks

Computer Associates International, Inc. is plans to offer its micro products — Supercalc 4, Superproject Plus, Easywriter and others — on 3½-in. diskettes as well as 5¼-in. diskettes to accommodate users of the IBM Personal Computer Convertible laptop. Previously, only IBM offered software in both disk forms.

The SAS Institute, Inc. is scheduled to dedicate a new five-story research and development facility March 10 at its 11-building Cary, N.C., campus. The $6.5 million building will house 500 research and development staff members.

MDBS, Inc., the developer of Knowledgeman/2 and Guru, has entered into a distribution agreement in Japan to have Guru distributed by Knowledge Engineering Laboratory Corp. of Tokyo.

A videotape of a panel discussion on automated Cobol restructuring sponsored by the **Software Maintenance Association** in Chicago Jan. 12 is available for $75 from Jamie A. Goossens, who can be reached at (312) 938-5364. Panel members were Eric Bush, chairman of Language Technology, Inc.; J. Cris Miller, a principal of Peat, Marwick & Co.; and Henry W. Morgan, vice-president of Group Operations, Inc.

Concurrent DBMS goes distributed

BY ALAN ALPER
CW STAFF

TINTON FALLS, N.J. — Concurrent Computer Corp. last week brought out Release 8.0 of its Reliance Plus on-line transactional processing and relational data base management system, providing its 3200-family processor users with remote and distributed facilities.

At the same time, the firm unveiled an office automation environment for Reliance Plus featuring word processing, electronic mail, calendar and diary, telex communications, personal computer connectivity and decision-support software, the firm said.

With the distributed capabilities of Release 8.0 of Reliance Plus, users can create nationwide manufacturing and distribution systems, retail networks and branch-office or departmental computing networks, Concurrent officials said.

For example, Release 8.0 enables a user in a manufacturing business to search and fill orders from either local inventory or any other inventory on the firm's network, according to Russ Lombardo, manager of transaction processing marketing. The logic routing of an order query can be contained in an application written for the purpose. The query can be routed by the application over Concurrent's Pennet network, he said.

Upon locating the product, the system can immediately order it, update the inventory data base, bill the customer and ship the product — all from a remote system, Lombardo explained.

Other features of the release are a security system with control levels of authorization; IBM SQL-like commands, such as SELECT and FETCH, that can be embedded in Cobol, Fortran or C applications; a record-transfer utility; support for a virtually unlimited number of terminals; and light-pen support.

In addition, Concurrent is offering three optional packages with Release 8.0: Reliance Monitor, which provides tools for monitoring resource usage and tuning production environments; Reliance Access, which combines the Query/Update software into a single package; and Reliance Interface, which allows users to build application interfaces into Reliance Plus from high-level languages under Concurrent's OS/32 proprietary operating system.

Release 8.0 will be available in March and is priced from $3,000 to $24,000, depending on the processor model used. Reliance Access is priced from $1,000 to $5,000, depending on the processor model, while Reliance Monitor and Interface cost $2,000 each, regardless of processor model.

Reliance Office enables users to tailor systems to their specific needs by building OA functions in a modular form. The environment supports user-developed programs and third-party software while allowing access to IBM mainframes through gateways or links to other Concurrent systems.

The word processing option, called Lex, provides for document creation, editing and printing. TTR includes automatic

Continued on page 20

Bank lauds start-up's DB2 dictionary

Says three-year conversion project would not have been possible without it

BY CHARLES BABCOCK
CW STAFF

NEW YORK — A data dictionary for IBM's DB2 has been introduced by a newly formed company with no previous product history, Brownstone Solutions, Inc.

The dictionary is in use at a major New York investment bank that has started a three-year project to rewrite its production applications to work with DB2. Spokesmen for the bank commented on the dictionary on the condition that their institution not be identified. The principal spokesman is the supervisor of technical architecture for the applications conversion project.

The conversion project would not be possible without a dictionary, and no comparable product exists yet from other sources, the spokesman said. The dictionary remains a basic technical product, storing entity and data definitions in DB2 tables. "You have to know the entity-relationship model and understand it to use the dictionary. We built a lot of panels to hide the internals of the dictionary. We have a menu-driven front end now," the spokesman said.

The dictionary provides referential integrity to the conversion process, the spokesman added. Lack of referential integrity is one of the most frequently cited complaints about DB2.

The dictionary also supports creation of DB2 tables and is extensible; as new entity types are defined, they become available to all procedures that rely on the dictionary.

Although Brownstone Solutions is a newly minted company name, and the two principals have yet to establish a company telephone number, the bank proceeded with the dictionary because "we have to get this project up and going," the spokesman said. The young authors of the dictionary, Barry Brown, 27, of New York, and

Continued on page 20

[illegible]
- [illegible] CEO [illegible] Page 22.
- [illegible] DBS market. Page 31.
- Sun rolls out Version 5.0 of [illegible] Page 25.

[illegible] change their [illegible] match the [illegible] manufacturing system, we say [illegible]

[illegible] MITROL, our [illegible] fourth generation language. [illegible]

The [illegible] Art of Information Management

Company
Address
City State Zip
Phone

DG spruces up CEO graphics

BY ALAN J. RYAN
CW STAFF

WESTBORO, Mass. — Data General Corp. has announced two products it said it expects to enhance its CEO office automation software graphics.

DG/Fontstyles contains 12 presentation-quality typefaces that may be used with DG's existing graphics software packages — CEO Drawing Board, Trendview and CEO Wordview.

The font module is designed for DG's AOS/VS operating system and supports six filled and six unfilled font styles as well as international character sets, the vendor claimed.

The package is said to provide graphic arts-quality font capabilities licensed from Bitstream, Inc. in Cambridge, Mass., a vendor of digitized fonts.

Single-key charts

Users of the second product — the enhanced version of CEO Decision Base — can create charts from spreadsheets or data tables with a single keystroke, according to a DG spokeswoman.

Using the enhanced CEO Decision Base, a single function key selects data from spreadsheets or data tables to create charts that can be saved in the CEO filing system as graphics-kernel metafile documents, then edited using CEO Drawing Board, DG explained.

CEO Decision Base is integrated decision-support software for spreadsheet, personal data base and charting applications that includes bar, pie, line and surface-chart options.

The CEO software products support a variety of printers, according to Caren Spital, DG product manager. Those include DG's desktop laser printer and some dot matrix printers, several Hewlett-Packard Co. plotters and HP's film recorder device. Trendview also supports ink-jet printers.

"We currently do not support a page-description language output device," Spital said, "but we are looking to gain that support in the next nine months."

DG/Fontstyles costs $550 per license, and the CEO Decision Base software license is priced from $1,800. Both are available immediately, DG said.

Bank lauds

CONTINUED FROM PAGE 19

Lewis P. Stone, 26, of Stamford, Conn., are "DB2 heavies," the spokesman claimed.

Brown and Stone are former Arthur Andersen & Co. technical service managers who were selected to develop an IBM DB2 workbench for a project that converted the applications of the New York State Employees Retirement System for use with DB2. The workbench included 300 screens and 100 DB2 tables to aid in developing applications under IBM's CICS, Stone said.

The prototype of the DB2 dictionary was developed in that project as well, he said. The New York bank is the firm's only installation to date, and the company has yet to hire a sales staff or establish a business address other than the addresses of the two principals. Brown can be contacted at 20D, 375 S. End Ave., New York, N.Y. 10280.

The dictionary is based on an entity-category-relationship model. Entities or types of objects and concepts are defined and have the relationships between them described and categorized. The categories allow different entity types to have common relationships, Brown and Stone said. Users can view and maintain entities, relationships, categories and text through IBM's Interactive System Productivity Facility. The dictionary costs $55,000, Stone said.

Concurrent

CONTINUED FROM PAGE 19

numbering of footnotes and paragraphs, form-letter production, mass mailing with data base, a 100,000-word dictionary, sorting within documents, programming capabilities and a four-function calculator.

Scheduled for availability in April, Lex lists for between $3,500 and $10,000, depending on the processor model with which it is used.

The electronic mail option, NEM/32, allows users to create and send messages, including stored documents, charts, spreadsheets, reports, tables and non-ASCII files, to other users. A diary and calendar facility allows the user to schedule and route appointments throughout a network.

Currently available, NEM/32 is priced from $800 to $4,0000.

C-Telex, an automated telex system that works with NEM/32, is said to be capable of routing messages, including multiple copies, outside the network. Due to be available in April, it is priced from $2,000 to $8,000.

PC connectivity is achieved through the firm's Pennet PC software. The software enables the IBM Personal Computer, PC XT, AT or compatible to run Reliance Office residing on a 32-bit minicomputer. Pennet PC is fully compatible with Reliance Plus.

Pennet PC is currently being beta-tested, Lombardo said. Pricing and availability have not yet been determined, he added.

IF YOU NEED TO KNOW WHO, WHAT, W

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DB2 tool vendor: 'Let the market drive you'

BY ALAN J. RYAN
CW STAFF

HOLMDEL, N.J. — With two hits behind him, Bernard Goldsmith recently said finding the key to success in the mainframe software market lies in listening to the needs of the user. "If you let the market drive you, rather than your own technical desires, the odds are in your favor," he suggested.

Goldsmith, who developed Top Secret and Single Image Software, two big sellers for CGA Computers, Inc., has now jumped feet-first into the IBM DB2 market with his new company, Updata Software Co., located here.

Updata's productivity tool offering, available now, is called DB/Pro Edit. The software can display tables in full-screen, tabular or row format, which allows applications programmers to create test tables and display the results, the vendor said.

Using IBM's Interactive System Productivity Facility editor-style commands, rows can be inserted, deleted, replicated or changed interactively. DB/Pro Edit can also be used to create DB2 tables and allows existing table definitions to be used as templates for new tables, CGA said.

To monitor and tune system catalog tables, the software reportedly can build complex catalog queries without coding IBM's SQL select statements.

An IBM SQL Processor Using File Input (SPUFI) emulator allows use of existing SPUFI libraries. The software generates resulting tables that can be edited online. The product can be installed quickly and requires no changes to other software, Updata claimed. Licensing costs $4,500 per year, Goldsmith said.

The chief executive officer of Updata said he has entered the DB2 market because he sees great opportunities in the systems software market. "There are opportunities for financial gain and opportunities to build a company," Goldsmith observed.

"The key is finding a good niche in which you can operate. We feel DB2 represents an opportunity niche for us," he added.

DB2 has an installed base of more than 1,000, the developer said, "so there is strong evidence that there will be a large user community" for DB/Pro Edit.

Goldsmith said the installed base for DB/Pro Edit is currently 19. The installed base for the Single Image Software series is approximately 1,000, according to a spokeswoman at Duquesne Systems, Inc. in Pittsburgh, which purchased that product from CGA. Top Secret currently has a worldwide installed base of 2,200, said a spokeswoman at Computer Associates International, Inc. of Garden City, N.Y., which purchased that product from CGA.

Top Secret "really was a great product," Goldsmith said. "In some respects, you have the advantage being the second or third one in the market. You can see what the other person did." He said that with Top Secret, CGA took an entirely different approach to the software's security system than did IBM with its Resource Access Control Facility, "and it turns out that that's what the users wanted."

HERE, WHEN, OR WHY... HERE'S HOW

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This proud heritage is your assurance the BASIS and DM systems are truly representative of the most innovative thinking in TIMS and DBMS technologies available. And, Information Dimensions provides a network of marketing, [illegible]

Information Dimensions, Inc.

Uccel to exploit emerging IBM VSE/VM mart

BY CHARLES BABCOCK
CW STAFF

DALLAS — Uccel Corp. is offering a system utility for what it sees as an emerging market of customers who use the IBM VSE operating system as a guest under VM.

Uccel's VSE Systems business unit in Boston has brought out a $22,500 package called Tape/Manager VM-VSE. The software performs tape-drive management and tape-volume control functions typical of tape-management products in the IBM MVS and VM environments.

VSE Systems general manager Donald L. Sullivan, citing figures from Focus Research Systems of West Hartford, Conn., said 25% to 26% of all DOS/VSE sites also have VM. For Uccel's customer base, the percentage is closer to 40%, he said.

"VM was supposed to be a bridge to MVS. But VM has so much flexibility that some companies in the VSE world are turning to VM instead of MVS. That is something that IBM didn't fully anticipate when it brought VM out," Sullivan said.

With the Uccel product, a VM/VSE user can use VM tape drives rather than dedicated VSE tape drives. A central catalog allows systems operators to control both VSE and VM tape files and volumes, Sullivan added.

The VSE Systems business unit, formerly Corodale, Inc., which was acquired by Uccel in 1985, produces a line of VSE utilities, including Space/Manager, a disk-file space-management tool, and System/Scheduler, a production work load organizer. The unit plans to convert additional utilities for use in the VM environment, Sullivan said.

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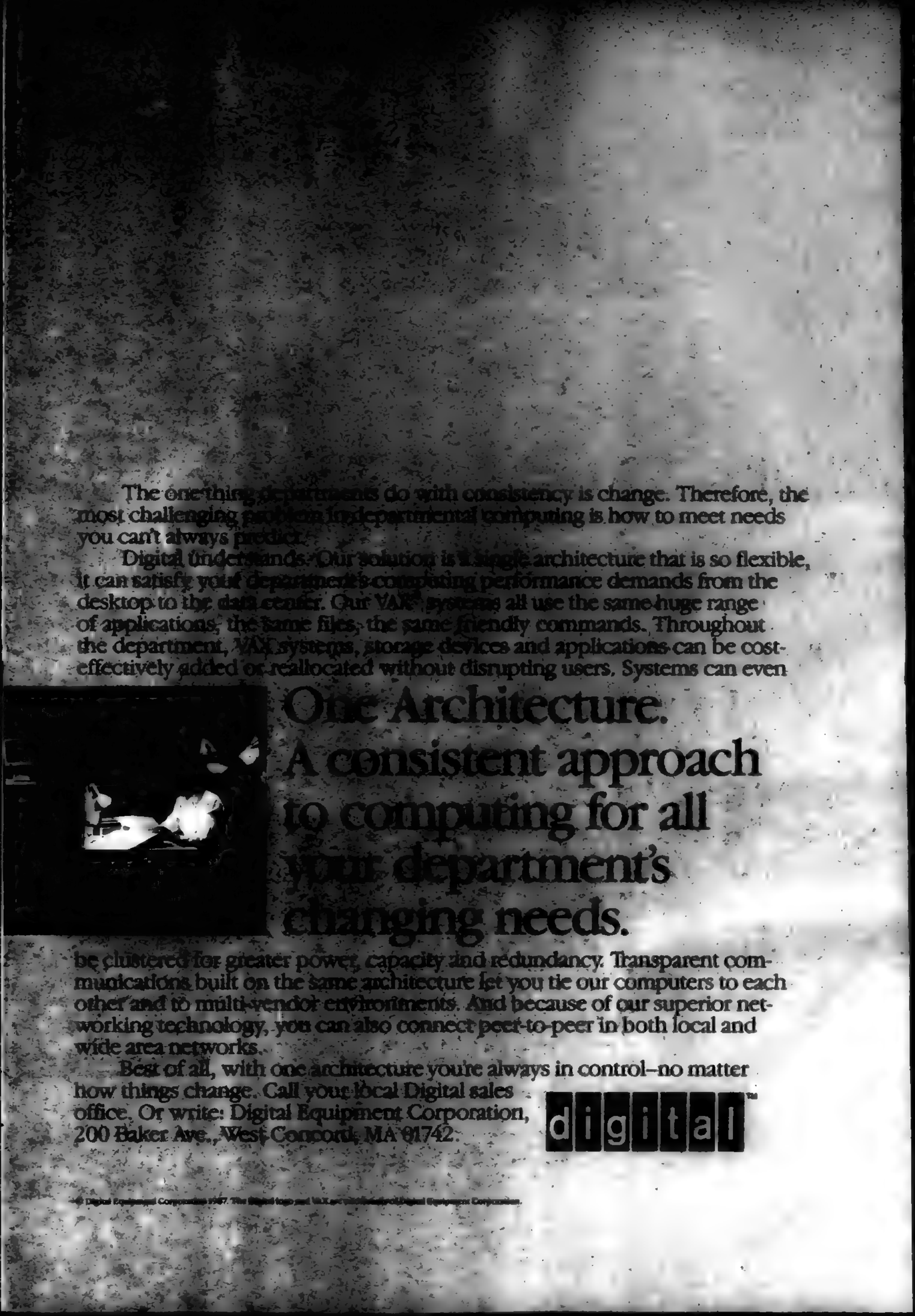

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NEW PRODUCTS

Systems software

Software Architecture and Engineering, Inc. has ported its **Knowledge Engineering System** to the IBM Mainframe OS-MVS environment.

The Knowledge Engineering System is said to be a group of software tools designed to help users develop, implement and support artificial intelligence expert systems. The vendor claimed expert systems built with this software can be directly embedded in other software. Choice of inferencing techniques include production rules, hypothesize and test and statistical reasoning.

Prices for the Knowledge Engineering System on IBM mainframes range from $6,000 on the 4331 to $30,000 on the 3090.

Software Architecture and Engineering, Suite 500, 1600 Wilson Blvd., Arlington, Va. 22209.

Applications packages

Rehmann, Robson & Co. has enhanced its **Fixed Asset Control One** (FACO) software.

FACO is a depreciation software package that runs on IBM's System/34, 36 and 38.

New features include multiple company or entity support within an installation; assets entered onto one screen for inclusion in up to four schedules; data entry online, with interactive editing; 12 additional reports; and accommodations for the Tax Reform Act of 1986.

The Fixed Asset Control One for the System/38 costs $5,000 per CPU. It costs $2,500 per CPU for the System/34 and 36.

Rehmann, Robson & Co., P.O. Box 2025, Saginaw, Mich. 48605.

Lee Blue & Associates has announced **Contact Organizer**, a software product designed to run on IBM's System/34 or 36.

The software is said to allow users to record, organize and retrieve information on customers, sales representatives and other business and personal contacts. Contacts are grouped by type.

A notepad function allows up to 20 pages of comments and notes to be included with each contact record, according to the vendor.

Other features include a search capacity, variable sort and select, phone directory, one-time labels, multiple file environments, multiple label sizes and documentation.

The Contact Organizer costs $695.

Lee Blue & Associates, 11910 44th Ave. N., Plymouth, Minn. 55442.

Utilities

Blueline Software, Inc. has introduced **Multiterm/SNA**, a VTAM multisession manager for users of IBM's DOS/VSE operating system running either as a stand-alone or as a guest under IBM's VM.

The software is said to allow the user to be logged on the several VTAM applications at once and to switch between them instantly via a menu or a toggle key. Users may define their own custom menus or use the menu system provided by Multiterm/SNA. Other features include dynamic profile editing and multiple CPU network support.

Multiterm/SNA operates as a VTAM application. A site license costs $10,795. It is also available in combination with the vendor's Multiterm VM product.

Blueline Software, Suite 340, 1500 S. Lilac Drive, Minneapolis, Minn. 55416.

Archimedes Software, Inc. has announced **C cross compilers** for the Motorola, Inc. 68HC11, Hitachi Ltd. 6301 and Motorola 6801 microcontroller families.

The kits include a C compiler and C library functions, a macro assembler, linker and librarian.

The compilers are hosted on personal computers and Digital Equipment Corp. Microvax and VAX systems, the vendor said.

The compilers implement the proposed American National Standards Institute's C language enhancements, according to the vendor.

They are also said to support IEEE 32-bit, single-precision, floating-point library functions.

Mathematical support includes trigonometric, logarithmic and exponential functions.

The personal computer, Microvax and VAX versions cost $995, $3,995 and $4,995, respectively.

Archimedes Software, 1728 Union St., San Francisco, Calif. 94123.

Data Translation, Inc. has introduced the **DT-Iris** subroutine library. DT-Iris is intended for use with the Digital Equipment Corp. Microvax II.

The software is said to provide access to image processing functions.

According to the vendor, DT-Iris takes control of system-service calls, memory mapping and all management of virtual memory.

The program also assumes responsibility for controlling the specialized frame grabber and frame-processor peripherals, the vendor said.

Functions include windowing, frame averaging, zoom, pan, scroll, logic operations, cursor manipulation, image acquisition and reduction, buffer allocation and disk storage.

DT-Iris costs $1,995.

Data Translation, 100 Locke Drive, Marlboro, Mass. 01752.

Data base management systems

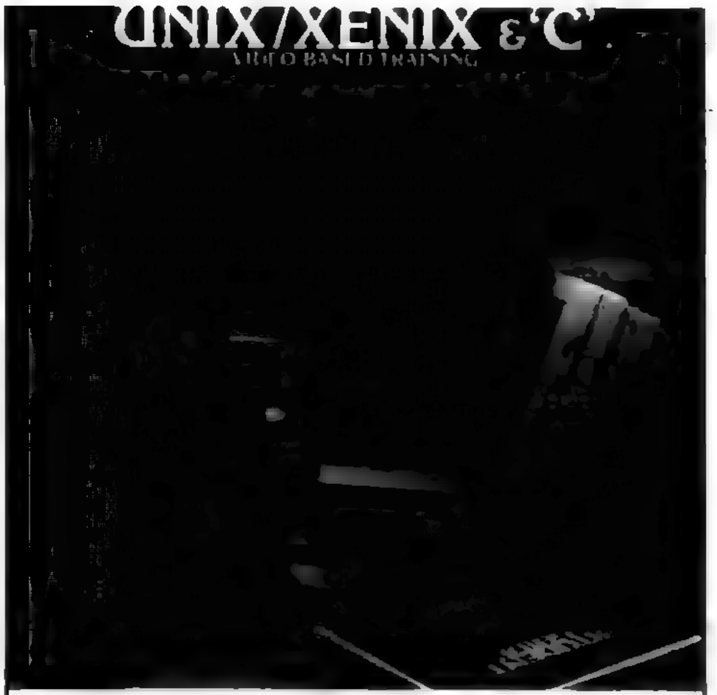
Sun Microsystems, Inc. has announced **Version 5.0** of **Suningres**, which is the firm's relational data base management system.

Enhancements include capabilities that allow users to share data bases across IBM's SQL and a network of computers and operating systems from different vendors.

The Suningres/Net networking software package included with Suningres 5.0 is said to connect different systems or to connect any system with Relational Technology, Inc.'s Ingres/Net networking implementation.

Suningres Release 5.0 is priced at $3,990.

Sun Microsystems, 2550 Garcia Ave., Mountain View, Calif. 94043.



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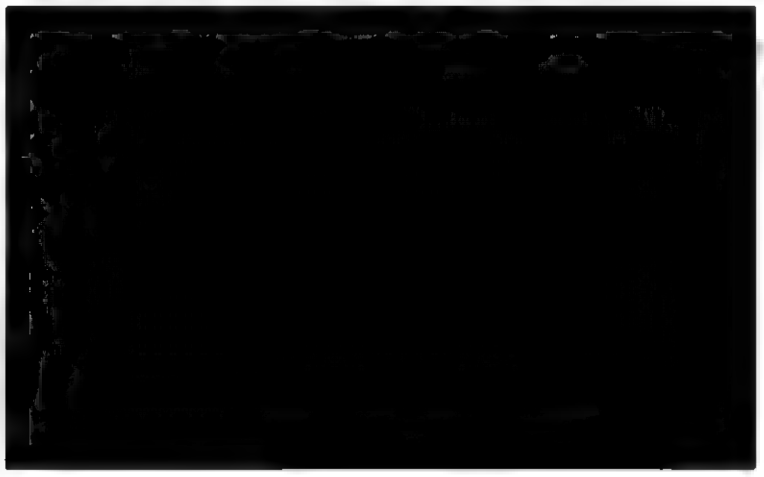

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MICROCOMPUTING

SMALL TALK

William Zachmann

Innovative commodities

It has become trendy for manufacturers of personal computers and related hardware to disdain commodity products. There are two implicit premises behind this disdain. The first is that commodity products are necessarily low-margin products because of relatively low barriers to entry in the market and the intense competition that results from their entrances.

Second, it is implied that commodity products are necessarily imitative. They are compared with supposedly more innovative products that add value to what is already available in the marketplace.

Wyse Technology, Inc., headquartered in San Jose, Calif., has long been delivering practical examples of the inaccuracy of these two assumptions. Entering supposedly saturated commodity markets for ASCII and American National Standards Institute (ANSI) terminals several years ago, Wyse was a spectacular success, achieving impressive market share

Continued on page 30

Package helps economic forecasts

BY DAVID BRIGHT
CW STAFF

A number of businessmen have been using an IBM Personal Computer statistical software package called Forecast Master to speed the creation of a broad range of economic predictions, sometimes involving hundreds of variables.

Users of the package, which was introduced two years ago by Scientific Systems, Inc. in Cambridge, Mass., include utility companies, telecommunications firms, financial institutions, colleges and government agencies.

The $595 package consists of seven modules for manipulating economics-related statistics: State Space, Box-Jenkins, Bayesian vector autoregression, Auto-Pro regression, seasonal decomposition, exponential smoothing and curve fitting. A mathematics background is required to properly use the program, users say.

About 3½ years ago, Jack Malehorn started using Lotus Development Corp.'s 1-2-3 in conjunction with State Space — a precursor to Forecast Master — to forecast interest rates and loan volumes for an agricultural bank. It was a very important part of his job, he says.

Later, when Malehorn accepted a job as an economist with United Telephone System, Inc.'s Eastern Group in Carlisle, Pa., he was relieved to hear that he had the freedom to choose his tools. He promptly acquired an IBM PC XT and Forecast Master.

Malehorn's job is to predict what impact local economies will have on his company's operations. He says Forecast Master helps him more easily understand, describe and analyze the local economies. He has built several econometric models, each with over 100 variables, and says the tool box nature of the program enables it to handle just about any task.

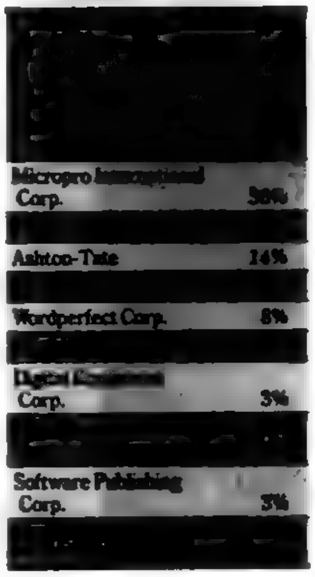
Variables to be input include real investment in residential and nonresidential construction, building permits, housing starts, retail sales, new car registrations and telephone use. Lotus's 1-2-3 is used to store the data.

While Malehorn is not able to estimate the time or money savings achieved with Forecast Master, he claims his job would be "pretty difficult" without it.

Another positive user is Steve Scarborough, administrator of the economic analysis division at the Texas Department of Human Services in Austin. The division is responsible for setting rates that the state will pay for medical and other services. Scarborough says he is impressed by the package's wide range of forecasting ability. He uses the package to forecast welfare case loads and the state's costs relating to services for each eligible person. Ashton-Tate's Framework II and Dbase III Plus packages are used to

Continued on page 31

Data View



Lotus readies Jazz successor for Mac

BY DAVID BRIGHT
CW STAFF

LOS ANGELES — Two years after the introduction of its less-than-popular Jazz integrated package for Apple Computer, Inc.'s Macintosh, Lotus Development Corp. says it is taking the Macintosh market more seriously. To demonstrate its "renewed commitment" to the Macintosh, Lotus plans to preview the successor to Jazz at the Appleworld exposition here this week.

Code-named Galaxy, the package will run on the Macintosh Plus as well as the two more powerful Macintosh systems scheduled to be introduced at the show. Galaxy will not run on the 512K-byte version of the Macintosh. Lotus said last week it plans to formally introduce the product and begin shipments in early summer, but the company has yet to reveal its pricing and upgrade strategy.

According to Lotus officials, the difference between what Macintosh users and IBM Personal Computer users want is lessening. "We've learned a lot since we introduced Jazz in 1985," product marketing manager Pamela Campagna said. What Lotus has learned, she added, is that users want power, performance and programmability in their integrated packages.

With Galaxy, Lotus has made a faster spreadsheet, deepened each of the link modules and added a command language and a forms module, Campagna said. A drawback of Jazz has been its lack of macro support. Microsoft

Continued on page 31

Inside

- Executive Technologies offers Searchexpress document storage and retrieval software. Page 31.
- Network Technologies' introduces hand-held generator to test the IBM Color Graphics Display. Page 34.

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Innovative

CONTINUED FROM PAGE 29

growth in the tough market.

Wyse, in its terminal business, effectively demolished the conventional assumptions about commodity markets. Wyse's terminal products drove home the point that innovation in procurement and production management can be just as important as innovation in product design.

Wyse's success in terminals rested on the ability to buy and build better, faster and less expensively than the competition, even when the competition was bigger and had supposed initial economies of scale in its favor. At the same time, however, Wyse also managed to offer products with superior individual features and capabilities.

Innovative tools

It should come as no surprise to those who have followed Wyse's successes in the terminal market, therefore, that the company's movement into the personal computer market should be marked by products delivering substantial value at highly competitive prices. The WysePC 286 and the WY-700 high-resolution display monitor are not only competitive products but also significantly innovative.

The WysePC 286 is a highly compatible alternative to the IBM Personal Computer AT. But it is also a well-engineered, high-speed (9.54 MHz) system that runs circles around the standard product.

At a reduced list price of $3,699 — with 640K bytes of memory, built-in clock, two serial ports and one parallel port, a 1.2M-byte floppy and a 40M-byte hard disk — the WysePC 286 offers reliable high performance at an attractive price. It comes with a one-year warranty.

While no radical departure, the WysePC 286 is more that just a fast PC AT compatible. Well designed throughout, it has many low-key features that distinguish it. The front-panel switch selectability between the standard 4.77-MHz and the higher speed 9.54-MHz modes, for example, can be used at almost any time with a much wider range of software than similar options I have seen with most other systems.

Little touches, like an easily detachable cover for the cable connections at the back of the unit, demonstrate intelligent thoughtfulness about design details that are not commonly found in similar systems. With the WysePC 286, you get a distinct feeling that you are dealing with a system that easily plays BMW to IBM's Cadillac at Honda prices.

Impressive as the WysePC 286 may be, however, the WY-700 monitor display is even more convincing evidence of Wyse's ability to combine efficient low-cost manufacturing with product innovation. Handily complementing the processing speed of the WysePC 286, the WY-700 provides monochrome graphics of up to 1,280- by 800-dot resolution for only $999, which includes the graphics controller board.

The WY-700 makes it easy to obtain high-resolution monochrome graphics at a very low cost. It be used with any PC AT-compatible system. In addition to providing high-resolution black-and-white graphics, it also can emulate the IBM Color Graphics Adapter with four shades of gray.

The WY-700 and adapter card is an economical IBM PC-compatible desktop publishing and computer-aided design and manufacturing application. More than that, however, it is a practical option for a wide range of business-oriented personal computing applications.

The WY-700 requires software drivers specific to it to be used fully. Standard text modes, however, allow up to 50 lines with 160 characters each, provided that application software is able to handle these sizes.

Individually or together, the WysePC 286 and the WY-700 monitor are testimonials to the positive impact of highly competitive markets.

They clearly show how competition encourages innovation in ways to lower the cost of manufacturing as well as make a product better.

Limitations

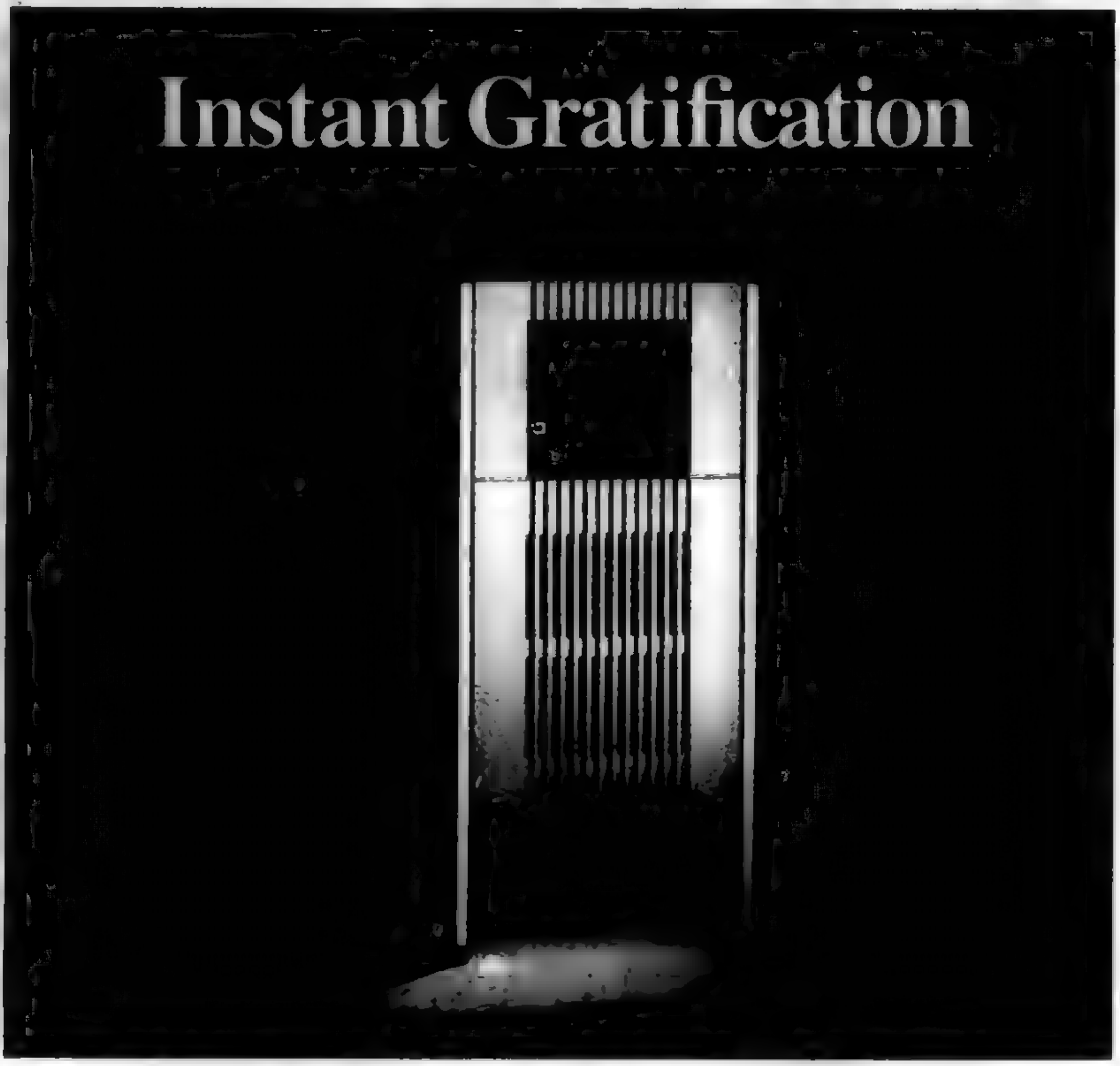
Two relatively minor limitations of the WY-700 should be noted. First, the interlaced scan on the monitor does seem to create a slight, almost imperceptible flicker to the image. This is more noticeable at the edges of the screen than at the center. The flicker, however, will be no more than a minor matter for most users, if it is noticed at all.

Second, the brightness and contrast of the WY-700 could be a bit crisper. At least on the unit evaluated, the readability of the screen in the high-resolution graphic mode in a brightly lit room was not quite as good as I would have liked.

These considerations are minor, however, compared with the overall function and value of the WY-700. Both the WY-700 and the WysePC 286 deliver substantial value at attractive prices.

Together, the fast system and the high-resolution monitor unquestionably provide a practical platform on which to develop a wide range of critical applications for a growing number of users. Separately or together, the WysePC 286 and the WY-700 help show the limitations of overly simple assumptions about innovation and supposed commodity markets.

Zachmann is vice-president of research at International Data Corp.



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Storage tools let users work with magnetic, optical media

BY DOUGLAS BARNEY
CW STAFF

BIRMINGHAM, Ala. — Executive Technologies, Inc. recently announced the Searchexpress product series, a line of document storage and retrieval software.

The $199 Searchexpress 1.00 package provides text retrieval from magnetic media only. Searchexpress 2.00 allows the user to store and retrieve documents on both magnetic and optical media.

"It allows the businessman to store all of the textual information that comes across his desk for future retrieval," said James L. Geer, president of Executive Technologies. "It is like having a photographic memory."

The packages feature windows, pull-down menus and what-you-see-is-what-you-get capability. The current products provide full Boolean search capabilities as well as simple word search. Users can also search and retrieve documents through word rooting, save and restore search requests and search for only recently added documents or similar documents.
for optical media.

A displayed document can be viewed as a whole, or the user can zoom in to paragraphs or sentences containing key words.

Geer said the growth of high-capacity magnetic and optical storage, along with the advent of low-cost optical scanners, has made document storage possible.

Executive Technologies' next move, Geer said, will be into image storage and retrieval.

The Searchexpress family runs on IBM and compatible personal computers and requires 427K bytes of random-access memory. Searchexpress 2.00 for magnetic media sells for $349 and $549 for optical media.

Package

CONTINUED FROM PAGE 39

store the data on an IBM PC AT with a hard disk. Forecast Master correlates variables such as hospital in-patient dollars per claim with external variables like cost of living.

Scarborough suggests that Scientific Systems expand the manual and on-line Help facility and also upgrade the Box-Jenkins module to better compete with Auto Box, a specialized package from Automatic Forecasting Systems, Inc.

Both Malehorn and Scarborough stress that a math background and a math coprocessor are essential to the efficient operation of Forecast Master.

Lotus

CONINUED FROM PAGE 29

Corp.'s competitive Excel program for the Macintosh and Lotus's IBM PC-based 1-2-3 and Symphony all accept macro commands.

Galaxy's command language goes beyond macros to encompass the spirit of Symphony's command language, systems architect Adam Hertz said.

The six modules for handling various functions can be used separately or in an integrated fashion. In addition to being faster, spreadsheet models under Galaxy can be linked together and can look up information in other models.

Using the communications module, 1-2-3 and Symphony files can be directly imported into Galaxy without the translation step required with Jazz. The module also provides IBM 3270 emulation support for mainframe access, according to Lotus.

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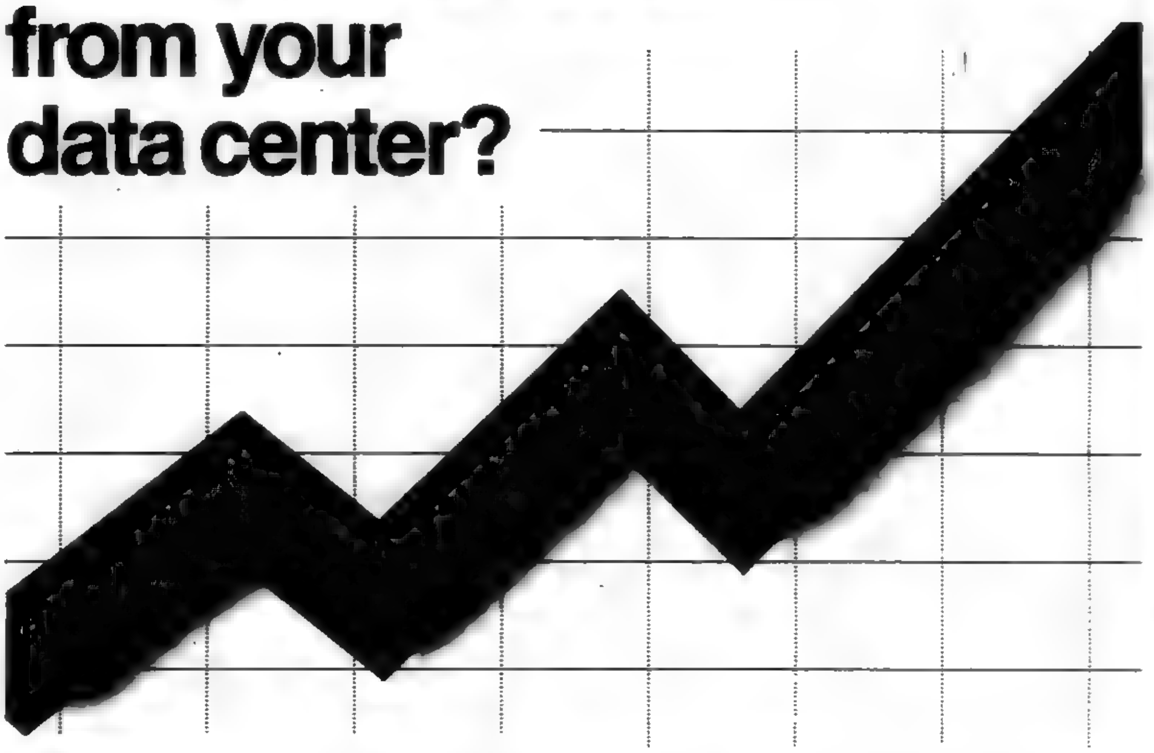

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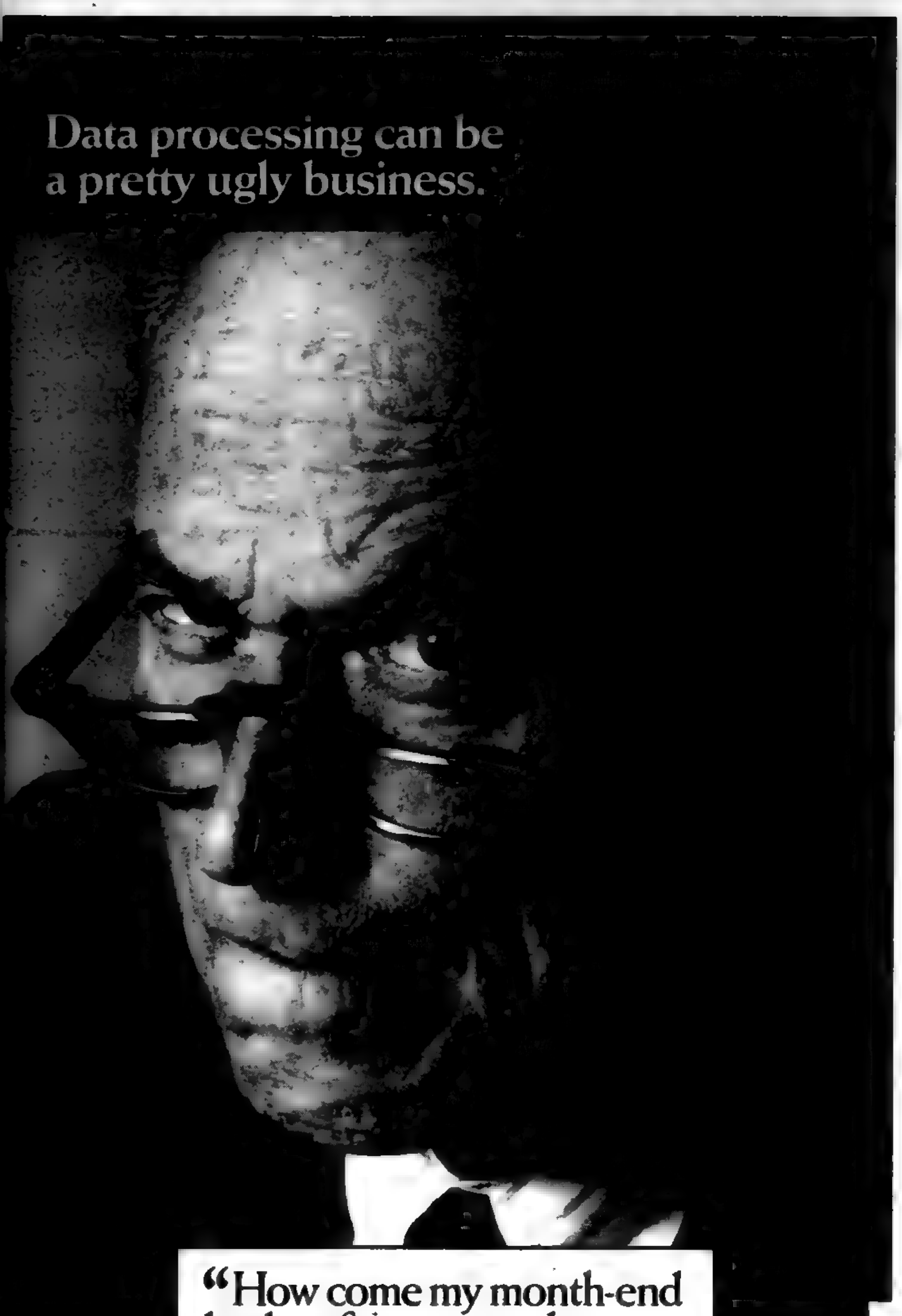

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NEW PRODUCTS

Software applications packages

The **Thoroughbred Division** of Concept Omega Corp. has announced **Thoroughbred Idol-II**, a relational data base management and retrieval system.

Designed for use in the Thoroughbred Basic multiuser environment, the software features free-form on-screen editing, windows, context-sensitive Help and free-form text fields. It also incorporates a multirecord data management capability allowing users to view and edit multiple file records simultaneously.

Idol-II is priced from $795 to $3,895.

Thoroughbred, P.O. Box 1035, 102 Old Camplain Road, Somerville, N.J. 08876.

Software utilities

Sapiens Software Corp. has announced **Sapiens Make**, a maintenance utility said to be fully compatible with Unix Make.

Make is a utility that maintains modular program source code. It uses make files, which the programmer writes, to construct dependency rules.

According to the vendor, make files can be taken straight from a Digital Equipment Corp. VAX running University of California at Berkeley Unix 4.2 or from an IBM Personal Computer AT running Unix System V.

Sapiens Make is priced at $79.

Sapiens Software, P.O. Box 7720, Santa Cruz, Calif. 95061.

Development tools

Skylight Software, Inc. has announced **Handprints**, a software tool said to allow handprinted character input for IBM Personal Computers.

Handprints is said to enable programmers to incorporate the character-recognition capability into applications. The software is an implementation of the advanced, on-line, handprinted character-recognition algorithm. Extraction methodology is used to extract descriptive features of the character shape.

Handprints can handle handprinted letters, digits and some special characters and mathematical symbols.

Handprints is priced at $1,200, including the Mitsubishi Corp. Grafnet tablet.

Skylight Software, 2 Charles St., Bedford, Mass. 01730.

Software enhancements

Magee Enterprises has announced **Version 4.0** of its **Automenu** software management system.

Version 4.0 allows users of IBM Personal Computers and compatibles to set up a menu system that can directly execute IBM PC-DOS commands.

Features include capabilities for organizing all programs into one menu system, on-screen Help and the ability to execute commands at a preselected time.

Automenu costs $46. Current registered users of earlier versions can upgrade for $20.

Magee Enterprises, 6577 Peachtree Industrial Blvd., Norcross, Ga. 30092.

Data Storage

Sysgen, Inc. has introduced the **Smart Image-60**, a cassette-tape backup subsystem for the IBM Personal Computer XT and AT.

The Image-60 is said to offer 60M bytes of storage. It features dual read/write heads for one-pass data verification, a dedicated controller and Sysgen's proprietary automatic backup software.

The Smart software can be set to back up only those files that have changed, so there is no need to change tapes for every backup, the vendor said.

The Smart Image-60 is priced at $895.

Sysgen, 47853 Warm Springs Blvd., Fremont, Calif. 94539.

Board-level devices

Levco has unveiled its **Prodigy Prime** enhancement board for the Apple Computer, Inc. Macintosh.

The basic configuration of the Prodigy Prime board is said to feature a 16-MHz Motorola, Inc. 68020 CPU, 1M byte of random-access memory expandable to 32M bytes, an internal fan and an additional power supply.

The Prodigy Prime board costs $1,195.

The vendor also announced a price reduction for its Prodigy 4 enhancement board for the Macintosh to $4,995.

Levco, Suite C-203, 6160 Lusk Blvd., San Diego, Calif. 92121.

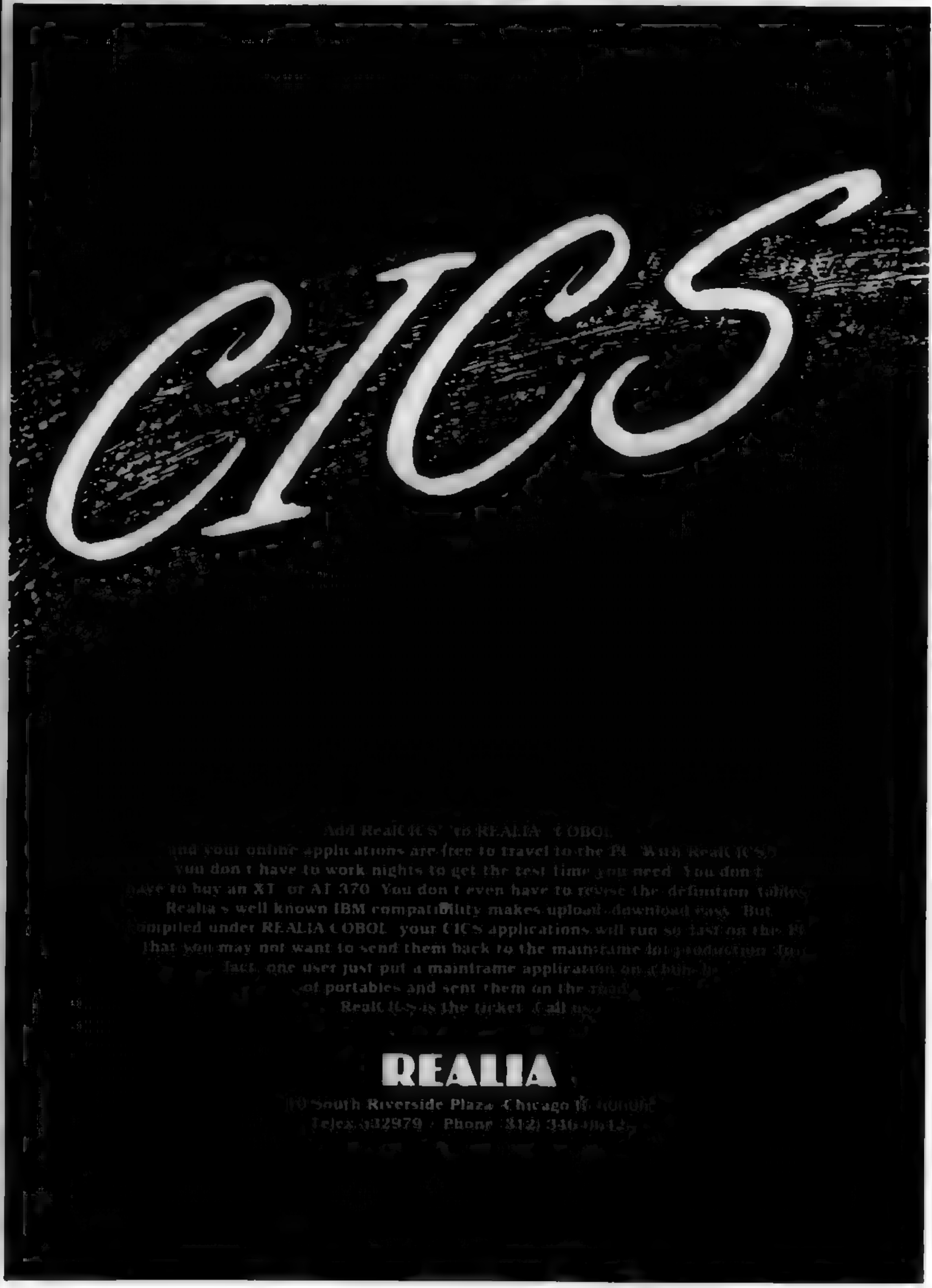
Auxiliary equipment

Network Technologies, Inc. has announced the **Montest-15K** portable video generator for testing the IBM Color Graphics Display.

The hand-held unit is said to generate four different patterns, including color bars, cross-hatch, window and full raster, with up to 16 different color and intensity options. It also generates reverse video, the vendor said.

The Montest-15K is priced at $199.95.

Network Technologies, 19145 Elizabeth St., Aurora, Ohio 44202.



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NETWORKING

ISDN terminals come to market

AT&T admits use limited until local exchange carriers deliver services

BY ELISABETH HORWITT
CW STAFF

INDIANAPOLIS — AT&T Network Systems recently announced the commercial availability of a wide range of Integrated Services Digital Network (ISDN) terminals, admitting that these products will be of limited use until the long-awaited ISDN services arrive.

AT&T's voice, data and voice/data terminals, which were announced at the recent U.S. Telecommunications Association's Eastern Telecommunications Showcase, were designed to communicate with an AT&T 5ESS digital switch running AT&T's ISDN software. Large companies can now install their own private ISDN networks, made up of the new workstations and a 5ESS switch, which has the capacity of a top-of-the-line AT&T System 85 private branch exchange, according to AT&T spokeswoman Susan Fleming.

The majority of customers, however, will have to wait for the divested operating companies to install sufficient AT&T 5ESS switches to support ISDN services, she added. "You can buy the terminals today, but then you have to wait for your local exchange carrier to install ISDN switches." Currently, the only AT&T ISDN switch is installed at Illinois Bell's Oak Brook, Ill., central office, which is being used in the McDonald's Corp. ISDN trial initiated late last year. The terminals are also being used in the trial.

'Not nailed down yet'

AT&T's ISDN workstations will not work with other types of ISDN central office switches, such as Northern Telecom, Inc.'s DMS-100, according to Fleming. "Northern Telecom, like AT&T, did what was necessary to implement the existing standard," but each company incorporated its own protocols for those aspects of ISDN that are "not nailed down yet," Fleming said. "ISDN has not yet reached the point where everything will work with everything."

Northern Telecom research and development subsidiary Bell Northern Research recently announced call management software that enables an IBM Personal Computer and telephone set to share an ISDN Basic Rate interface to a DMS-100 ISDN switch.

The terminals do not work with AT&T's recently announced Enhanced System/86 private branch exchange, which supports the ISDN primary interface. AT&T is "working on it," Fleming said.

ISDN offerings announced by AT&T include:

- The ISDN 7505 Modular Terminal, a voice terminal with optional Asynchronous Data Module that supports asynchronous data transmission at rates of up to 19.2K bit/sec.
- The ISDN 7514 Voice/Data Terminal, which supports simul-

Continued on page 38

DEC may add Netbios interface

BY CHARLES BROWN
and JANE LAWRENCE
[illegible]

LONDON — Users could see improved connectivity between Digital Equipment Corp.'s Decnet and networks based on IBM's Netbios before the end of this year, according to DEC's Charles Monk, product manager for the Vaxmate here. Monk says the company may include Netbios in Version 2 of Decnet DOS, which is due for release this fall.

"It's not a certainty, but it is very possible," he maintains.

While users have been able to integrate Vaxmate workstations and other VAX products into combined networks, the absence of a DEC Netbios interface in Decnet DOS currently limits the transparency of the network, particularly when it comes to running software that requires full compatibility. One major British user, Alistair Banks, project leader with Midland Bank Group, says he regards the lack of Netbios as a serious omission in an otherwise good product.

Heavily reliant on flexible and high-powered computer sys-

Continued on page 38

Inside

- Tangent Technologies adds software tying IBM PC, Appleshare. Page 38.
- KMW Systems Auscom 8400 interfaces between IBM mainframe channels and VMEbus. Page 38.
- Corvus enhances its Omninet LAN. Page 39.

X.25 bridges Novell LANs

BY DONNA RAIMONDI
CW STAFF

IRVINE, Calif.— Gateway Communications, Inc. has released a remote bridge for Novell, Inc.'s Netware local-area networks (LAN).

G/Remote Bridge is a generic, high-speed X.25-based Netware LAN-to-LAN remote bridge. It supports all Netware communications protocols applications and is available to more than 37 different types of networks from major LAN suppliers.

The product looks like a step forward for personal computer LANs, according to David Terrie, editor of Patricia Seybold's newsletter, "Network Monitor." "More typically, you have

Continued on page 38

Rolm lets Phonemail talk

BY ELISABETH HORWITT
CW STAFF

SANTA CLARA, Calif. — Rolm Corp. recently announced the Phonemail Network, which allows users on geographically dispersed Phonemail systems to exchange voice messages.

Rolm also announced Phonemail integration for Centrex systems and enhancements to Phonemail systems that support non-Rolm private branch exchange (PBX) systems.

The Phonemail Network option provides the capability of forwarding and answering calls across multiple Phonemail nodes, and lets users set up a distribution list that automatically forwards the same message to multiple mailboxes residing on different Phonemail systems, Rolm product manager associate Amy Beringer said.

The Network sends voice messages over existing dedicated or public analog lines. A line-quality testing feature ensures that noise, harmonic distortion, frequency and amplitude levels are acceptable each time a message is sent, Rolm claimed.

Systems link

A required component of the network is the Enhanced Voice Processor, which sends error checking, destination-header and calling-party information on the link between Phonemail systems.

Rolm also introduced fuller integration between Phonemail and 1AESS Centrex and non-Rolm PBX systems, Beringer said.

"Before, we interfaced with other vendors' systems; integration means features like automatic pickup of a call after it rings a certain number of times, the ability to provide specialized messages to callers, and call waiting messages," she explained.

Box replacement

The Phonemail-Telephony-Interface is an expansion card that fits into a Phonemail system replacing the more expensive Phonemail-PBX-Interface box.

Rolm also announced Phonemail security features, including unauthorized access notification and administrative reports.

Phonemail Network pricing starts at $1,000 per system. A Phonemail system including the Phonemail-Telephony-Interface starts at $47,000. Security features are included with Phonemail at no additional charge. Pricing for Phonemail integration for Centrex systems starts at $2,000. All of the products are scheduled for availability in the second quarter.

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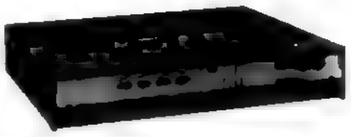

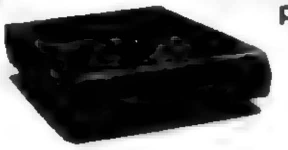

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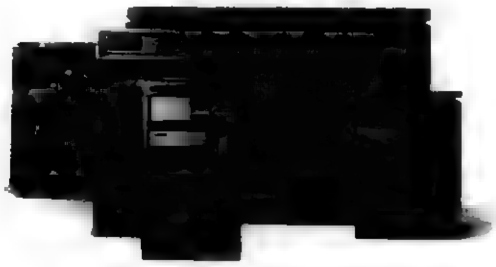

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Options designed for Appleshare

BY PATRICIA KEEFE
CW STAFF

HOUSTON — Kent Marsh Ltd. has introduced Foreground Manager, designed to allow Apple Computer, Inc.'s Appleshare file server to select more than one foreground program.

Foreground Manager is shipping now and carries an introductory price of $79.95 until June 1. Thereafter, it will sell for $110. It is available through Apple dealers.

ATLANTA — Tangent Technologies has announced PC Macbridge/AFP, software that allows IBM Personal Computers to access Apple's Appleshare file server. PC Macbridge/AFP is fully compatible with Apple's Appletalk Filing Protocol (AFP) and allows PCs to be integrated into the networked server environment.

PC Macbridge/AFP works with Apple's Appletalk PC card and within the Apple Communications Framework of integrating and enhancing Microsoft Corp. MS-DOS information, the vendor said.

PC Macbridge/AFP works with PC Macbridge/ATB, Tangent's Appletalk board for the IBM PC. The board enables the PC to function as a node on an Appletalk network, allowing it to communicate with other networked PCs, Apple Macintoshes and Adobe Systems, Inc. Postscript-based laser printers. Once software is installed, the PC becomes a client of an AFP server and can access both PC and Macintosh files. After logon, the PC user mounts a volume on the remote server and accesses its files as if they were internal to the PC.

Scheduled for availability in March, PC Macbridge/AFP costs $150. PC Macbridge/ATB, which includes PS Print, costs $350.

DEC

FROM PAGE 35

tems, Midland currently uses Vaxmates and Microvax IIs hooked together.

The Vaxmate's use of windowing conforms with Midland's decision to standardize around the interface, which was developed by Microsoft Corp., according to Banks.

But while Banks says he is pleased with the ability to interface between both DOS and DEC's VMS, he admits that Decnet has limitations.

"The main problem is that you can't run industry-standard software that relies on being able to find Netbios in order to run," he says.

"That excludes a lot of packages — particularly in the communications area — such as Microstuf, Inc.'s Crosstalk," he states.

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ATRIUM

Bridge supports redundant LANs

Observers say multimedia routing capabilities aimed at niche market

BY DONNA RAIMONDI
CW STAFF

MOUNTAIN VIEW, Calif.— Bridge Communications, Inc.'s Government Products Division has announced an internetwork bridge that supports redundant local-area networks (LAN) and a version of its Etherterm software that gives IBM Personal Computers the file-transfer capabilities of IBM 3270 PCs.

The Internetwork Bridge/1-Fault Tolerant (IB/1-FT), a product resulting from Bridge's January acquisition of Phoenix Technology, Inc., is said to provide multimedia routing between redundant LANs or between redundant and nonredundant LANs.

While such products are important to users who need 100% availability of their computers, such as banks and airlines, they are really niche-market items, said David Terrie, editor of Patricia Seybold's "Network Monitor" newsletter.

'Not the mainstream'

"You are talking about products that are pretty reliable as it is. The average server or gateway has a very low failure rate, so this is an extension of the fault-tolerant market, not the mainstream networking market," Terrie said.

The unit interfaces simultaneously to two Ethernet IEEE 802.3 LANs, two Bridge broadband LANs or a combination.

"If one cable plant is damaged, the IB/1-FT has an automatic recovery feature that directs all traffic over the unaffected cable," said Joseph Kennedy, vice-president of Bridge's Government Products Division.

The product costs $12,000 with three data links, plus $350 for a software license.

One possible configuration for the IB/1-FT is a redundant LAN backbone connecting multiple nonredundant Ethernet subnetworks, Bridge said.

The IB/1-FT can also extend broadband's 15-mile distance to multiple 15-mile segments.

Bridge also launched its Etherterm/3270 LAN software, which performs terminal emulation and file transfer between personal computers and the IBM mainframe environment through a LAN.

A single-user version that operates with a stand-alone PC costs $400; a network-server version shared by multiple PCs costs $2,000.

Etherterm/3270 lets IBM PCs access IBM mainframes as IBM 3278 or 3279 display stations and performs high-speed file transfers as IBM 3270 PCs. It also offers Digital Equipment Corp. VT100 terminal emulation and file transfer with ASCII hosts.

Something for everyone

"This is something that everybody needs, but it's not new," Terrie said.

Previous Bridge products allowed the user to go from an ASCII terminal to an IBM SNA host or from a 3270 to an ASCII host, he said.

The software requires that the PC be equipped with 3Com Corp. Etherlink or Etherlink Plus network-controller boards for direct attachment to an Ethernet LAN.

IBM, Motorola units linked via high-speed interface

AUSTIN, Texas — KMW Systems Corp. has introduced the Auscom 8400 VME Channel Interface, a high-speed, single-board interface between IBM mainframe channels and the VMEbus used by many Motorola, Inc. 68000-based engineering workstations.

KMW Systems says the Auscom 8400 features on-board intelligence to minimize VME processor support in communications functions.

In addition, the Auscom 8400 transfers data between the channel and the VME system memory at rates of up to 1M byte/sec., the vendor said. A standard feature is data-code conversion between the IBM host's extended binary coded decimal interchange code, also known as EBCDIC, and VMEbus systems' ASCII transmissions.

Communications

Communications between the Auscom 8400 and the VMEbus master take place through an on-board random-access memory communications region.

An on-board bit-slice microcontroller supervises communications as well as channel activity with the VME system CPU.

The Auscom 8400 is priced at $3,650.

X.25 bridges

FROM PAGE 35

dial-up lines for PCs and X.25 packet switching for minicomputer-based systems," Terrie said.

The G/Remote Bridge works in conjunction with Novell's external and internal bridges, which were designed to connect physically adjacent LANs. A starter kit for linking two LANs costs $2,990. It costs $1,595 to add each additional LAN.

The cost to add a single-user PC to the network is $795.

The bridge works with either dedicated or nondedicated micros. A packet assembler/disassembler interface incorporated into the bridge enables transmission over X.25 trunk lines or public or private data networks. As many as 32 remote LANs can be connected at the same time, according to the vendor.

Using the X.25 protocol, G/Remote Bridge runs at transmission speeds of up to 19.2K bit/sec.

"Typically, a PC has been limited to the 9.6K bit/sec. rate, so this gives you some added speed," Terrie said.

ISDN

FROM PAGE 35

taneous voice and 56K or 64K bit/sec. data transmission.

- The ISDN Attendant Console features more than 35 call handling and administrative features that can be updated at the carrier's central office.
- The ISDN 3270 Data Modules, enabling IBM 3270-type terminals to access hosts and cluster controllers through 5ESS-based dial-up services, eliminating the need to install coaxial cable.
- The ISDN 7500 Data Module, which interfaces synchronous and asynchronous data equipment with the ISDN network.
- ISDN key telephones and power equipment.

AT&T intends to sell the above products to the divested Bell operating companies, which will then distribute the terminals to their customers.

Other major customer premise and central office equipment manufacturers, such as NEC America, Inc. and Fujitsu America, Inc., are currently testing ISDN-compatible workstations at site trials.

While admitting that AT&T's early announcement of commercial availability gives it a headstart in closing contracts with the Bell operating companies, Fujitsu spokesman David Gould pointed out that Fujitsu expects to announce its own commercial offerings by year-end.

NEW PRODUCTS

Diagnostic equipment

International Data Sciences, Inc. has announced the **Blue Box II Model 672** RS-232C breakout box.

The Model 62 is said to provide users a pocket-sized monitor and breakout panel to isolate and solve modem/terminal problems at the Electronic Industries Association RS-232C and CCITT V.24 interface.

The Model 62 Blue Box II costs $199.

International Data Sciences, Seven Wellington Road, Lincoln, R.I. 02865.

Local-area network software

Corvus Systems, Inc. has enhanced its **Omninet** local-area network to provide full support of Apple Computer, Inc.'s Appletalk File Protocols (AFP) and Appleshare.

AFP support provides Omninet users with access to Appletalk-compatible, third-party software. Users will also be able to share Apple Laserwriter printers and Corvus Omnidrive network drives and directly interface with Appletalk.

Corvus also reduced the list price for its Omninet interface for the Apple Macintosh. The new price is $199. The Macintosh network interface is required to link the Mac to Omninet.

Corvus, 2029 O'Toole Ave., San Jose, Calif. 95131.

Links

Datanex, Inc. has enhanced its **Hasp+** communications software to allow Digital Equipment Corp. VAX and Microvax systems to link with IBM System/34, 36 and 38 computers.

According to the vendor, running Hasp+ in host or central mode allows the VAX to operate as a multileaving Hasp host. The IBM system must have IBM's Remote Job Entry facility.

Hasp+ communications software costs $5,500 for VAX and $3,500 for Microvax versions.

Datanex, P.O. Box 1728, Eugene, Ore. 97440.

Protocol converters

Advanced Computer Communications has introduced the **ACS 1030** communications interface said to allow IBM Systems Network Architecture systems to use X.25 packet-switched networks in a transparent manner.

The ACS 1030 offers service for eight fully independent Synchronous Data Link Control or asynchronous IBM connections. Connection to the host is made through existing line sets of an IBM 3705 Series front end. At the remote site, connection is made through the RS-232 port of devices such as an IBM 3274 controller supporting IBM 3278 terminals.

The ACS 1030 is priced at $15,500, the vendor said.

Advanced Computer Communications, 720 Santa Barbara St., Santa Barbara, Calif. 93101.

File servers

Televideo Systems, Inc. has announced the **PM/286** local-area network (LAN) file server.

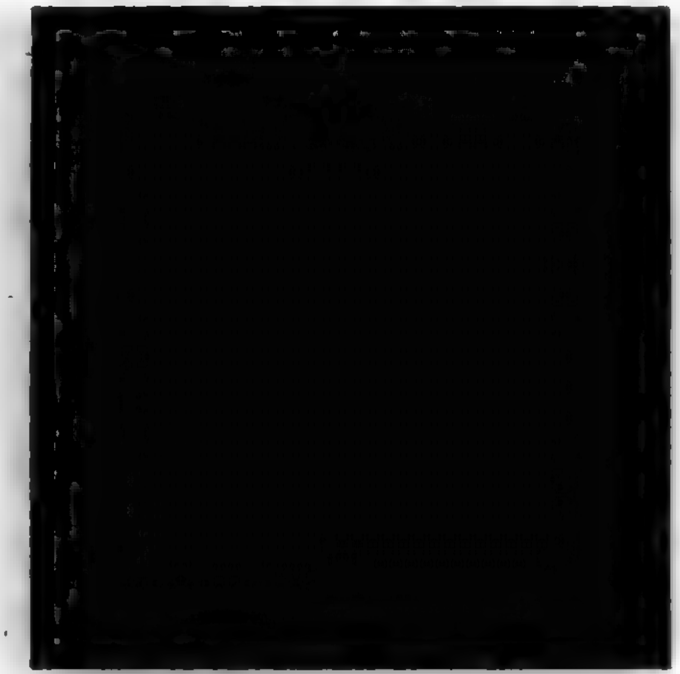
The file server is said to act as a bridge among disparate LANs. IBM Personal Computer or PC AT-compatible systems can connect to a PM/286 LAN through an interface card.

The product uses standard PC AT-compatible expansion slots and can accommodate off-the-shelf interface cards for Ethernet, AT&T's Starlan or the IBM Token-Ring network. The PM/286 is an active server on each connected LAN.

Each server features a built-in 45M-byte tape backup system; a 14-in., tilt-and-swivel monitor; RS-232C serial and parallel ports; and the Televideo Advanced Netware-286 operating system.

Prices range from $8,495 to $10,995.

Televideo, P.O. Box 3568, 1170 Morse Ave., Sunnyvale, Calif. 94088.



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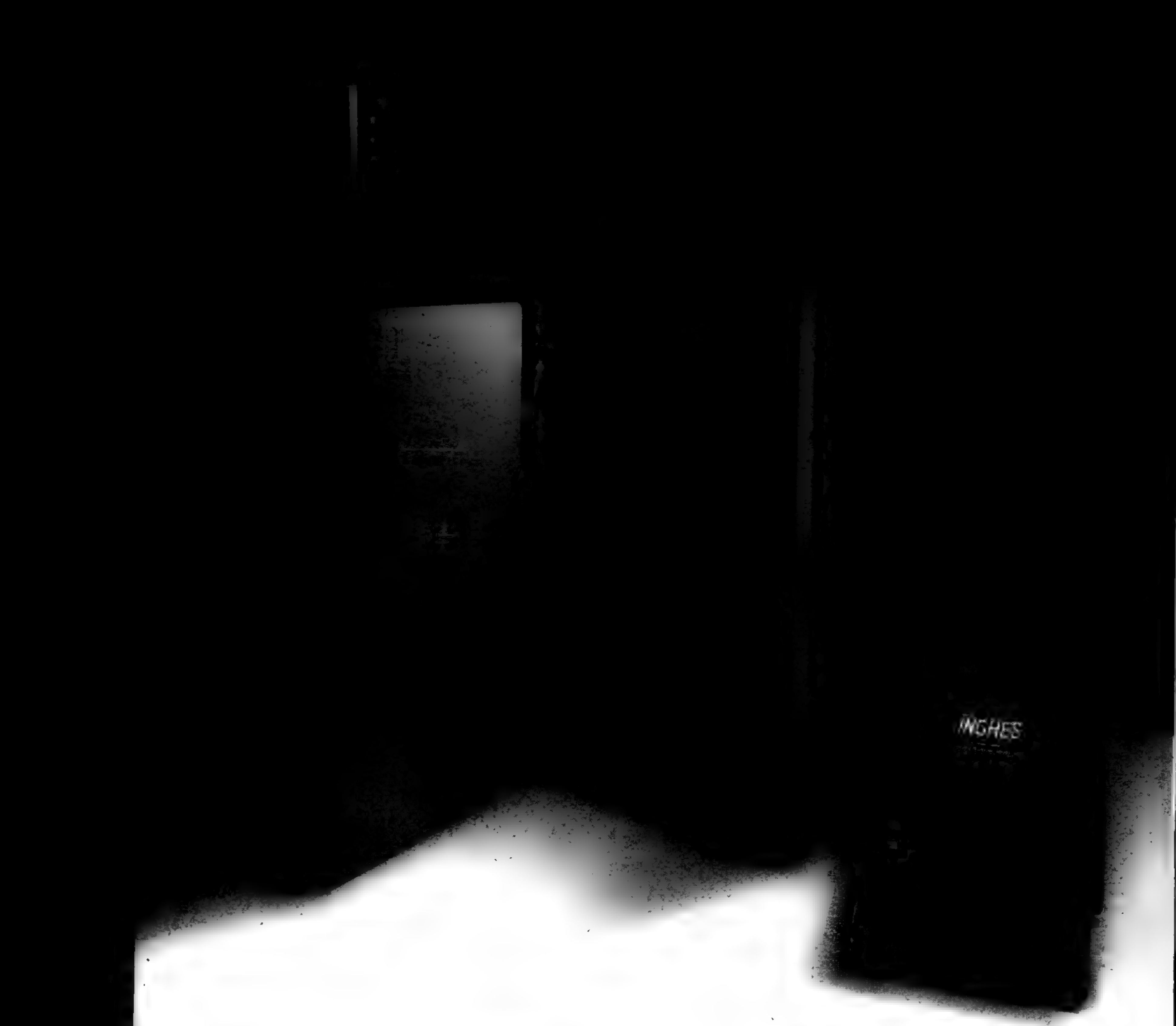

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SYSTEMS & PERIPHERALS

HARD TALK

Rosemary Hamilton

Vendors snipe; users suffer

Distributed computing is becoming a hot topic — and rightly so, because it holds many potential benefits for users, particularly engineers. Among other things, it would provide a new way to optimize computing resources on a network.

Because of its importance and its highly technical nature, the concept of distributed computing should be presented to users in a clear-cut way to assist them in their decision making. Instead, it has become the latest debate between longtime engineering workstation rivals Apollo Computer, Inc. and Sun Microsystems, Inc.

Apollo started things off in early February by announcing its Network Computing System (NCS), a full suite of tools that would allow users to simultaneously run portions of one application on various systems on a heterogeneous network. Not to be outdone, Sun countered the following week by claiming that it has had distributed computing tools on the market for

Continued on page 43

Software vendor lauds RT PC

BY NINAMARY BUBA MAGINNIS
CW STAFF

IRVINE, Calif. — The latest IBM RT Personal Computer hardware enhancements have given IBM a competitive advantage in the workstation market, according to an engineering software vendor whose firm served as a beta-test site for the original RT PC announced one year ago.

Jon Prun, a technical director for Manufacturing Consulting Services, Inc. (MCS), a software house in Irvine, Calif., says he is anxious to take advantage of the RT PC's increased power. "The delivery date IBM quoted was April. We are trying to get them to expedite that," Prun says.

An MCS benchmark comparing the earliest RT to a similar Apollo Computer, Inc. workstation showed the RT performed 40% to 60% slower in runtime than Apollo, Prun reports.

"Most of our customers — or potential customers — discovered that independently," Prun says, explaining that his clients steered clear of the RT because of its cost/performance ratio.

IBM's first round of enhancements, announced in mid-1986, allowed MCS to upgrade its RT PC. "It wasn't until this week that they were actually, truly competitive in the marketplace," Prun says. IBM introduced RT PC models Feb. 17.

MCS markets two software applications, Anvil-5000, a computer-aided design and manufacturing (CAD/CAM) package; and Anvil-1000MD, a two-dimensional CAD package. The engineering software firm has ported its applications to hardware offered by several companies, including Apollo, Sun Microsystems, Inc., Digital Equipment Corp., Hewlett-Packard Co., Prime Computer, Inc. and Data General Corp.

IBM representatives told Prun that software written for the older RT will run without modification on the new models. Until MCS receives the enhanced workstation, the portability remains to be seen, Prun says.

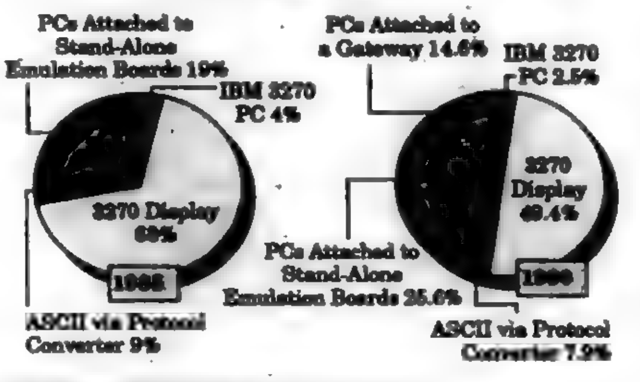
When MCS first ported Anvil-5000 to the RT, it was the easi-

Continued on page 42

Data View

Personal computers

Eating into IBM 3270 market



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CW CHART: MITCHELL J. HAYES

Low-cost IBM terminals out

BY STANLEY GIBSON
CW STAFF

NEW YORK — IBM recently unveiled lower cost terminals and controllers for its mid-range and large systems.

Three 3192 terminals were introduced for use with IBM 370 hosts. IBM also added two 3197 terminals for use with System/36 and 38 computers and two 3174 controllers designed for IBM 370, Series/1 or System/88 machines.

All five terminals are

Continued on page 43

Masscomp speeds up MC5000s

BY JAMES CONNOLLY
CW STAFF

WESTFORD, Mass. — Masscomp last week boosted the performance of its MC5000 family of scientific systems by implementing faster microprocessor technology on its lower end products and adding support for two extra CPUs on the top-end system.

In addition, the company introduced a set of optimizations for its Fortran compiler, a graphics-compatibility library to help customers and third-party software developers support Masscomp graphics and to implement Sun Microsystems, Inc.'s Network File System.

The key to the performance gain is the use of faster Motorola, Inc. 68020 microprocessors. The enhanced systems are the MC5350, MC5450 and MC5550. Masscomp officials said earlier models, the

Continued on page 43

Inside

- Memorex introduces compact display terminal for use with IBM systems. Page 42.
- Mass-memory subsystem for VME-based systems out. Page 46.
- Calcomp announces digitizer for military, government applications. Page 46.

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IBM minis get display terminals

MILPITAS, Calif. — Memorex Corp. has introduced a compact display terminal for use with the IBM System/34, 36 and 38 and a line printer designed for use with IBM mainframes.

The Memorex 2296 monochrome terminal is intended as an alternative to the IBM 3196 Model 10, particularly in data-entry applications, according to the company.

The 2296 occupies less than two square feet of desk space and includes features that are not available on the IBM 3196, including a screen-printer port, a quick-command-key set-up menu and optional antiglare filters, according to Memorex officials.

The 2296 is available now and costs $1,210.

The Memorex 2062 line printer family is offered as an alternative to IBM's 3262 printer. The printers were designed for heavy transaction loads and print at 400 or 800 line/min.

Memorex officials said the printers are intended to handle draft, data processing, letter-quality, bar code and line-and-block graphics printing.

According to the company, the printers are suited to office or industrial environments and come in standard cabinets that allow 60-DBA operation. An optional 55-DBA sound-deadening package is available.

The 400 line/min 2062 Model 1 is priced at $10,000. The 800 line/min Model 2 is priced at $13,700.

RT PC

FROM PAGE 41

est port the engineering software house had ever performed, Prun notes. "It was a very pleasant surprise. The performance of the original was about half of what you would find on a Sun or Apollo. With the new hardware, we feel it's going to be at least as fast as the top-of-the-line Suns and Apollos," he says.

When porting its applications to other vendors' hardware, MCS experienced limitations, Prun reports. Anvil-5000 is written mostly in Fortran with about 1% written in C or assembly language. The application consists of 4,000 subroutines and one million lines of code.

"IBM is the first vendor we have not had problems with," Prun says. When porting Anvil to the Hewlett-Packard 9000 Series 500, the hardware gravely limited the number of subroutines that could be linked in one pass. To solve the problem, Prun was required to run a two-pass link process. "It takes more time to do and takes about twice the disk storage as the one-pass process. And it also makes the building of executable code more complicated," Prun notes.

With Prime, Prun says, there was a limit to the number of symbols one could have on an executable process. "Again, we didn't have that limit on the RT," he adds. In the past, some hardware, such as Apollo's early workstations, had a 16M-byte or less limit to runtime executable code. "The RT did not have any limit," Prun says.

> "I'm not much more positive than I was a year ago. [The RT PC] is still overpriced, but you can get something for your money."
>
> RICHARD SHAFFER
> TECHNOLOGIC PARTNERS

Yet industry analysts remain skeptical. "I'm not much more positive than I was a year ago. Now the machine is worth using. It's still overpriced, but you can get something for your money. If you're IBM, all you have to be is adequate," observes Richard Shaffer, principal of Technologic Partners, a New York-based financial consulting company.

John McCarthy, research manager at Cambridge, Mass.-based Forrester Research, Inc., says, "IBM is getting very serious about this market. That's the good news. The bad news is it's IBM's third architecture at the mid-range."

The enhanced RT is more competitive than DEC's new Vaxstation 2000, according to Charles Foundyller, president of Daratech, Inc., a Cambridge, Mass.-based research firm. "The RT is not a blocking move," says Foundyller, explaining that DEC's low-cost 2000 series workstation will serve only to keep DEC shops from buying the less expensive Apollo and Sun products.

"The RT is a move to win a new set of users for IBM and its RT architecture," Foundyller adds. "Basically, it's a strong machine and bears the promise that others are on the way. And if you buy that promise, I think you have to move to the RT."

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Vendors

CONTINUED FROM PAGE 41

months. This statement came as a surprise to many users and analysts, but Sun responded by saying it has marketed these tools in a low-key manner.

"This is a my-dog-is-bigger-than-your-dog situation," says Richard Shaffer, principal of Technologic Partners in New York. "But it doesn't matter whose dog is bigger. What matters is how many people are going to support what dog."

But just who is making use of these capabilities is not very clear, either. Late last month, Apollo retreated from its claim (made during the announcement) that NCS was at beta-test sites and said testing was being conducted strictly in-house.

Transparent access

Meanwhile, Sun says its tools are being implemented by many of its Network File System (NFS) licensees. NFS allows for transparent access of files across a heterogeneous network and has been licensed by nearly 100 vendors and universities. But there are apparently only a few in this group of 100 that are actually using these tools to distribute applications across a network for computation.

Furthermore, customers using the Sun tools do not appear to be fully exploiting the concept of distributed computing. At Computervision Corp., which resells Sun workstations as part of its Caddstation product, software developers have written computer-aided design software for a distributed computing environment. At this point, the software reportedly can only work in a Cadds environment — not in a multivendor installation, which is a key issue at engineering sites.

Currently, portions of the Cadds software can be split between the Caddserver and various Caddstations on a network, according to Chris Gregory, a Computervision systems marketing manager.

Just how similar the Apollo and Sun products are is also unclear. A closer inspection of the two offerings shows that Apollo has advantages in certain areas. For instance, it offers a key component, called the Location Broker, that would be responsible for tracking available resources on a network and assigning tasks to the most appropriate system that is available at the time of execution.

Sun does not have this capability, but then Apollo really doesn't either. Sun may have a less comprehensive package, but it does have some tools on the market. Apollo's won't be available until late in the year.

Sun has been releasing tools since May 1985, the latest of which was unveiled in August along with the newest release of Sun's operating system. This tool, which includes both a compiler and a high-level language — critical components in the distributed computing environment — was not mentioned in the official announcement.

"It's our fault," says Chris Wellens, a Sun network services product manager. "It was part of that release, but no one understood how important it was. It slipped through the cracks."

But Phil Neray, a marketing manager at Alliant Computer, Inc., a minisupercomputer maker that supports both Sun's NFS and Apollo's NCS, says, "As far as I know, Sun hasn't announced all these tools." According to Neray, "If Sun came out with the same capability as Apollo, chances are we'd want to support it as well. Many of our customers have Sun workstations."

Hamilton is a *Computerworld* senior writer.

CICS Presentation Announced:

Bob Yelavich - IBM Dallas Systems Center; conducts a full day session for Metro NY CICS Users Group.

Bob Yelavich will present a CICS Product Update with emphasis on the current status of CICS/VS 1.7 and 2.1. Included will be CICS related product announcements, CICS trends and directions, an assessment of current product, and requirements for possible future implementations. Bob works closely with the Hursley England development group; is the CICS representative to SHARE and GUIDE, and has authored many CICS technical bulletins and articles.

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Masscomp

CONTINUED FROM PAGE 41

MC5300, MC5400 and MC5500, can be upgraded for performance gains of 20% to 30%.

The MC5350 features a 16.7-MHz 68020 in place of the 12.5-MHz version in the MC5300. The MC5450 and MC5550 use 20-MHz chips rather than the 16.7-MHz CPU used in the MC5400 and MC5500.

Masscomp also claimed 50% performance gains for the high-end MC5700 with the addition of two CPUs to the previous maximum of four processors.

A basic MC5350 configuration, including 45M bytes of disk storage, an alphanumeric terminal, four communication lines and 2M bytes of memory, has a list price of $15,250, which is also the MC5300's price.

A basic configuration of the MC5450 costs $22,750, which is $1,000 more than the MC5400. A basic MC5550 costs $29,750. The systems are scheduled for availability in April of this year.

Analysts observed that Masscomp has been stronger in recent quarters than for several years.

'Out of mainstream'

"One of the things they have done is to try to stay out of all the activity in the mainstream of the engineering workstation market. They really have been focusing on the real-time and scientific markets," said Hal Feeney, a technical systems analyst for Dataquest, Inc., a San Jose, Calif.-based market research firm.

Feeney observed that Masscomp has avoided direct competition with workstation vendors such as Sun and Apollo Computer, Inc. Omri Serlin, owner of Los Altos, Calif.-based consulting firm Itom International, said Masscomp has been struggling, although it has recently shown some business gains. He observed that the real-time scientific arena does not provide enough sales volume for long-term growth and that Masscomp still needs major OEM contracts to continue growing.

DEC Q-bus supermicro released

BY ALAN J. RYAN
CW STAFF

HARTFORD, Wis. — General Robotics Corp. has announced a supermicrocomputer that is based on the National Semiconductor Corp. 12.5-MHz 32032 microprocessor and is said to be 50% faster than its predecessor.

The Python/32T, a 1.5 million instructions per second (MIPS) supermicro for the Digital Equipment Corp. Q-bus, performs compute-bound tasks more quickly than the 10-MHz Python/32B. General Robotics said National Semiconductor's optimizing C compiler improves machine-code generation.

The Python/32T CPU with 4M bytes of memory and an AT&T Unix System V.3 license costs $7,500 in OEM quantities.

Low-cost

CONTINUED FROM PAGE 41

equipped with printer ports so that an inexpensive printer may be attached to the terminal rather than requiring a user to share a more expensive printer on a network. An added feature of the terminals is a 1,500-char. keystroke buffer.

"The prices are less than for previous models. For the first time, they are in a price-leadership role. They put pressure on independent suppliers," said Ilene Goldman, an industry analyst with International Data Corp., a Framingham, Mass., research firm.

The terminals come with a one- or three-year warranty. Previously, IBM offered only a nine-month warranty, Goldman pointed out.

Direct-attachment feature

The terminals replace models introduced three years ago, she said. The printer direct-attachment feature is offered by a number of independent terminal suppliers, according to Goldman.

The 3192 models, which come in monochrome and color versions, are priced from $1,795 to $2,795. The 3197 models, available in monochrome and color versions, are priced at $1,795 and $1,895.

The two controllers are designed for users requiring attachment to a host of only one to eight printers or display stations. Previous models had offered 16 attachments.

The controllers are also different in that, unlike previous 3174 models, they allow connections to both the Series/1 and System/88 hosts.

Goldman said the 3174 Model 81R and 3174 Model 82R cluster controllers are the first IBM has offered that do not support all kinds of IBM terminals. She said, for example, they do not support an ASCII adapter card.

PC connection

"It doesn't make sense to me, because small shops have PCs they want to connect to a controller. You still need an Irma-board to connect a PC," Goldman said, noting that many users tie personal computers to hosts using products such as the Digital Communications Associates, Inc. Irma product.

Goldman said IBM explained the controllers' limited features as necessary to keep their prices down. She added that she expects another version of the 80-series controllers that supports IBM's Token-Ring network, which the 81R and 82R do not support.

The controllers are the same except for supporting different sets of protocols. Each is priced at $3,500 and will be available in the second quarter.

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NEW PRODUCTS

Processors

Datacube, Inc. has introduced **VFIR-MKII**, a video finite-impulse response (VFIR) filter for its Maxvideo VMEbus-compatible, real-time image and digital-signal processing family.

VFIR-MKII is a single-board video finite-impulse response module said to implement a programmable 64-point finite-impulse response filter with on-board multiplier/Asynchronous Line Unit (ALU) hardware to speed processing. It is said to provide more than six times the number of programmed filter coefficients and integrate the ALU and software-controllable delay lines, previously features on Datacube's Max-SP module.

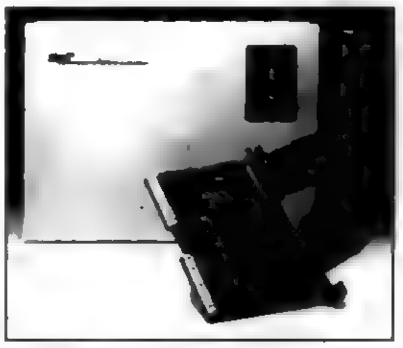
Each VFIR-MKII module costs $7,800.

Datacube, 4 Dearborn Road, Peabody, Mass. 01960.

Zitel Corp. has announced a 128M-byte mass-memory subsystem for VME-based systems, called the **VME93**.

The subsystem is said to execute single-bit, error-corrected block transfers at a rate of up to 40M byte/sec. It performs normal READ, WRITE, READ-MODIFY-WRITE and unaligned transfers of D8, D16, D32, A24 and A32 modes.

The VME93 occupies one bus slot and is available in 32M-, 64M-, 96M- or 128M-byte configurations. It consists of a VME interface set and Zitel's standard System 93 memory system, which includes chassis and error logger.



Zitel's *mass-memory subsystem*

The VME93 is priced at $1,300 per megabyte.

Zitel, 630 Alder Drive, Milpitas, Calif. 95035.

Novix, Inc. has announced the **NB4300**, a bus card built with the company's 16-bit, 8- to 10-million instructions per second NC4016 microprocessor.

The card is said to be capable of master and slave bus control. It supports 20-bit addressing, has an 8-bit data bus and performs word fetches or stores from the microprocessor in two bus cycles.

On-board memory can include up to 32K bytes of programmable read-only memory and 128K bytes of high-speed random-access memory.

There is one RS-232 port and a B-port connection to a 26-pin connector on the front of the card.

The standard NB4300 is priced at $1,170.

Novix, Suite 280, 19925 Stevens Creek Blvd., Cupertino, Calif. 95014.

CAD/CAM/CAE

Calcomp has introduced the **Model 25128** digitizer, designed to meet Nacsim 5100A requirements for military and government applications.

The digitizer has an active digitizing area of 12 by 12 in. It has a flush surface and recessed connectors, and the power supply is contained within the tablet case.

The interface is said to be compatible with RS-232C, RS-422 and MIL-SD-188-114.

Seven modes of operation are selectable via CPU command or soft keys: point, prompt, delta, increment, halt, line, track and run.

Standard output rate is 125 coordinate pairs per sec., and data transmission rates are selectable from 300 bit/sec. to 19.2K bit/sec.

The Calcomp 25128 digitizer is priced at $1,995.

Calcomp, P.O. Box 3250, Anaheim, Calif. 92803.

Printers/Plotters

Honeywell Information Systems Italia has announced four **serial matrix printer mechanisms.**

The mechanisms are said to feature line widths from 8 to 15.6 in. and carriage speeds up to 40 in./sec. They are suited for printers up to 156 col. and 480 char./sec.

The mechanisms can reportedly be optionally equipped with nine- and 18-wire ballistic print heads.

All mechanisms are available as standalone products with cover sets, electronic boards or power supplies.

According to the vendor, the Model 4/66 is a color multifunction mechanism. The Model 36 is a 13.2-in., high-throughput mechanism.

The Model 12 is an 8-in.-wide mechanism, and the Model 32 is a 13.2-in.-wide version of the Model 12.

Prices range from $250 to $700 in quantities.

Honeywell Information Systems Italia, Suite 800, 120 Howard St., San Francisco, Calif. 94105.

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Three team leaders master a framework for managing change

Managers learn to think in terms of change sponsors, change agents and change targets

BY MICHAEL SULLIVAN-TRAINOR

There is nothing pretty about technological change. Replacing old systems with new ones holds the promise of increased efficiency, but it also causes the users a significant amount of pain. Thrust into this scenario, the MIS manager does his best to implement new systems without getting mauled by users in the process.

Many managers excel at change management. However, even the best of these operate more on instincts developed from dealing with hostile users than according to any written guidelines. The intuitive approach works well so long as there are plenty of in-house change management gurus to go around. But what if the project is too large for one person to handle or there is no experienced manager available?

Many corporations turn to independent consultants to solve the problem. But while this approach may meet present needs, it fails to arm the company with a permanent way of coping with change. When the consultant leaves, the change management expertise goes with him. An alternative approach involves adopting a set of structured change management principles that can be applied to the present project as well as to future ones. To acquire these principles, many companies send their project managers to programs that offer training in this area.

Representatives from 20 organizations, including McDonnell Aircraft Corp., 3M Corp. and Merck, Inc., recently attended an intensive three-day program on the human aspects of technological change sponsored by O. D. Resources, Inc., an Atlanta management consulting firm. The goal of the program is to provide each project manager with a framework for managing technological change. Consisting of the O. D. Resources' principles of change management, the framework can be applied to present and future projects. Ultimately, the concepts can be passed on to other managers within the company who are implementing other change projects.

'Tools for the swamp'

No one seminar can address all the complexities of organizational change, but the O. D. Resources approach does provide the principles for effective implementation, according to Jack Tesmer, manager of 3M's change management department. Tesmer says the seminar does not provide an analysis of an organization's value system or suggest what that value system means for the future of the company, as some management consultants do. But it does enable the project managers to carry out the change without calling upon outside assistance.

"They give you the tools to walk through the swamp," Tesmer says. "I'm not sure they give you the tools to tell you about the nature of the swamp."

Nevertheless, 3M is considering offering elements of the O. D. Resources' approach to change management in its worldwide executive and management development programs, according to Tesmer. 3M's interest in the seminar stems from the positive reaction of information systems department members after their participation in the program.

McDonnell Douglas Corp. is also considering implementing some of O. D. Resources' change management principles on a wider scale after it received positive feedback from one of the corporation's project managers who attended the workshop. Ken Link, a project manager for McDonnell Aircraft, part of McDonnell Douglas, attended the seminar to find a structured way of addressing resistance to change and the uncertainty of a large population of users. Link is responsible for taking a hodgepodge of automated logistics systems maintained by separate departments at McDonnell Aircraft's St. Louis location and combining them into one computer-aided logistics system. He has 30 staff members to help him dramatically change the work lives of 2,600 people.

Having earned his management credentials by working his way up through user departments, Link has an intuitive understanding of the issues users face. But because of the size of the project, he is unsure how to address the reaction of the users as a whole. "The people in the trenches are enthusiastic about the change. But there is a group of middle- to first-line supervisors who are very quiet. Part of

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Sullivan-Trainor is a senior writer for *Computerworld.*

- **The pain new systems inevitably bring**
- **Managers are stuck as monkey in the middle**
- **How to win support at many levels**

TO BATTLE the reflex of resistance to change, seminar participants are encouraged to think of their actions in terms of planting wedges in the user environment to make the present state so uncomfortable that eventually the change will look more positive.

the problem is uncertainty, but I need to bring out a strong level of commitment," Link says.

As a first step to addressing problems like Link's, the O. D. Resources seminar leaders instruct participants to view their change projects objectively so that the extent of the projects' impact on the users and the company can be identified. The participating project managers are asked to compare what is happening in their environments with the following factors that users commonly face when asked to accept new technology:

- New skills are required.
- Communications patterns are altered.
- Time spans between communications are decreased.
- Points of influence, authority and control are redefined.
- Roles, work relationships and reporting responsibilities are modified.
- Data ownerships shift.
- Privacy and security concerns increase.
- New management techniques and organizational structures evolve.

Confronted by the potential trauma of these changes, many users are reluctant to give up the security of their current systems for the unknown challenges posed by the new technology. To battle this reflex resistance to change, seminar participants are encouraged to think of their actions in terms of planting wedges in the user environment to make the present state so uncomfortable that the change will look more positive.

Strategically, this involves three steps:

- The wedge: Initiate actions that dispute the viability of the present state and promote movement away from current expectations.
- Transition: Initiate actions that provide structure, guidance, confidence and trust while encouraging movement.
- The magnet: Initiate actions that confirm the viability of the desired state and promote acceptance of the new expectation patterns.

Although it is early in their project, the team members from 3M that attended the seminar are initiating many of the tactics outlined in this strategy.

3M harvests change

The 3M project involves converting all the company's applications running on Digital Equipment Corp. Decsystem-20s to other environments, such as DEC VAX systems, with the goal of shutting down the 20s at some point in the future. DEC has said it will stop providing service for the 20s in 1993. About 10,000 users will be affected by the project, which involves 18 Model 2060s and 19 2050s.

Besides user resistance caused by an upgrade in technology, the three-person team is also fighting financial objections. Converting to new equipment means a large expenditure by user departments, which conflicts with management's mandate to keep expenses down.

To address resistance, the team introduced a wedge by informing users it intended to shut down the Decsystem-20s before DEC dropped support. It also provided a magnet to address financial issues and other objections in the form of a chargeback plan that makes it less expensive for users to run their applications in the VAX environment than in the Decsystem-20 environment. So after the initial expenditure in equipment, the users could realise savings because their systems would be operating more efficiently.

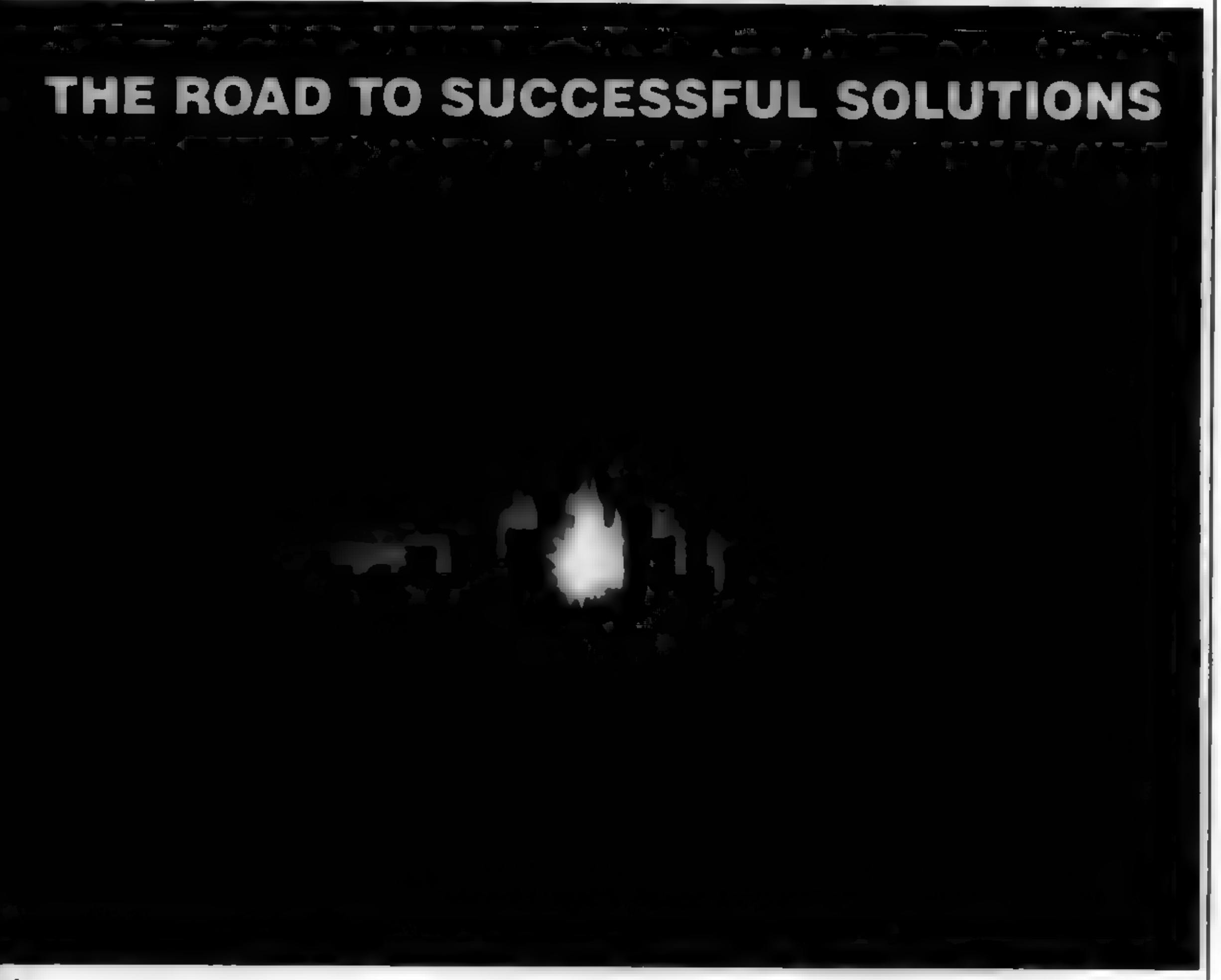
Now, most of the users' new applications are being designed to run in the VAX environment, according to Hugh McDonald, lead analyst for the team. This tactic goes a long way toward accomplishing the changeover in technology, and it allows users to gradually become familiar with the workings of the new systems.

The current Decsystem-20 applications are a different story. Because of a combination of factors, many users are skeptical about how quickly the Decsystem-20s will be shut down, and they deny that the change will affect them. "The users have taken a wait-and-see attitude on the old applications that need to be converted to the new system. They're not convinced that we're going to pull those machines out in a time frame they have to be concerned about," McDonald says.

Sharon Young, the team's unit leader, adds, "We have quite a bit of time here, and a lot of these applications have a lifetime shorter than the time DEC has given for ending support of the 20s. A lot of people are saying that their particular application will not be in existence at that time anyway, so they can live with it on the 20."

After becoming more aware of this issue through the seminar, the team has decided to change its approach. Instead of setting a definite deadline for shutting down the 20s, it is moving gradually and hoping the conversion of new applications to the VAXs will help convince users that a change is taking place.

"It brings to light a realization of the



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human part of the project. We can't just look at our own tasks. We have to look at those people we're trying to change to see what their needs really are," Young says.

After the general needs of the user population are identified and addressed, the next step in the O. D. Resources' approach is to examine the key roles of those involved in the project.

Players and their roles

According to the seminar instructors, each project has three critical players: change sponsors, one or more change agents and change targets. The sponsor legitimizes the change, while the agent implements it, and the targets actually change their behavior to accommodate it. In addition to these three basic roles, those involved in the project can also be change advocates. The goal is to turn as many members of the target population as possible into change advocates.

McDonnell Aircraft's Ken Link:
"I need to bring out a strong level of commitment."

Perhaps the most crucial role is played by the sponsor. To emphasize this, the seminar establishes the following sponsorship guidelines:

- Significant change within the target population will not occur without sufficient commitment demonstrated by the appropriate sponsors.
- When sponsors fail to understand the implications of the change, are unwilling or unable to take the necessary actions to secure resources or cannot fulfill their role requirements, they must be educated or replaced, or else the change effort will fail to meet its stated objectives.
- Sponsorship cannot be delegated. The change agent cannot function as the authority that approves the change.
- There are two kinds of sponsors: Initiating sponsors and sustaining sponsors. Initiating sponsors possess the organizational wherewithal to order that the change take place, and sustaining sponsors wield the logistic, economic and political clout to maintain the change process.
- Cascading sponsorship should be established. This is a process in which the initiating sponsor directly passes active support of the project on to sustaining sponsors. This process ultimately creates sustaining sponsors within the target population. If the department head in a user organization is a leading sustaining sponsor of change, the chances of success within that department are very high.

To help project managers assess the level of sponsorship, the seminar requires that they work with the sponsors in their companies to identify the goals of the project. In addition, each participant is given an evaluation form that numerically ranks sponsor commitment based on 13 criteria, including the sponsor's dissatisfaction with the present state, his public role in the change and whether he will provide sustaining support. Ranked on a scale of one to 10, these factors are then plotted on a graph. A significant number of responses in the one through four areas of the scale indicates a low level of sponsor commitment and little chance that the change will be accomplished effectively.

Evaluations of this sort cause the project managers to stop and think very carefully about how much support they have from the top. One of the participants in the seminar, Joanne Stachura, manager of the personal computer learning center at Continental Illinois National Bank in Chicago, decided to reconsider her project after assessing the sponsorship. Her project involved introducing computer-based training to take the load off of classroom instructors. If it had been implemented, the project would have helped teach about 1,000 bank employees the intricacies of a new demand-deposit system.

"One of the things I learned in the seminar was to make sure you have sufficient sponsorship for the project before you invest a lot of time in it. I found out right at the beginning that we just didn't have the sponsorship at this point in time to continue. So we have set the project aside for a while," Stachura says.

In Stachura's case, the sponsorship was lacking in the form of financial resources to sustain a large-scale operation. "Because of the economic conditions right now and because we had to shift resources to different areas, it was felt that we couldn't invest the time or the personnel to move forward," she says.

Ensuring that sufficient sponsorship is present to accomplish the project is also a concern of the 3M team. McDonald says, "The first thing we worked on when we got back to the office was the importance of sponsorship and defining the duties of the sponsor as opposed to the duties of the change agent. We didn't even know that there was a difference. Just finding out what those responsibilities were and trying to apply them to our project was very important."

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the team discovered that they were attempting to implement the project without the full commitment of top MIS management. "Upper management was aware of what was going on and was voicing support. But essentially, they were acting in a passive role of listening and okaying what the team was doing but not necessarily carrying the story on to other people at their level," McDonald says.

Following the principles outlined in the seminar, the team is now educating 3M executives in the ramifications of the project and the role of the sponsor. Daryl Conner, president of O. D. Resources and the originator of many of its concepts, went to 3M's St. Paul, Minn., location to demonstrate the importance of cascading sponsorship.

User department sponsors

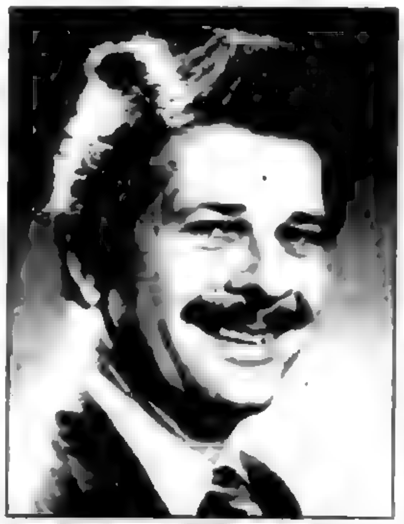
The 3M team is also planning to reach out to user departments to find sustaining sponsors. "Now we're looking at getting our internal sponsorship in line first and then moving out to the division. We have cultivated some primary users in our target population to help us with the sponsorship," says Sue Gilbertson, senior analyst for the team.

'Once sponsorship is secured, the change agent can begin focusing on the strongest sources of resistance within the user population. Back at McDonnell Aircraft, Link has identified the main source of resistance among the middle-level managers.

Developing the computer-aided logistics system will require some managers to give up some of their power and influence because they will have to relinquish control of information that resides in their departmental data bases.

"In an organization of this size, communication is a major factor, and those who possess the current real-time information typically find themselves in somewhat of a power broker position," Link says. "When you move the responsibility for that information from one function to the next, it not only shifts what tasks these managers do, but it also shifts the power position in terms of who has the current information.

"It is a pure turf issue," Link continues. "One function will have to give up some ground, and the other will have to take on some additional responsibility. Some of the hard-core resisters to the project are in the areas that have to give up turf."



Merck's Leonard Olen: *"I am making an effort to emphasize feelings."*

Seminar principles regarding the nature of the user population have helped Link to more readily see the obstacles presented by those managers who are protecting their turf. "If some of the hard cores are in some very key spots, then there is a population that gets caught in the cross fire. The users see the need for doing something different, yet they know their own management is nonsupportive of it. They're not going to stick their necks out too far," Link says.

To address this problem, a useful seminar concept is the idea of "melting resistance." Rather than attempting to force the hard-core resisters to accept the change, Link is dealing with them one on one, trying to change their frame of reference gradually so that change looks more positive than status quo. "I'm trying to find out: What are their concerns?" Link says.

"What are the real issues that they're hung up about? Why can't they recognize the need for change and have some level of commitment toward it? The most optimistic result of this is that you get to a juncture where you can make a breakthrough with one of these individuals. Then you can start defining things in ways that allow them to start accepting the change," he says.

Unfortunately, a breakthrough cannot always be reached. In that case, Link says, there are two choices. "If they're in a key position, you have to decide whether you can tolerate keeping that person in that key position, recognizing the effect it may have on other people's support and commitment. If you can't, then you've got to look at other alternatives that satisfy the good of the whole as opposed to a single individual," he says.

In addition to evaluating the sponsors and the users, the seminar provides tools to allow the project managers to look objectively at their own skills and communication styles. Evaluation forms provided at the seminar identify four major communication roles that people adopt in work or life situations:

- Intuiter: conceives, projects and induces. At his best, this person is a leader and a visionary who can see the center of the problem. At his worst, he may be seen as long on vision and short on action because he avoids the nitty-gritty tasks.
- Feeler: relates to and understands experience through emotional reactions and responses to feelings. A patient, empathetic listener, this person can be perceptive and aware or insightful. However, this person's tendency toward emotionalism can make him seem more concerned with the process, rather than the content, of a project.
- Senser: experiences reality mainly on the basis of his own sensory perceptions. This person can be a dynamo who is totally committed to a task or be a well-organized and resourceful

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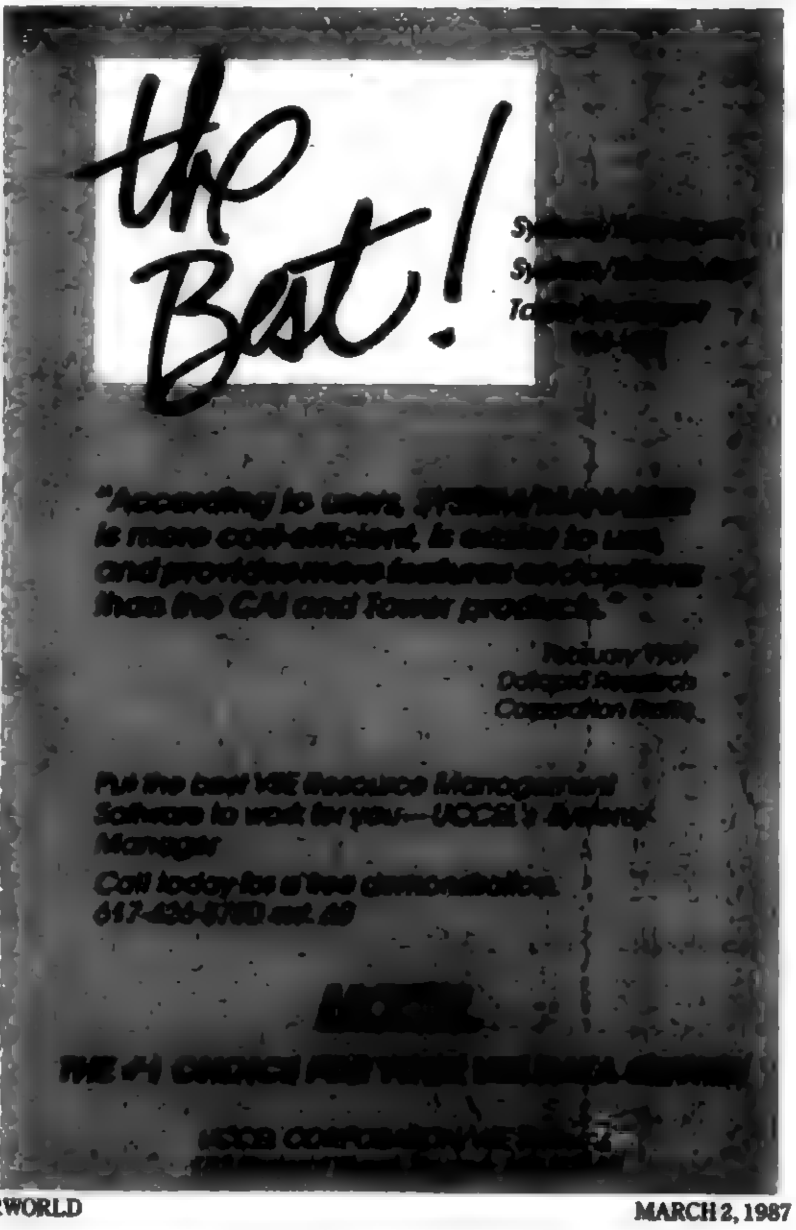
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individual. But he may also fail to consider the long-range consequences of his actions. This person may be so action-oriented that he skips important steps in the process.

- Thinker: analyzes and orders life in a logical fashion. A consistent force for progress, this person is at his best when cutting through emotion and untested ideas to get to a planned, orderly solution. At his worst, this is an overly cautious and conservative individual who emphasizes deliberation instead of action.

Answering a series of questions in the seminar's communications style evaluation form yields scores, which are then plotted on a grid. The grid shows the major personality types toward which each participant leans.

Another seminar participant, Leonard Olen, personnel data systems manager at Merck, a Rahway, N.J., pharmaceuticals company, found the analysis of communications styles particularly useful in his efforts to address user concerns about his project.

> THE analysis trains project managers not only to look at their own personalities but also to use other communications styles to get their points across.

Olen and his staff are installing an automated personnel records system that replaces paper files with computer terminals connected to a mainframe. Olen found that he tended to be more logic-oriented and therefore less sensitive to emotions.

He says, "Realizing that the emotional side of my communications style is very low, I am making an extra effort to emphasize feelings in dealing with the people who are going through this change."

Group therapy

The analysis also applies to the user population. If a project manager is trying to advocate a change using a communications style opposite to the one predominant in the user population, it will be more difficult to convince the users of the need for change. So the communications style analysis trains project managers not only to look at their own personalities but also to use other communications styles to get their points across when necessary.

Being sensitive to the various styles within the end-user population has allowed Olen to match his project implementation approach more closely to the needs of the users.

"One of the problems we have in a company this size is that if you start doing things with groups of people, the second and subsequent groups feel like they're second class because all the design considerations were handled with the first group," Olen says.

"I avoided that approach. Instead, we sat down with each new group and tried to figure out where they were coming from and how they were using the data, almost like it's a whole new system," he adds.

After evaluating all the aspects of change, the project manager is well prepared to realistically evaluate the chances for success. The positive signs are high sponsor commitment, low or reduced target resistance and an aware, skilled change agent. Negative signs that mean the project is headed for disaster are low sponsor involvement, high and intractable resistance and inadequate change-agent skills.

In Link's case, the sponsorship is strong, and he has become more aware of what he needs to do as a change agent. Keeping the principles of change management at hand has helped him to pinpoint the sources of resistance and develop tactics to address them. "I feel I have a much better comprehension of the psychology of getting people to accept the change and assessing whether they're going to accept it," Link says. "This is going to allow me to do some things up front in the development process that maybe I would not have thought of until I got downstream and the problem had already surfaced." ●

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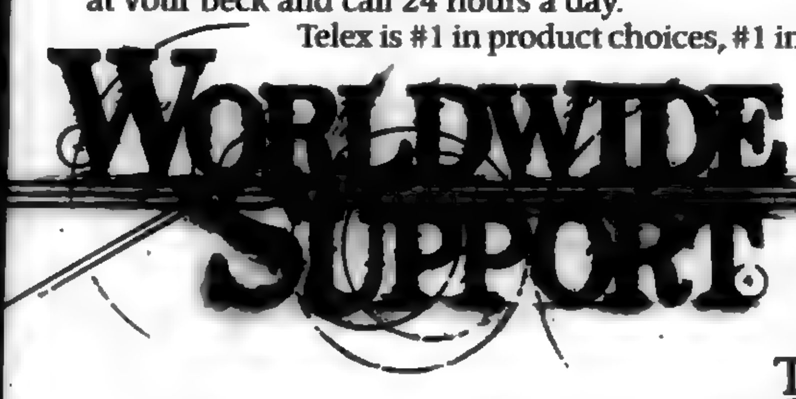

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IDMS/87

Makes your technology investment easier to justify.

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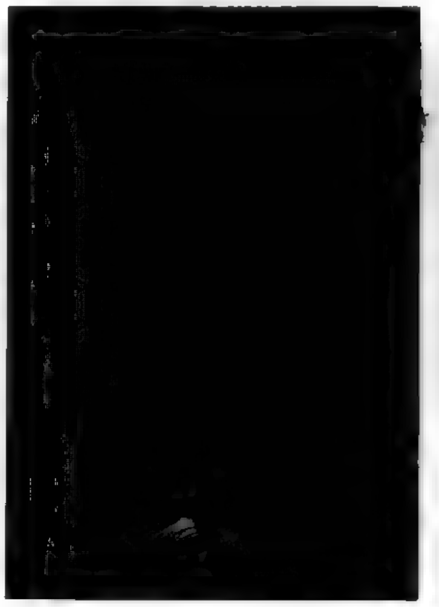

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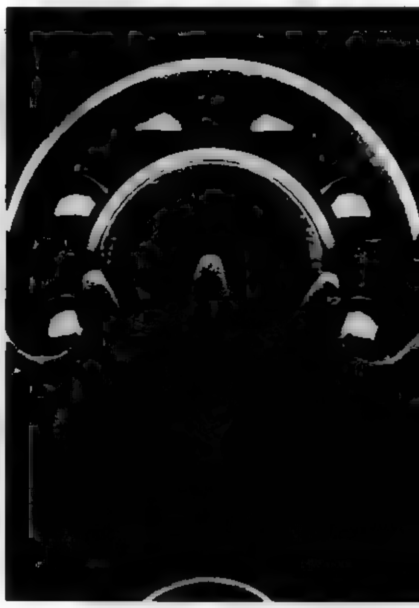

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Integrated business applications now in use by over 2500 customers form the core of your successful information strategy.

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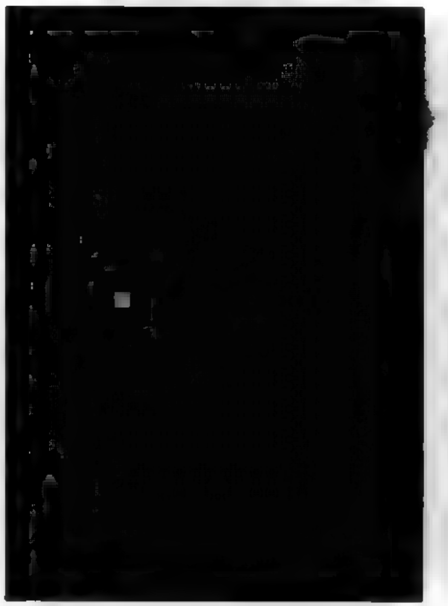

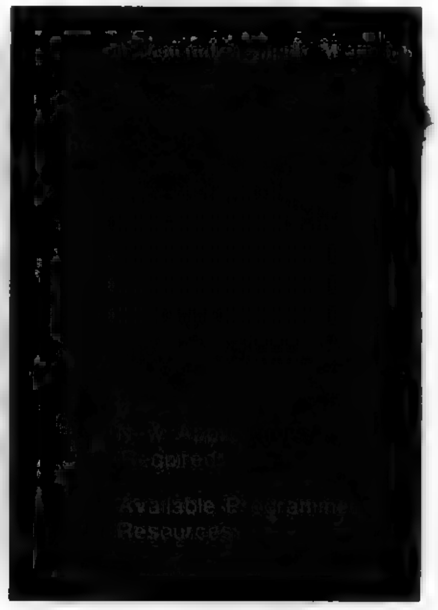

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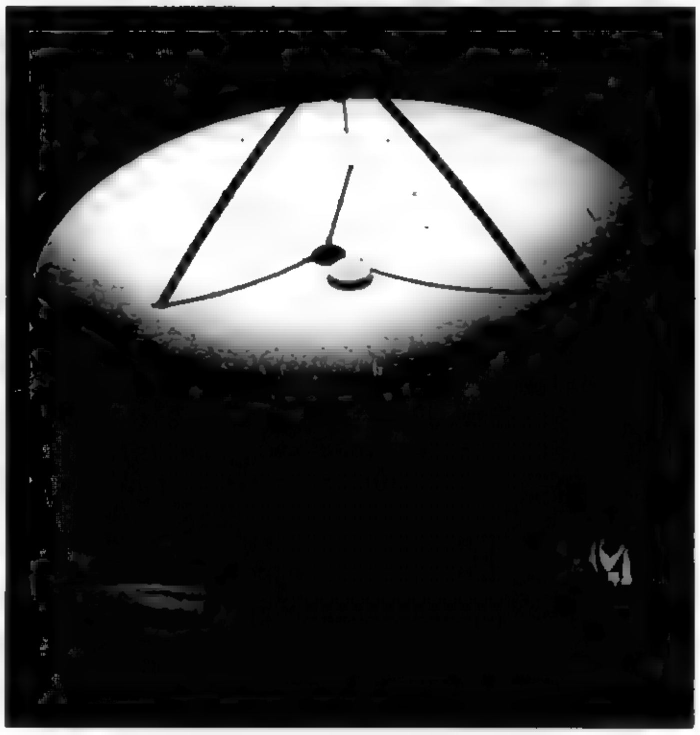

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MIS has its insiders too

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When attorneys further their own welfare by acting contrary to their clients' best interests, they risk disbarment and face the possibility of permanent expulsion from their chosen livelihood.

When psychiatrists wheedle sex from their emotionally vulnerable patients, they can lose for all time their licenses to practice medicine.

Practically every profession truly deserving of the name not only quires its members to abide by a strict, written code of ethics but establishes standard procedures for enforcing these rules as well as for disciplining violators.

One notable exception is information systems, even though the field almost surely entails as much of a position of public trust as bona fide professions such as accounting and law.

Programmers or other systems specialists who tamper with their employers' data or electronically embezzle a company's funds are subject to the

Continued on page 63

J. C. Penney melds DP, television

Plans interactive cable TV shopping by summer

BY DAVID A. LUDLUM
CW STAFF

J. C. Penney Co. plans to open up a new sales channel — television — with a strategy built on an innovative marriage of data processing, networking and cable TV technology.

Penney's home shopping service, which it plans to test with about 125,000 homes in the Chicago area this summer, is menu-driven, like videotex, but is delivered via cable TV and accessed and manipulated with a Touch-Tone telephone.

The service, dubbed Telaction, relies on still video screens, which can be delivered rapidly to approximate animation. Penney decided that delivery of interactive, full-motion video would be prohibitively expensive, according to Stuart C. MacIntire, president of Telaction Corp. in Schaumburg, Ill., a wholly owned subsidiary of Penney that is developing and operating the service.

Stuart MacIntire

Based on experiences with videotex systems, Penney designed Telaction on the principle that the home shopper should not have to acquire equipment such as a terminal or PC. "Needing extra equipment is a deterrent," Penney spokesman Duncan Muir says.

Customers will receive Telaction through a cable TV channel included in a basic service package and will be able to access it with a local telephone call, using an identification number based on a credit card account.

The service also differs from many videotex systems by focusing on merchandising rather than banking and other information-based services. 'It's going to be very much of a marketing or merchandising activity," MacIntire adds.

Penney's plan reflects the growing popularity of home shopping via television and a more established trend toward alternative channels of retail distribution, particularly catalogs. The developments stem, in part,

Continued on page 60

Management insecure about security measures

BY ALAN ALPER
CW STAFF

NEW YORK — While senior management teams in most organizations are becoming more aware of data security requirements, few managers are confident that the safeguards they have already taken are adequate.

This is one of the major findings released last week by Cleveland accounting and consulting firm Ernst & Whinney from its second annual survey on computer security issues.

Of the survey respondents, 62% indicate they believe that security risks are rising and 75% say they are taking substantial steps to implement security policies. Only 6%, however, say security measures taken by their organizations have been adequate.

"Awareness of the issues is on the upswing," says Toni Fisher, co-director of Ernst & Whinney's Information Security Services Group. "But as is the case in many areas, awareness is one thing, implementation is another."

Yet the issues of security and contingency plannning have become basic management concerns. "Today, more senior management people are involved," notes Dave Wilson, national director of Ernst & Whinney's Information Services Group. "It has become a major part of running the business. It's no longer an ancillary aspect."

Organizations that have addressed disaster recovery are usually more apt to have established data security procedures, according to the firm. Unfortunately, Fisher says, most companies have adopted the "Scarlett O'Hara Plan — I will think about it tomorrow."

The survey, which will be published in April, polled 1,000

Continued on page 61

Irish woo software operations

BY DAVID A. LUDLUM
CW STAFF

Just in time for St. Patrick's Day. The Travelers Corp. is set to join a trickle of U.S. corporate computer users that are setting up on-line software development or maintenance facilities in Ireland.

The trend, aided by Ireland's 5-year-old digital telecommunications network, follows widespread use of overseas software facilities by U.S. computer vendors and the popularity of offshore data-entry operations among users.

However, it is relatively innovative for a U.S. computer user to do on-line software development overseas, according to John O'Brien, vice-president of research and marketing for Ireland's Industrial Development Authority (IDA).

"It's a very attractive place for computer companies, and now we're beginning to get people who are computer users . . . to set up software development and maintenance facilties," O'Brien said. "The next area of expansion, the big area we see for expansion, is development by computer users."

American Airlines has investigated establishing a software facility in Ireland, according to an airline spokesman, and the IDA is talking with a number of other U.S. user companies about opening software facilities and data centers, O'Brien said. "We're in the business of attracting data center services as well as development," he noted.

Continued on page 65

Boosts in '87 systems budgets paced by personnel

Major computer users will boost spending on information systems an average of 5% this year, although more than 15% of the users will cut the outlays, according to a soon-to-be-published survey of nearly 500 organizations.

Among the 473 respondents that indicate a direction for the information systems budget, 57% project an increase, with the portion higher among larger organizations. A reduction is projected by 16%, and no change is projected by 27%.

However, estimates of growth or contraction vary considerably by industry and budget components, according to a draft of the survey, which was conducted at the end of 1986 by International Data Corp. (IDC) in Framingham, Mass.

Among budget components, nearly half the respondents (49%) project increased spending on salaries and benefits. Areas commonly targeted for reduced spending are hardware, for which 22% project cuts, and outside services other than service bureaus, for which 20% foresee declines. Service bureau spending is projected to be relatively stable.

Among industries, those that foresee the largest increases in overall information systems spending are financial services (19%), insurance (13%), banking (6.6%) and nondurable manufacturing (5.2%). The only projected decrease is among a group that combines agriculture, mining and construction, in which an 8.6% decline largely reflects cutbacks by major oil companies, according to IDC.

Areas of low projected growth in information systems spending include state and local government (no change), health services (0.5%) and transportation and utilties (1.4%).

Salaries and benefits will form the largest component of information systems budgets at 39%. That represents a decline from 43% in 1984, which reflects the growing volume of information systems work done by end users outside of MIS budgets, according to IDC. Meanwhile, the portion of budgets spent on communications has risen from 7.7% to 9.7% with decentralization of information systems, IDC reports.

Hardware, at 29%, is the second largest budget item in the recent survey, after salaries and benefits. All the other factors account for less than 10% each. The total information systems budget will account for an average of 1.3% of the organization's total revenue, the survey says.

In November and December, IDC surveyed 4,000 manufacturers with annual information systems spending of $250,000 or more as well as 6,000 service organizations. It received responses from 751 of those surveyed. Growth in information systems spending was calculated only among the companies with a fiscal year ending in November, December or January.

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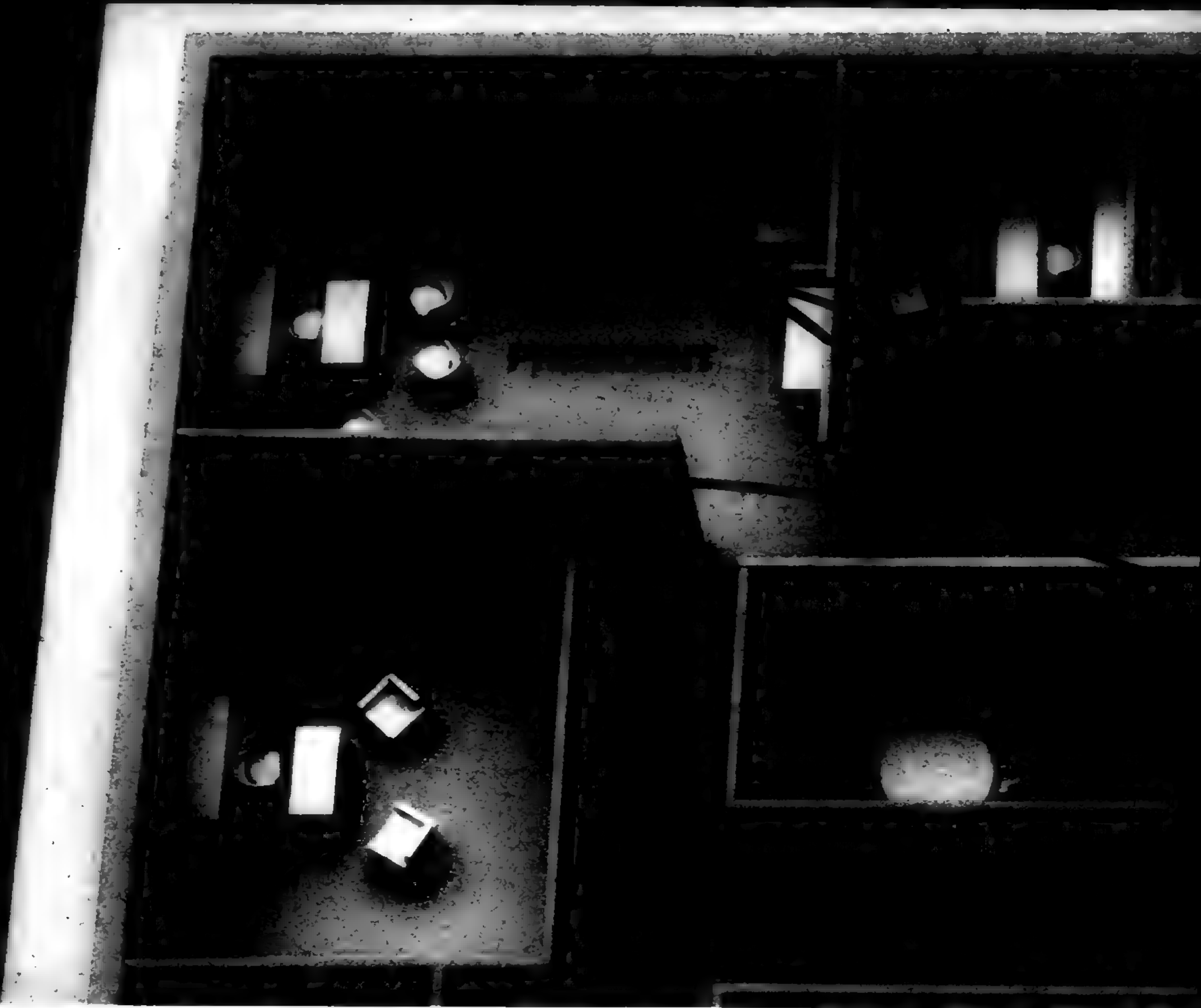

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J. C. Penney

FROM PAGE 57

from growth of two-income households, which have money to spend but relatively little time to shop, observes Jay Rowell, Telaction's vice-president for corporate planning.

In addition to sales of its own merchandise, Penney's expects the system to generate earnings from sales of products and services of other companies, including specialty retailers, grocers and travel services.

Telaction employs Tandem Computers, Inc. VLX and TXP fault-tolerant hosts in Schaumburg, which are fed cable subscribers' telephone calls and instructions by modified AT&T devices called telephone management units.

The computer directs central display units to connect with proprietary, interactive "frame grabbers" mounted on cable system lines, which select the requested screens and route them to the proper subscribers.

Plans call for one frame grabber to serve about 15 cable subscribers. Only one of those 15 could use the system at one time. At that rate, Penney's estimates that a subscriber could get on the system with no delay about 85% of the time, Muir says. If a subscriber's neighbor was using the system, he would see what the neighbor was viewing when he tuned in the Penney's channel.

Citing concerns with confidentiality, Telaction officials declined to comment further on the technology until the company issues a formal statement.

The interactive cable TV technology has been developed by a Canadian company, Cableshare, Inc. in London, Ontario, which has licensed it to Telaction, MacIntire says. Penney's currently owns 36% of Cableshare's stock.

Assuming Telaction succeeds, Penney's expects to install the service in 20 major markets within "a couple of years" and in about 60 markets within five years, Muir projects. "Our intention is to go nationwide," he adds.

The company has budgeted about $40 million for developing the service, including the Chicago-area test, and "it remains to be seen how much we're going to spend from there on in," Muir says.

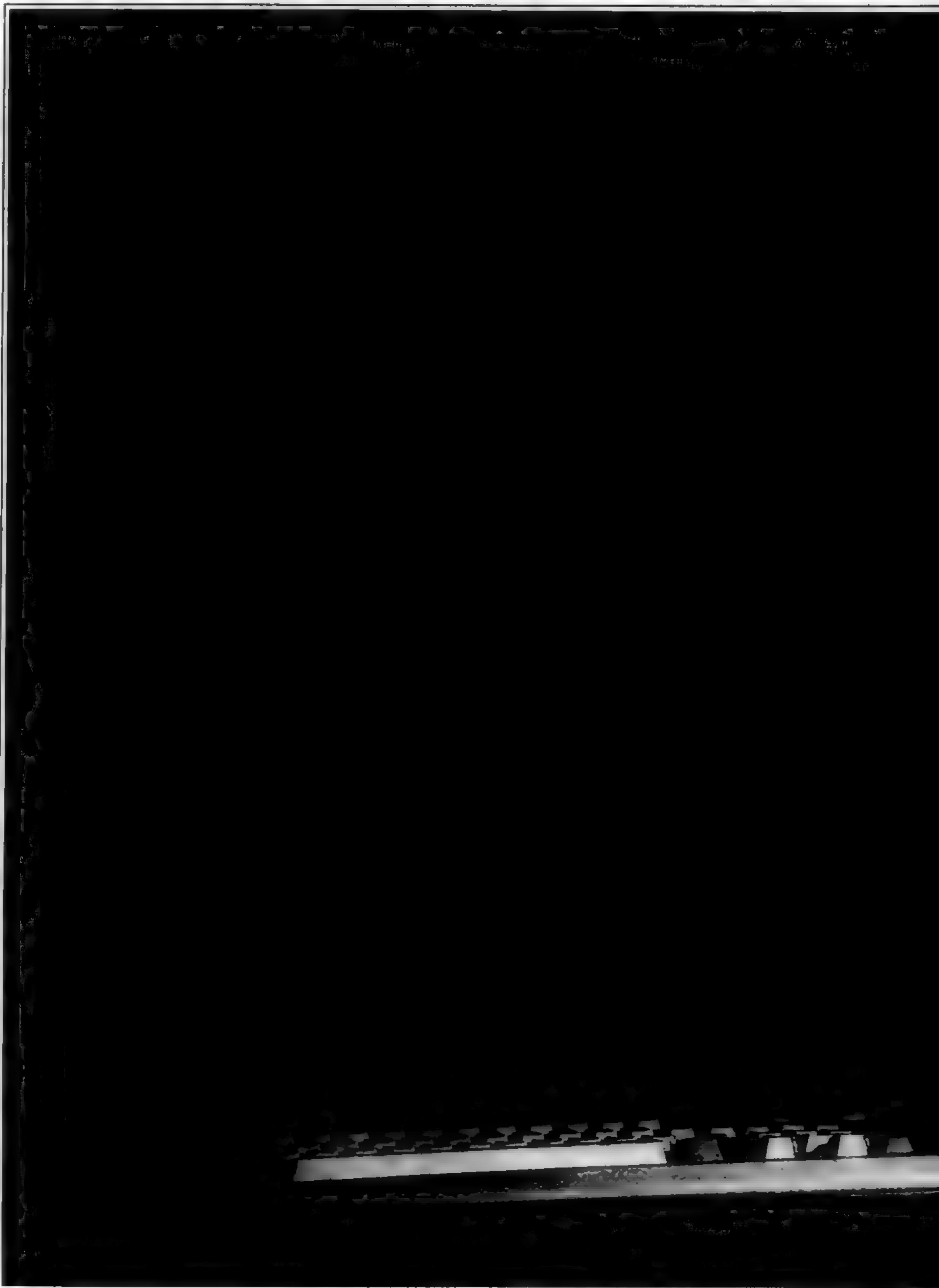
Penney's, which is based in New York, set up its Telaction subsidiary in March 1986 on the basis of technology purchased from First Bank System, Inc., a Minneapolis-based bank holding company.

First Bank System tested a videotex service based on the French Minitel terminal with 300 farm homes in North Dakota in 1982 and 1983, a project joined by 42 retailers and other merchants, including Penney's.

Even before the trial, the banking company suspected that use of special equipment was an obstacle to acceptance of electronic home services, says MacIntire, formerly a senior vice-president for marketing at First Bank System.

"We had already made the decision that home banking by itself was rather dull and that, by itself, home banking would not be very successful. It is just pure information," he adds.

Of the 300 families with whom the videotex system was tested, 60 had purchased a personal computer — independent of the test — but only one was using it, MacIntire says.



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Management

FROM PAGE 57

attendees of the Computer Security Institute Conference in Atlanta last November.

Approximately 560 managers completed a three-page questionnaire on data security issues, Fisher says. Roughly three-quarters of the respondents are from the industry.

The balance of those who responded are from the government.

Fisher says the survey has a 95% confidence level, based on a total of 4,500 computer security professionals or 1,200 convention attendees.

Protecting data from the competition — be it in industry or government — is a top concern of those polled. Historically, organizations have felt they need to protect their data from their own employees.

Employee security is still a close second for both government and industry, however.

"Hackers are perceived more as a nuisance or embarrassment, not as a serious problem to be concerned with," Fisher comments.

Data classification and network security are listed as top security issues, according to the survey.

Tightening up

As data processing environments become more complex, end-user authentication is becoming a focus of security efforts, Ernst & Whinney officials point out.

While passwords and controlled-access systems have been the major means of securing data processing systems and computer rooms, such measures have not successfully prevented unauthorized access.

Ernst & Whinney anticipates the use of see-through tokens that authenticate a user's identification regardless of the trustworthiness of the user, location or network configuration. Smart cards and, to a lesser degree, biometric devices that read finger, voice and retinal prints are also expected to play a larger role in data security in the future.

Weak measures

Apparently, National Security Decision Directive 145 (NSDD-145), which placed the National Security Agency and the National Security Center in advisory roles on data security issues for business and industry, is having little effect on the public sector.

> PROTECTING data from the competition — be it in industry or government — is a top concern of those polled.

Only 6% of nongovernment organizations say the 3-year-old directive affects their security activities, while 24% of the government respondents say they are affected.

Wilson says the reason NSDD-145 is having little effect on the public sector is that many government data security measures are not applicable to the industry's data processing and storage concerns.

The government's special requirements for data integrity, however, will begin to rub off on commerce, Ernst & Whinney officials predict.

The government's use of encryption techniques to store data will soon make their way into the commercial sector.

Currently, the banking industry is the most prevalent nongovernment user of encryption. The industry uses encryption to provide message confidentiality and integrity for funds-transfer applications.

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MIS insiders

CONTINUED FROM PAGE 57

same legal penalties as lawbreakers in any other line of work. But once they pay their fines and complete their jail terms, they can usually return to the DP fold either by finding a comparable job at another workplace or by setting themselves up as independent contractors or consultants.

To be sure, a certain percentage of corporate MIS organizations balk at the idea of hiring or retaining convicted felons. But if the wrongdoers persevere, they can usually re-establish themselves in the end.

Is the systems field overly lenient in its treatment of the former miscreants in its ranks? Should computing technicians and managers require themselves to heed the same ethical standards as doctors or lawyers and provide the MIS equivalent of disbarment for practitioners who overstep the bounds of accepted conduct?

Or do DP employees who once violated their positions of trust deserve a second chance as long as they pay their debt to society and are genuinely repentant? Does the systems trade have a moral responsibility to forgive past misdeeds, however egregious?

Professional label

Clearly, such questions can be examined from many perspectives and defy easy answers. But eventually, systems people will need to confront the problem of professional ethics face to face. Until they do so, they will never be fully justified in labeling themselves professionals.

What prompted the present meditation on information systems ethics was a story that appeared in *Computerworld* two weeks ago. The story concerns Stan Rifkin, who in the early 1980s held MIS management positions with the American Red Cross and the American Association for the Advancement of Science.

Last spring, Rifkin was elected a director of the Washington, D.C., section of the Institute of Electrical and Electronics Engineers, Inc.

But, as the story makes clear, his personal history also includes a highly dubious claim to fame. In 1979, Rifkin began a three-year prison stretch after being convicted of electronically stealing $10.2 million from Security Pacific National Bank, where he formerly worked as a systems consultant.

By itself, the mere fact that a felon is now occupying a position of some authority within a major professional association may be of little consequence.

What makes the story noteworthy, however, is the additional disclosure that, although the section's leaders knew of Rifkin's background, they failed to tell their constituents, some of whom consider the omission presumptuous.

At the story's heart, therefore, lies the question of whether association members have the right to know for whom they are voting, especially when a candidate has been convicted of a felony that relates directly to his occupation.

But the story raises another question with even broader implications: Should a systems specialist continue to enjoy the privileges of working in his field when he has abused his position of trust?

Most of the people who agreed to be interviewed for the story take a comparatively charitable position on the subject. Why, they ask, should an ex-con who makes no secret of his criminal past endure a lifetime of punishment for one regrettable misdeed that may have occurred many years earlier?

Those who advance the let-bygones-be-bygones argument present their case forcefully and make some valid points. But so does the hard-line minority that espouses exactly the opposite viewpoint and wants systems employees held to the same ethical standards and sanctions as physicians and attorneys.

Maybe, the minority line of reasoning goes, potential wrongdoers would be dissuaded from committing premeditated crimes if they understood at the outset that misbehavior could cost them their careers.

As to the question of whether one or the other side of the argument is right, no one can say with certainty. At least one point, however, is beyond dispute: How the systems field ultimately responds to the dilemma of unethical conduct by its practitioners will go a long way toward determining whether the field will ever meet the minimum requirements of a true profession.

Many systems specialists like to think of their discipline as a profession on a par with medicine, law and accounting. But the sad truth of the matter is that MIS has yet to make the grade as a profession in the strict sense of the term.

Just as a tropical storm must reach a specified level of intensity before it can be classified as a hurricane, so a highly skilled occupation must satisfy certain well-defined criteria before it can qualify as a profession. Included among the prerequisites of an authentic profession is a recognized code of ethics, which computing currently lacks.

Someday, information systems may mature to the point at which the field certifies all its members as competent practitioners, formulates its own version of the Hippocratic oath and enforces high ethical standards through stiff penalties. For now, though, DP employees will have to be content to accept their specialty for what it truly is — a potential profession that has yet to come of age.

Beeler is a *Computerworld* West Coast correspondent.

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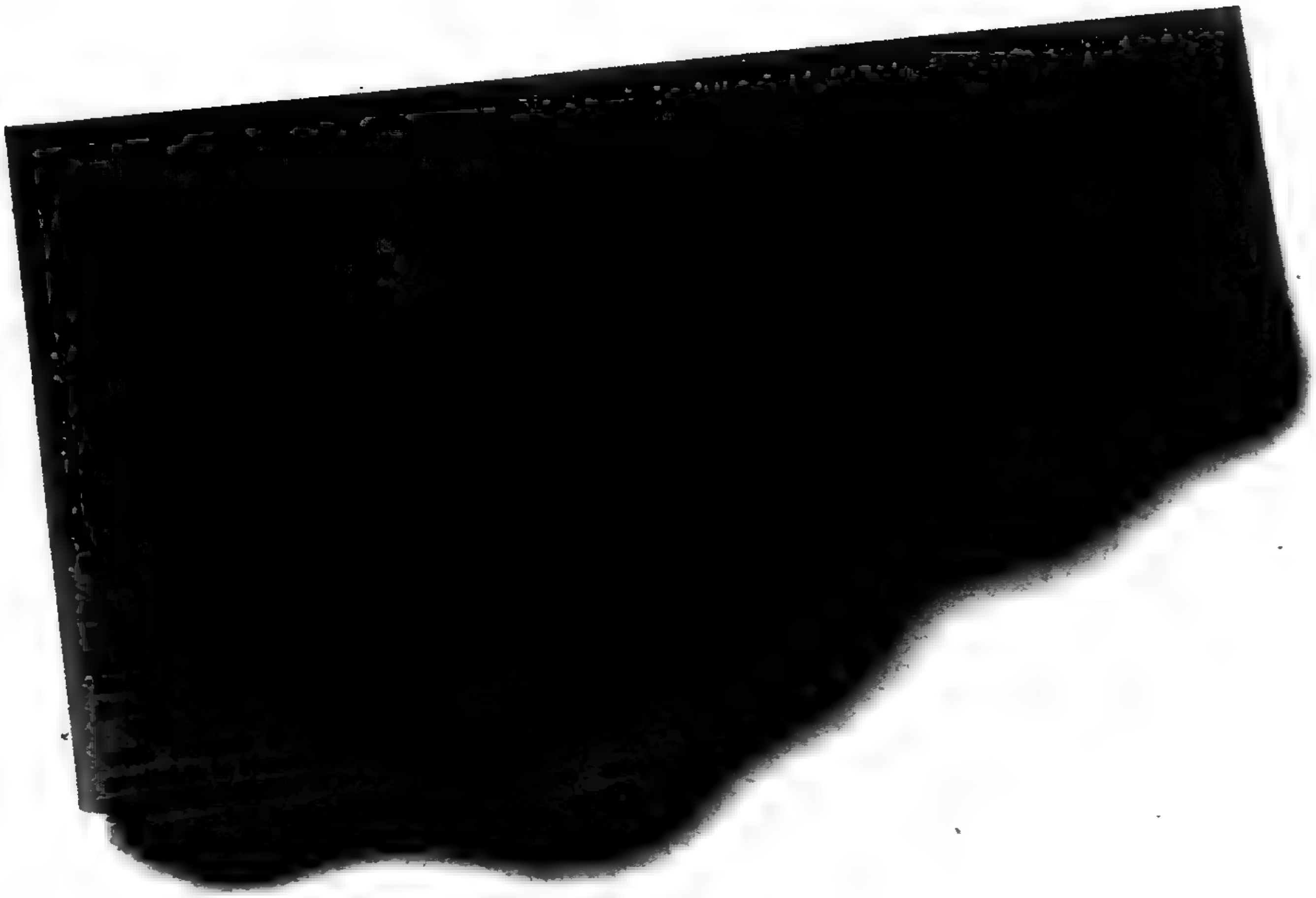

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Irish

FROM PAGE 57

Later this year, The Travelers will open a facility in Limerick, Ireland, for design, development and testing of its application software that is online with facilities in Hartford, Conn., and Atlanta.

The chief advantage of the Irish site is the work force, which is less expensive than in the U.S., well-educated and loyal, according to Bill Gollnic, assistant director of data processing for The Travelers and project manager for the facility.

"The labor rate is the critical factor," Gollnic said. While the annual turnover rate of software professionals in the U.S. is estimated at about 12%, the rate in Ireland, where many workers have emigrated recently due to a lack of job opportunities, is about 2% to 3%, he said.

"Ireland produces high-quality computer science graduates, pretty much comparable to what we find in the U.S.," Gollnic noted. Language is also an issue, he added. "English-speaking people are easier to deal with in technical subjects."

The Travelers did not investigate other overseas locations for the site, Gollnic said. He declined to specify the total cost of locating the facility in Ireland compared with the U.S., but called it "considerably less."

American Airlines has looked into locating an on-line software development facility in Ireland and liked what it found, particularly in salary levels and government subsidies, as well as in the quality of work, American spokesman Joe Stroop said.

However, the airline is not currently planning to build an offshore software facility, Stroop said. It also examined a location in India and may investigate other sites, he added. He declined to compare Irish and Indian locations.

Last July, Geisco, the division of General Electric Co. that provides network-based services such as remote processing and electronic data interchange, opened a software development facility in Dublin.

The location was chosen for its proximity to a large processing center in Amsterdam, to which it is linked, and compared favorably with Scotland for availability and cost of workers, according to Brian Flanagan, Geisco's manager of finance for technology operations.

The IDA has attracted development of software facilities by a raft of U.S. computer and software vendors, including IBM, Digital Equipment Corp., Wang Laboratories, Inc. and Lotus Development Corp.

This has helped Ireland develop expertise in software work, so programmers and analysts "come a little bit cheaper" than they might otherwise, O'Brien said.

There are about 3,000 people working in software development in Irleand, O'Brien said. "A lot of people have trouble getting enough programmers and analysts. We have a surplus," he said.

He estimated the cost of hiring software professionals in Ireland is about 60% of doing so in Massachusetts and, with lower rent and other factors, the overall cost of operating a software facility in Ireland is about half that in the U.S.

The time difference between Ireland and the U.S., particularly the western areas, allows Irish facilities to access computers in the U.S. during less busy nighttime hours, O'Brien noted.

Limerick, the site of many of the offshore computer facilities, is near western Irleand's international air terminal, Shannon Airport, and the National Institute for Higher Education, a technologically oriented school modeled after MIT.

Ireland has difficulty competing for data-entry work and other low-skill functions with areas where labor is less expensive, such as the Caribbean and China, O'Brien noted. "Our advantage is that we can do quite sophisticated projects," he said.

CALENDAR

MARCH 8-14

Cullinet Applications and End-User Computing Conference. Dallas, March 8-10 — Contact: Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, Ma. 02090.

Spring 1987 Conference of the North American Honeywell Users Association. Charleston, S.C., March 8-13 — Contact: Lester T. Pacca, NAHU, Inc., P.O. Box 2037, Willingboro, N.J. 08046.

Automated Manufacturing: Computers, Communications and Controls in the Factory. St. Petersburg Beach, Fla., March 9-10 — Contact: Yvonne Chism, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

CAD/CAM/CAE Executive Workshops '87. Cambridge, Mass., March 9-10 — Contact: Cynthia Wolfram, Daratech, Inc., 16 Myrtle Ave., Cambridge, Mass. 02138.

Electronic Banking: The Challenges of Tomorrow's Bank Within Yesterday's Legal Framework. Brussels, March 9-10 — Contact: Alan Galaski, Conference Office Brussels, 19 rue de l'Orme, B-1040 Brussels.

11th Annual BRS User Meeting. Kansas City, Mo., March 9-10 — Contact: BRS Information Technologies, 1200 Route 7, Latham, N.Y. 12110.

Computer Technology and the Law: Protecting Your Rights. Arlington, Va., March 9-11 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Federal Office Systems Expo. Washington, D.C., March 9-12 — Contact: National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

Effective Management Skills for the MIS Manager. Cambridge, Mass., March 9-12 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Open Network Architecture: Computer III Status Report. Arlington, Va., March 10-11 — Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

Corpcon. New York, March 10-12 — Contact: Corpcon, P.O. Box 3727, Santa Monica, Calif. 90403. Also being held April 28-30 in Chicago and Sept. 21-23 in Los Angeles.

Optical Information Systems. Long Beach, Calif., March 11-13 — Contact: Meckler Publishing, 11 Ferry Lane W., Westport, Conn. 06880.

MARCH 15-21

The 1987 National Automated Clearing House Association Conference. San Diego, March 15-18 — Contact: Barbara Hill, Manager of Meeting Services, NACHA, Suite 640, 1901 L St. N.W., Washington, D.C. 20036.

Fifth Annual Computer Based Training Conference and Exposition. Atlanta, March 15-18 — Contact: Julia Stasio, Conference Registrar, Weingarten Publications, 38 Chauncy St., Boston, Mass. 02111.

Guide International. Anaheim, Calif., March 15-20 — Contact: Guide Headquarters, 111 E. Wacker Drive, Chicago, Ill. 60601.

1987 West Coast Manufacturing, Accounting and Production Information Control System Users Conference. San Diego, March 16-17 — Contact: Salem Corp., 1654 Poplar Lane, Annapolis, Md. 21401.

Artificial Intelligence and Expert Systems. Cleveland, March 16-17 — Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held in Louisville, Ky., Dayton, Ohio, Portland, Ore., Fort Worth, Texas, Baltimore, Richmond, Va., Concord, Calif., and Tulsa, Okla.

Fifth National Conference on Measuring Data Processing Quality and Productivity. Orlando, Fla., March 16-18 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

Electronic Data Processing Audit Managers' Roundup III. Orlando, Fla., March 16-19 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

Tutorial Week. Kissimmee, Fla., March 16-20 — Contact: Computer Society of IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Workshop on Factory Communications. Gaithersburg, Md., March 17-18 — Contact: Robert Rosenthal, B217 Technology Building, National Bureau of Standards, Gaithersburg, Md. 20899.

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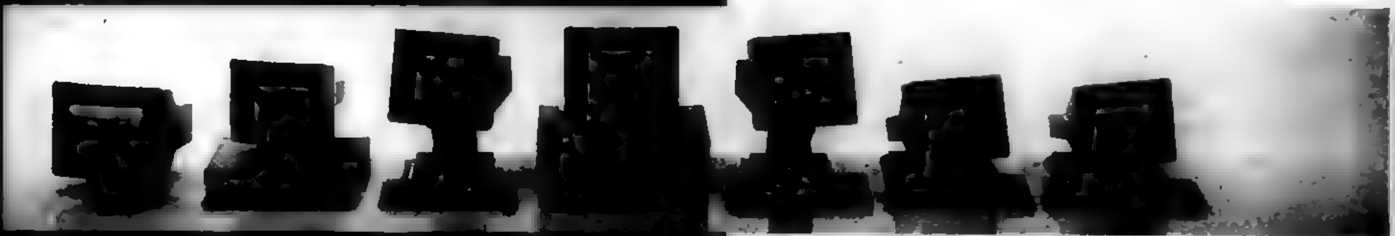

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

The year of the lawyer

A recent record album by folk singer Tom Paxton carried the title "One Million Lawyers — and Other Disasters." After the first two months of 1987, that sentiment could certainly apply to the computer industry. Instead of the Year of the LAN (about the fifth in a row, at last count), 1987 is the Year of the Lawyer.

Not since IBM went toe-to-toe with the U.S. government's antitrust division has there been such a flurry of barrister-related headlines. Lotus Development Corp.'s patent case against Paperback Software International and Mosaic Software, Inc. certainly led the parade, but it was just the beginning.

Now we have Ashton-Tate vs. Migent, Inc. — and vice versa. Rodime PLC vs. the 3.5-in. disk drive industry. The modem industry vs. Hayes Microcomputer Products, Inc. Micro software vendors, large and small, launching anti-piracy campaigns in the U.S., Canada and elsewhere. Digital Equipment Corp. stepping up its legal efforts against any and all makers of DEC-compatible peripherals — or at least those that don't have joint marketing or licensing deals with DEC.

And which player in the telecommunications industry has received the most ink this year? The U.S. Justice Department.

In the case of micro software, all the legal wrangling is a sure sign that the industry is aging. (In this context, "maturing" is the wrong word, since it implies that the amount of squabbling should be decreasing, not increasing).

No matter what high-minded legal precepts they claim they are only trying to uphold, companies at the top of the heap in their markets are using every means possible, including the courts, to stay there.

But computer users should not expend all their grains of salt

Continued on page 71

Industry scoffs at 3½-in. disk suit

BY JAMES A. MARTIN
CW STAFF

LONGMONT, Colo. — Rodime PLC's recent patent infringement lawsuit against 3½-in. disk drive competitor Miniscribe Corp. has met with skepticism from analysts and insiders, one of whom says the suit "is like trying to enforce a patent on a yardstick."

The suit was filed in U.S. District Court in Colorado last October and amended Feb. 10. In the suit, Scotland-based Rodime claims it first developed the 3½-in. disk drive technology that is becoming increasingly popular with microcomputer vendors. Miniscribe, based in Longmont, Colo., was infringing that patent by marketing a 3½-in. disk drive product without a licensing agreement, the suit alleges.

"At present, there are some 19 U.S. companies either manufacturing or offering to sell micro hard disk drive systems, which we believe infringes [on] our patents," says Bill Batchelor, Rodime's finance director.

Since April 1986, Rodime attorneys have been inviting 3½-in. disk drive manufacturers "either to obtain licenses from Rodime or to desist from any further infringing activities," according to Batchelor.

Analysts and observers have scoffed at Rodime's action, saying it will not hold water under close scrutiny.

"It's a very broad patent, and this sort of litigation comes up frequently, with few favorable decisions," says Andrew Neff, a technology analyst with Montgomery Securities in San Francisco.

Neff suggests that Rodime is motivated more by market concerns than legal principles. "A year ago, Rodime was the large-

Continued on page 71

Paperback wants Lotus case dismissed

Claims users not named in move seen as deadline-beater

BY PEGGY WATT
CW STAFF

BERKELEY, Calif. — Paperback Software International has asked a federal district court to dismiss Lotus Development Corp.'s claims of copyright infringement, saying the vital party — software owners — were not named in the proceedings.

The reply may not end the case, but it meets Paperback Software's legal deadline for responding to the suit filed by Lotus in Boston [CW, Jan. 19], according to Adam Osborne, Paperback Software president.

Osborne said his attorneys advised that the customers' role should be defined in the case.

Paperback Software sells VP Planner, marketed as an enhanced clone of 1-2-3. Lotus also sued Mosaic Software, Inc., which will handle its defense separately.

Osborne also said his company's insurance agent, Atlantic Mutual Insurance Co., has taken responsibility for the litigation and will handle the defense. The case has drawn interest throughout the user community and among attorneys interested in computer law.

Adam Osborne

The Lawyers' Special Interest Group on The Source has already launched an ongoing, online conference about the issue, according to Paul Bernstein, president of the Lawyers' Microcomputer Users Group (Lawmug) in Chicago.

"The initial reaction from Lawmug members is support for the defendants," Bernstein said. Lawmug and other groups of computer law scholars have indicated interest in filing amicus briefs, or third-party opinions, in the case.

Osborne said a countersuit is

Continued on page 74

Telebit to cancel DCA mart pact

BY ELISABETH HORWITT
CW STAFF

CUPERTINO, Calif. — Telebit Corp. intends to break off its joint distribution and marketing agreement with Digital Communications Associates, Inc.'s (DCA) microcomputer products division, the company recently told *Computerworld*.

The projected move is part of Telebit's quest for new distribution channels that better support its new marketing strategy of selling dial-up communications systems rather than stand-alone modems, according to Telebit President and Chief Executive Officer James Jordan.

Formerly executive vice-president of local-area network vendor Ungermann-Bass, Inc., Jordan joined Telebit approximately six months ago.

DCA reserved comment on the proposed breakup since a "formalized agreement has not been reached," according to DCA Vice-President of Corporate Communications Robert Zack. Zack expressed surprise that Jordan had talked to *Com-*

Continued on page 74

Inside

- Porteus on CAD/CAM/CAE stock opportunities. Page 70.
- Japan asks its semiconductor industry to cut production by 10%. Page 74.

Matsushita, IBM settle BIOS copyright infringement dispute

BY YASUKO YOSHIMI
SPECIAL TO CW

OSAKA, Japan — Matsushita Electric Industrial Co. last week admitted that its Panasonic microcomputers have violated IBM's copyright on the BIOS chip used in the IBM Personal Computer AT.

Matsushita's Shigeru Hayakawa announced that a friendly compromise had been reached between the two firms under which Matsushita agreed to pay IBM $1.95 million. Matsushita agreed to recall to Japan its exported inventory of approximately 2,000 units of the AT-compatible FX-800, sold in the U.S. as the Panasonic Industrial Co. Business Partner 286.

Jim Cullen, national marketing manager for computer products for Secaucus, N.J.-based Panasonic, said the agreement will not affect about 2,000 FX-800s already sold into dealer and distributor channels. There will be a 90-day suspension in future sales of the Intel Corp. 80286-based product while Matsushita rewrites the BIOS to comply with the copyright settlement, Cullen said.

"Matsushita certainly has the engineering horsepower" to complete the rewrite in 90 days, Cullen added. He said Panasonic plans to reintroduce the Business Partner 286 at Comdex/Spring '87.

Matsushita last summer started full-scale shipments of the FX-800 models in an attempt to crack the U.S. and European personal computer markets. Cullen said the AT compatible accounts for about 20% of the sales of Panasonic's computer product line, which also includes the PC-compatible Business Partner, or FX-600, and a portable.

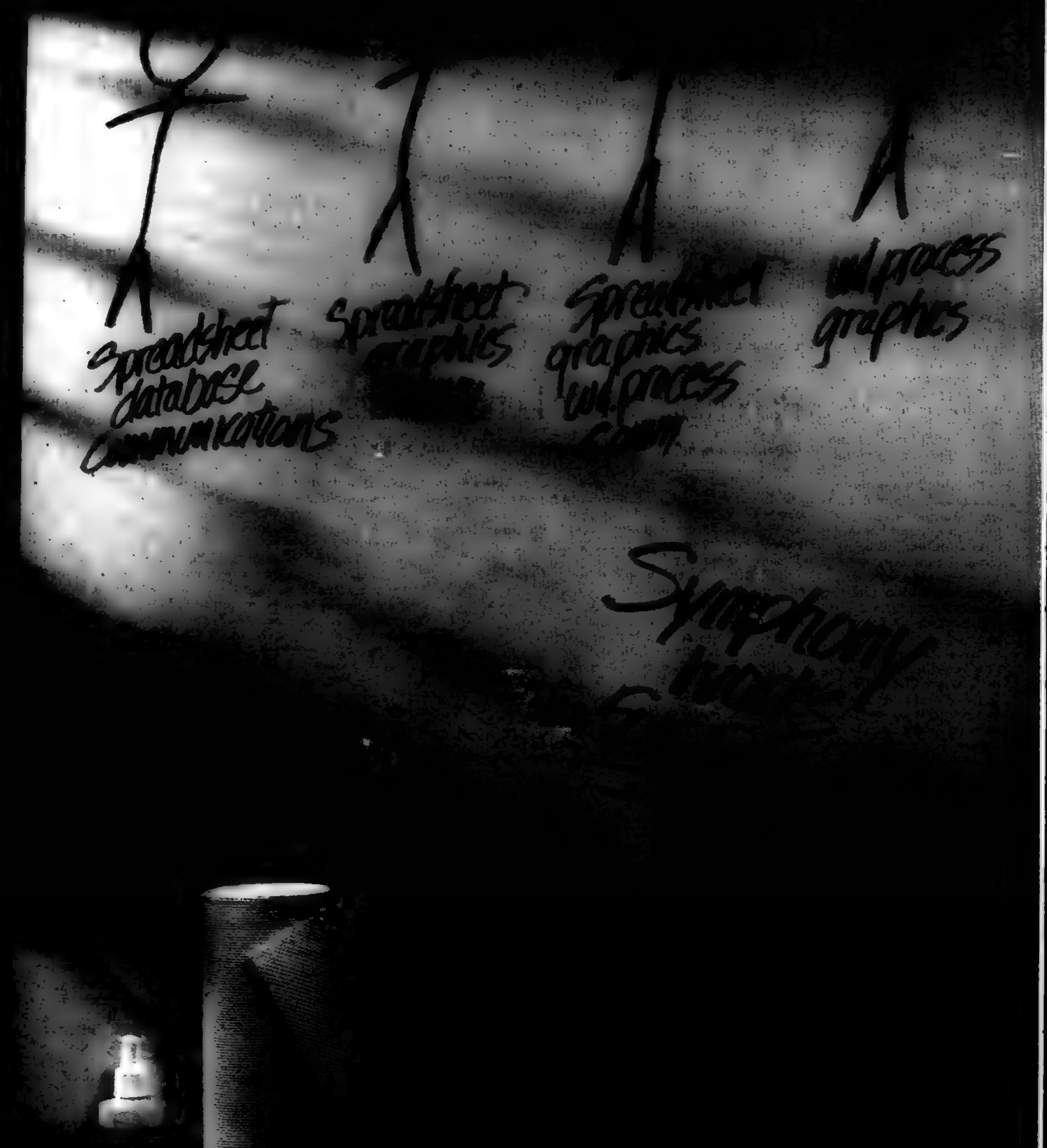
IBM had requested in January that Matsushita halt FX-800 shipments after customs inspections in Seattle revealed the IBM BIOS copyright infringement.

Matsushita Electric, according to industry sources, was anxious to conclude the copyright dispute amicably because of its OEM relationship with IBM Japan for the IBM 5550 systems line.

Both Hayakawa and Cullen warned separately that other Japanese manufacturers of IBM-compatible personal computers may come under fire at any moment, as IBM is tightening its software screws. "IBM is not being shy about this — it is taking a very hard line," Cullen said. "That is certainly an indication to others."

Computerworld *senior editor Clinton Wilder contributed to this story.*

Yoshimi is a Tokyo-based correspondent for the Asian bureau of the CW Communications International News Service.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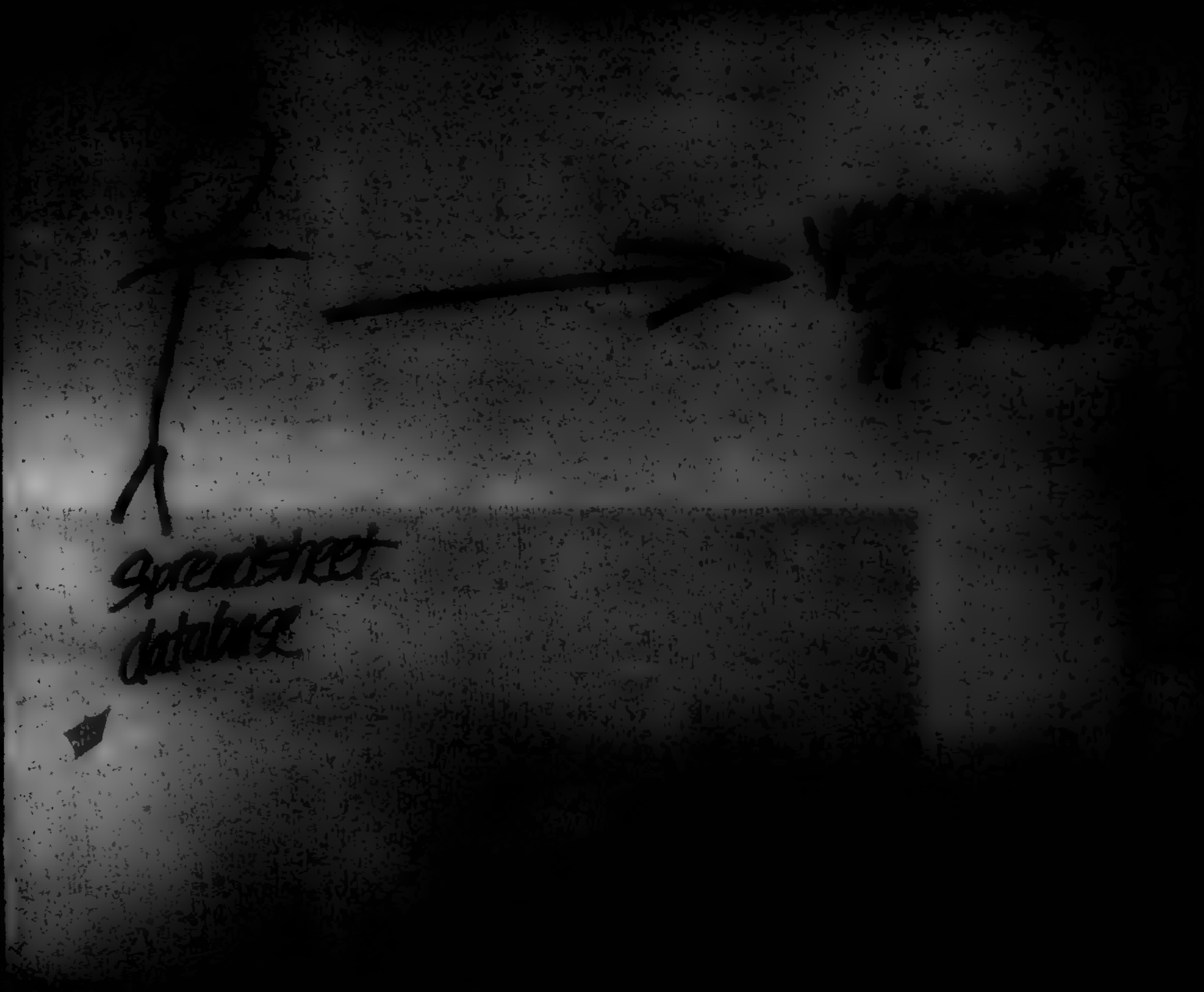

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ACTIVE

ISSUES

Kathy Porteus

CAD/CAM/CAE stocks on the rise

When expectations for improved business conditions are added to a record breaking stock market, the result is sensational stock performances by computer-aided design, manufacturing and engineering (CAD/CAM/CAE) companies.

Since the beginning of this year, stock prices of CAD/CAM/CAE companies such as Autodesk, Inc. (ACAD — 62), Mentor Graphics Corp. (MENT — 28½), Computervision Corp. (CVN — 21⅛), Intergraph Corp. (INGR — 24¼) and PDA Engineering (PDAS — 12) have soared between 30% and 55%.

"There's no question that some substantial anticipation of fundamentals is propelling this group of stocks," says Peter Heymann, analyst with Drexel Burnham Lambert, Inc. "Investors interpret faint signs of a rebound in semiconductor demand as something that will eventually translate into an improved spending environment for CAD/CAM/CAE tools."

According to Heymann, CAD/CAM/CAE stocks have also attracted attention because many still trade at the low end of their historical price ranges at a time when investors are hungry for undervalued situations. Nevertheless, Heymann says he sees no bargains in the group.

Laura Conigliaro, analyst with Prudential-Bache Securities, Inc., agrees that this year's outlook for CAD/CAM business is "certainly not explosive." However, she says, this year "represents the end of a very painful industry transition from host-based to distributed CAD/CAM/CAE systems." According to Conigliaro, companies that have seen the worst are now in a turnaround mode, thus justifiably attracting Wall Street's notice.

Topping Conigliaro's list of recommendations are Mentor Graphics and Autodesk. She estimates Mentor Graphics, a leading CAE vendor, will earn $1.05 per share this year, compared with earnings of 67 cents per share in fiscal 1986, ended Dec. 31.

Autodesk, the leading supplier of CAD/CAM software for personal computer-based systems, should continue to perform well, according to Conigliaro. Because of the company's strong fiscal 1987 results, she is currently reviewing her estimate of $2.05 per share and will probably raise it for Autodesk's fiscal 1988, ending Jan. 31.

Conigliaro also recommends Intergraph, the leading independent CAD/CAM hardware vendor, and PDA Engineering, a supplier of mechanical engineering software that enables modeling of complex shapes. "These stocks come with different risks but still represent good opportunities," she says.

Peter Schleider of L. F. Rothschild, Unterberg Towbin recommends purchase of Autodesk and PDA Engineering because as pure software companies, he says they "offer the best play in the CAD/CAM/CAE industry."

According to Schleider, both companies have already priced their products for the volume marketplace and each supports a number of different hardware systems.

On the other hand, Schleider recently downgraded his recommendations of Valid Logic Systems, Inc. and Computervision. He shifted his opinion on Valid Logic to "hold" owing to uncertainties created by the company's proposed merger with Telesis Systems, a vendor of CAD systems for printed-circuit design. Computervision now has a "hold" rating from Schleider to reflect the stock's substantial move and his earnings estimate of 50 to 60 cents per share for Computervision's fiscal 1987, ending Dec. 31.

According to Schleider, investors should be aware of two new developments affecting the CAD/CAM/CAE arena. He foresees widespread customer confusion this year, owing to many hardware product announcements coming from a variety of suppliers.

He adds, "We are beginning to see the merging of engineering and commercial computer purchases, which means CAD/CAM vendors will need to change their sales and marketing strategy to focus more on MIS departments."

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customised research services for financial and high-tech firms.

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Year of lawyer

CONTINUED FROM PAGE 67

on the industry leaders/plaintiffs. One should not forget that the defendants, who love to cite David and Goliath, the death of industry innovation and all that, often reap a tidy windfall of publicity from such lawsuits. Paperback Software's Adam Osborne has admitted as much, noting a nice jump in the sales of VP Planner since Lotus went to court in January.

Also, remember that the defendants are in business to capitalize on the success of Lotus 1-2-3, or the micro data base market that Ashton-Tate created, or the heady demand for DEC systems and peripherals.

Whether that is patent infringement or simply astute development and marketing will be decided in the courts, but let's not forget that "innovation," in this context, often means how well a vendor emulates an industry standard.

What does it all mean for users? On the surface, perhaps very little. But if the micro software industry — or any other, for that matter — drastically shifts its attention and energies from the development lab to the courtroom, the customer will ultimately suffer.

Targeting user's needs

It does a user little good to listen to debates about "look and feel," obscure legal precedents or the differences between copyright law and patent law. One would much rather hear talk about better user interfaces, networking standards, productivity gains or site licensing.

Unfortunately for the above distinction, this year is not off to a good start. And litigation almost always tends to lead to more litigation, with countersuits, preliminary injunctions and (later) appeals multiplying like mosquitoes over a swamp in springtime.

That makes a good analogy for the lawyers swarming around the computer industry lately.

EVERYONE HAS HEARD of market research. Now there is market research of the market researchers.

New York-based Knowledge Engineering has compiled a report that reviews and rates the artificial intelligence market forecasts published by 10 market research firms in 1986. The firm's pitch is that for $47.50 plus shipping charges, the corporate user can get Knowledge Engineering's view of "3,000 pages and $25,000 worth" of AI research reports.

Interestingly, Knowledge Engineering found that various firms' forecasts of the AI market in 1990 ranged from $885 million to $4.2 billion — a difference of almost five to one.

Even allowing for the difficulty of defining the AI marketplace, that discrepancy truly gives one pause about the relative value of such forecasts.

Wilder is Computerworld's senior editor, computer industry.

Industry scoffs

CONTINUED FROM PAGE 67

est 3½-in. disk drive company, and now they're number two under Miniscribe," he says.

"So if you're going to hit someone, you're going to hit somebody that has hit you. Miniscribe is the only other significant player in the market."

"Rodime is claiming a patent on the size of a disk drive, and you just can't enforce a patent on a yardstick," says one observer, who asked not to be identified.

"The technology used in these drives is very similar to that used on 5¼-in. disk drives, and Rodime is trying to claim that what they have is unique," the observer continues.

If successful, the suit could force all 3½-in. disk drive firms to pay Rodime a 7% royalty fee for each drive sold. Rodime could stand to gain as much as $70 million annually from those fees, according to Allen E. Carrier, a U.S. spokesman for Rodime.

Could corner market

Rodime could gain control of the market if the suit is successful, Carrier says. He estimates the U.S. market for 3½-in. disk drive technology might reach $1 billion by next year.

Miniscribe was targeted in the suit because it is the largest supplier in that market and is IBM's biggest supplier for 3½-in. disk drives, according to Carrier.

Rodime is only seeking to protect its investments, he adds. "The company simply wants to get the rewards for the risks they took in developing this technology, and they are not looking to gain a monopoly," Carrier says.

There is no timetable for the litigation at this point, and observers say it could be two years before the suit is heard. In the meantime, the disk drive companies have until June 30 to respond to Rodime's request for licensing fees.

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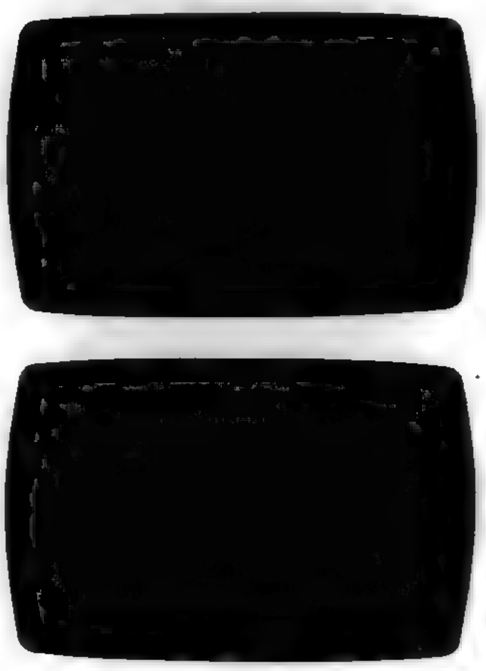

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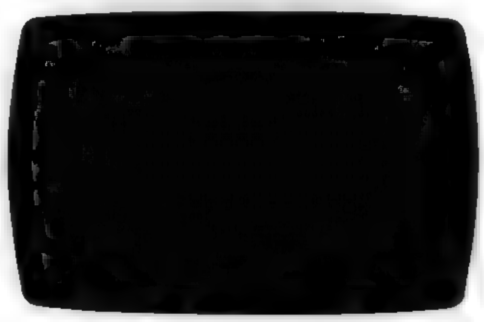

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Japan asks chip makers to cut production

BY JAMES A. MARTIN
CW STAFF

Under fire from the U.S., Japan's Ministry of International Trade and Industry has asked that country's semiconductor industry to cut production by 10% during the next three years.

Japanese officials said reduced chip production would drive up prices and thus help curb predatory pricing, which the U.S. has accused Japanese suppliers of practicing in U.S. and overseas markets.

The U.S. and Japan signed a trade accord in July that, in theory, would open up the Japanese semiconductor market more to U.S suppliers and stop Japanese firms from selling mass quantities of dynamic random-access memory (RAM) chips in the U.S. at extremely low prices.

The Japanese government, however, has been criticized recently by U.S. vendors for not enforcing the trade accord.

The Semiconductor Industry Association (SIA) was cautious about Japan's call for a drop in chip production. In the past, the Japanese have not always lived up to their word, so a wait-and-see attitude is the only appropriate response, according to Daryl Hatano, SIA's director of international trade and government affairs.

Separately, Texas Instruments, Inc. settled another round of patent infringement lawsuits, this time with Japan's Mitsubishi Electric Corp., Oki Electric Industry Co. and Matsushita Electic Trading Co.

The three firms were among nine Pacific Rim semiconductor firms sued last year by TI for dynamic RAM patent infringement. The firms have agreed to make significant royalty payments and pay additional per-unit royalties to TI.

Telebit

FROM PAGE 67

puterworld about the matter as if it were a foregone conclusion.

Telebit recently entered an OEM agreement with DCA's Network Division, which sells a full line of modems and multiplexers as well as T1 switches from DCA subsidiary Cohesive Network Corp.

DCA/Telebit Data Systems, Telebit's 1½-year-old joint venture with DCA's micro division, has distributed approximately 5,000 of Telebit's 18K bit/sec. asynchronous dial-up modems, according to Jordan.

Although the venture successfully launched the product, Jordan said Telebit was not satisfied with the sales approach by dealers that handled DCA's microcomputer-based products, such as the Irma terminal-emulation board.

"They did not present modems as sophisticated solutions or understand communications software like Blast and Crosstalk," Jordan said.

Telebit plans to enhance its current modem product line with X.25 packet switching, Systems Network Architecture support, protocol conversion and, eventually, network management, Jordan stated. The resulting communications systems will target the dial-up communications market, which Telebit expects to remain healthy while the world waits for Integrated Services Digital Network (ISDN), Jordan said. "I don't think ISDN will be here tomorrow," he asserted.

Paperback

FROM PAGE 67

also a possibility. For now, however, he says Paperback Software is enjoying a boost in sales that he attributes to publicity about the suit.

Paperback Software and Mosaic Software are small companies and may have difficulty financing a legal defense. As a result, according to industry sources, the two firms will share some defense resources, even though they are being sued separately.

Mosaic has already established a legal defense fund designed to raise money for its defense.

'Overburdening' motive?

"One of Lotus's motives must be to overburden a company like Mosaic with financial expenditures," said Richard Dikran Bezjian, president of Mosaic. "For them [Lotus], a half a million dollars doesn't mean much. For us it could simply mean the livelihood of the company. That is why we put together the defense fund."

The Lotus suits have prompted industry speculation that Ashton-Tate may also legally challenge firms that have cloned its popular Dbase series data base software tool.

"We believe a company ought to be able to protect its proprietary technology," said Edward M. Esber Jr., chairman of Ashton-Tate, who declined to disclose his firm's plans.

"Cases like the Lotus case, should it go all the way to court, will clarify things or set precedents upon which other suits can be filed, if they are successful," Esber said. But if Ashton-Tate decides to file similiar suits, it will not necessarily wait for the Lotus suits to be resolved, Esber added. He also argued that a programming language developed and marketed by one company, such as the Dbase language, deserves more protection than languages such as Basic and Fortran.

Ashton-Tate recently sued smaller data base developer Migent, Inc., but the suit involves more traditional trade secret theft allegations, rather than software patent infringement. Ashton-Tate has charged former Ashton-Tate developers now working for Migent with using proprietary information in the development of future products. Migent, in turn, has sued Ashton-Tate for violation of antitrust laws.

Senior editor Douglas Barney contributed to this story.

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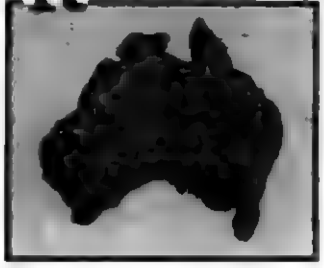

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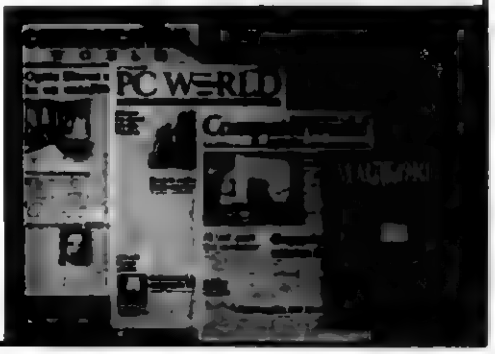

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EMPLOYMENT TODAY

Money's not the only object

Job hoppers seek technical challenges, career growth

BY MICHAEL BALL
SPECIAL TO CW

Marvin Rubenstein, a senior EDP consultant for a large corporation, has changed jobs 15 times during his 33-year data processing career. Eight of those moves were either for the same money or for less.

"The work I left was so mundane, so prosaic, so dead-endish that when someone offered me the intellectual stimulation, I jumped at it," he says.

Rubenstein, like many of his peers in the DP field, has reached a level of experience at which creative challenge often outweighs a salary increase when it comes to making a career move.

According to recent surveys by Perlin Associates, Inc., a New York employment consulting company, when managers look at their current positions, they usually evaluate the following factors:

- First, whether they are working with technology they enjoy.
- Second, whether career advancement is open to them.
- Third, whether they are receiving sufficient compensation.

"We tell companies that these people find the challenge in the technology," says Roger O'Connor, a Perlin consultant. "They want to be in a position to define the technical specs and go the full life cycle of the project. They want to be part of the team."

In a generally well-paid profession, money is a major issue only for those with less experience, according to Arlen Lessin, president of Communications Consulting Corp., a market research firm in New York.

"Programmers tend to start at such a low level that they have to change companies to advance. People tend to get more money by making changes, even if they're fired," Lessin says.

But even at the programmer level, the creative nature of DP people and many other professionals is a factor in whether they leave or stay with a given company, says James Matteoni, MIS vice-president for Mattel, Inc. in Hawthorne, Calif.

"Programmers, analysts and technical support people in general tend to be artists hired to create something. Then, they want to finish what they start in a year or two. If they're in the middle of a project, they won't leave for 10% more salary. But if they're at the end, they may, if they don't see something else good where they are," he says.

Industry trends also affect DP turnover. In the Silicon Valley area, there has been less job changing this year because of recent corporate mergers and acquisitions.

Seeing their peers lose their jobs because of corporate takeovers causes many DP professionals to hold onto secure positions if they have them. In addition, the fallout from a merger can cause the market to become more competitive. For example, when Wells Fargo Bank, N.A. in San Francisco merged with Crocker National Bank in Los Angeles, many MIS professionals lost their jobs because there was a lot of duplication of positions, says Bob LoPresto, a recruiter with Korn/Ferry International, a Los Angeles-based executive recruiting firm.

These trends are reflected in Korn/Ferry's survey of present turnover rates. The West Coast rate is about 6%, in comparison with the national average of 10% for DP professionals. In addition, DP turnover rates vary by industry, LoPresto says.

"Some companies don't have enough money to invest in MIS. This is particularly true in low-margin industries such as banking and insurance," he points out, "and not at all in high-margin ones like pharmaceuticals."

In the Northeast, the DP turnover rate is also lower than usual this year because of recent layoffs at several major employers, such as Wang Laboratories, Inc., says Jack Erdlin, president of the search firm Management Dimensions, Inc., based in Wellesley, Mass. "Large layoffs make DP professionals a bit cautious," Erdlin suggests.

> "JOB hoppers find the challenge in technology — they want to define the technical specs and go the full life cycle of the project. They want to be part of the team."
>
> ROGER O'CONNOR
> PERLIN ASSOCIATES, INC.

At the same time that many employees have become more cautious, companies have become more clever about keeping them. Employment consultant O'Connor advises his corporate clients to "concentrate on other issues rather than just keep giving salary hits."

Besides ploys such as counteroffers of both money and more exciting projects, employers are using stock options to keep employees.

"In the past year, options are becoming quite valuable. Some people could be leaving a lot of dollars on the table if they left," Erdlin says.

Because options are often fully exercisable only over a period of three or more years, he says, "this helps lock people in."

The single most important thing a company can do to keep high-level MIS people is "treat them as a key part of the company instead of just a support function," Mattel's Matteoni says.

He defines another crucial area as returning loyalty for loyalty demanded. Companies often cut MIS budgets and fire people too quickly. Then many DP professional are loyal only to the MIS organization, the project or the boss. "When the boss leaves or the project finishes, they look around," Matteoni continues.

As a result, "Many kids leave with a bitter taste in their mouth," he adds. More and more of these professionals are not even looking for salaried jobs with other companies. Instead, they become independent contractors, often with the company from which they left or were fired.

Matteoni says he expects this trend to continue, at least until more companies give MIS greater influence.

Michael Ball is a Boston-based freelance writer.

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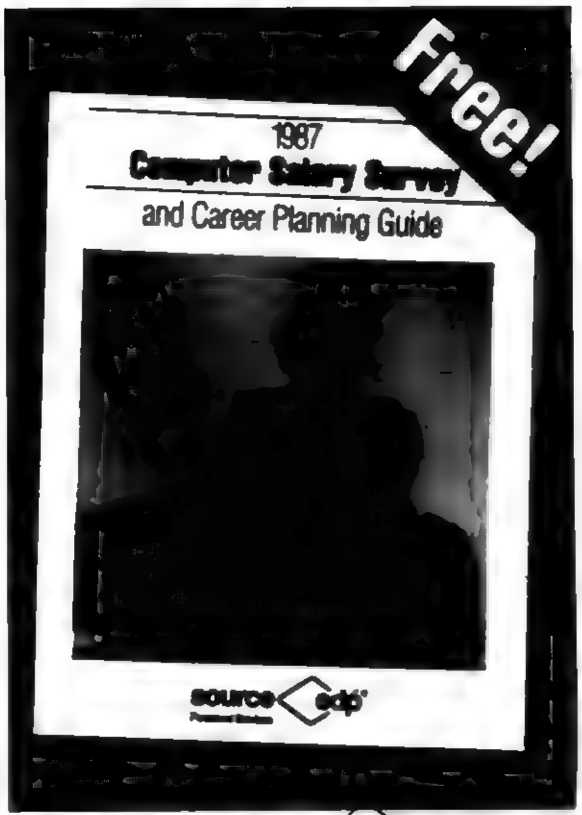

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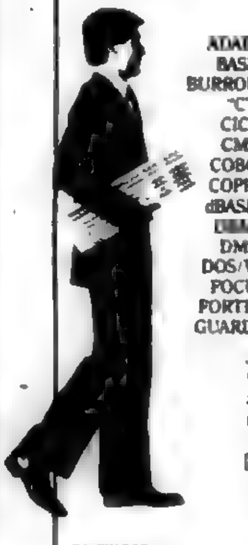

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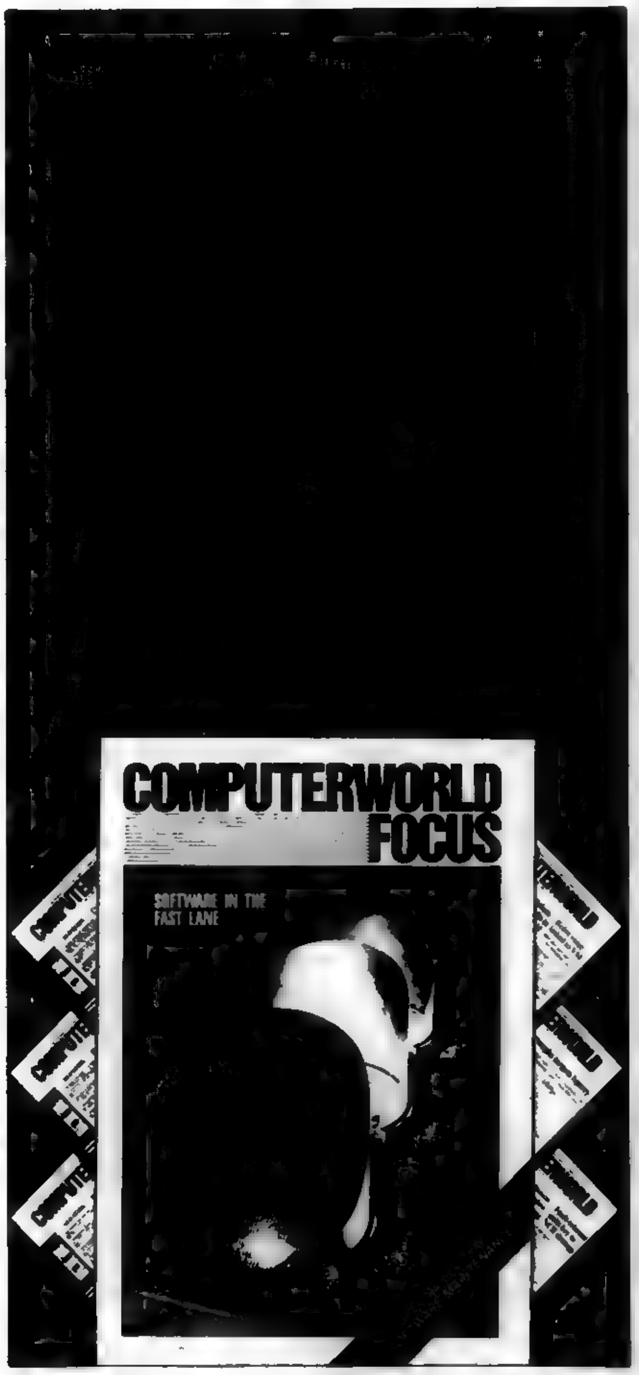
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ADVERTISERS INDEX

AGS	39
Amherst Information Systems	31
Applied Management	70
Artificial Intelligence	53
Atrium Info Group	38
AT&T	48-49,60-61
Bell Atlantic	65
BI Moyle Associates	54
Business Recovery Systems	43
Canaan	30
CGI Systems	95
Chen & Associates	61
Cincom	47,64
Communication Networks '87	25
Computer Tech Group	25
Computer Corp. of America	5
Cullinet	56/57
CW Circulation	90
CW Corporate	75
CW NASA	76-77
CW PC World	46
CWIMS Australia	74
CWIMS France	74
Data Design	96
Data General Corp.	26-27
Data South	14
Digital Equipment Corp	22-23
Flagstaff Engineering	80
Hewlett-Packard	36-37
Hughes Aircraft	55
Info Dimensions	20-21
Integral Systems	18
Interface Group	52,63
ITT Courier	32-33
Local Data	12
Lotus Development Corp.	68-69
Micom	10
Mike Murach	9
Mitrol	19
MSA	44-45
Multi-Tech Systems	35
National Advanced Systems	31
NEC	24,58-59
North Ridge Systems	15
Novell	50
On-Line Software	72-73
Oracle	11,29
Radio Shack	42
Realia Inc.	34
Relational Technology	40
SAS Institute	28,41
Scientific Computer	62
Syncsort	3
Telex	56
Teltech	43
3M File System Management	70-71
Tone Software	13
Uccel Corp.	54
VM Software	7
Wyse	66

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Publishing craze lures DEC entry

BY NINAMARY BUBA MAGINNIS
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. announced last week VAX Integrated Publishing (VIP) solutions, a group of applications that run on hardware from the Microsoft Corp. MS-DOS-based Vaxmate to the largest VAX systems.

The solutions include DEC hardware, software and communications with third-party products from Aldus Corp., Microtek Labs, Inc., Information Dimensions, Inc., Adobe Corp., Interleaf, Inc. and Datalogics, Inc.

"DEC more than anyone else has identified the real topology of what's going on in the publishing environment. These guys have addressed every point on the issue," said David H. Goodstein, president and chief executive officer of Interconsult, a Cambridge, Mass.-based consulting firm.

Work group system

The VIP Vaxmate solution is positioned as a work group electronic publishing system for improved quality of internally produced documents such as newsletters and reports. The Vaxmate system works with MS-Windows, MS-Chart, WPS-plus and Aldus Pagemaker desktop publishing software. Options include a desktop laser Adobe Scriptprinter and Microtek's Model MS-300A image scanner.

The Vaxmate allows users to access publishable information that exists on corporate data bases and share higher speed peripherals, such as the Printserver 40, the vendor said.

The Vaxstation Publishing Solution System is a Vaxstation 2000 system coupled with Interleaf's Technical Publishing Software. The Vaxstation system is designed as a diskless environment configured in a local-area Vaxcluster in which users share central storage and peripherals from a controlling boot node.

The VAX Departmental Publishing Solutions consists of any VAX system with publishing software that can be accessed from the DEC All-In-1 office menu. Information Dimension's Basis can also run with the system.

Dedicated solutions

DEC also offers dedicated VAX-based solutions to produce technical documentation for central production publishing departments in industries such as aerospace or defense. The systems include Datalogics publishing software that features a DX filter to accept text input from any DEC WPS-plus word processor. Datalogics software is available directly from the vendor.

In addition, DEC announced a low-cost LN03 laser printer, Scriptprinter. Scriptprinter's resident Postscript page description language prints publishing-quality pages with text, graphics and scanned images, the vendor said. It costs $6,295 and will be available in May.

The Vaxmate VIP Publishing System is priced at $6,670; the system including the Scriptprinter costs $12,190. Both systems are deliverable within 90 days, according to the vendor.

A six-station clustered Vaxstation Publishing Solution System costs $154,060 with a 90-day delivery. Technical Publishing Software is priced separately and is available directly from Interleaf.

VAX Departmental Publishing Solution prices start at $41,691 and are available now. Basis software is priced separately and can be purchased from Information Dimensions.

Data base

FROM PAGE 1

Inc. plans to announce a distributed version of its relational product, Supra, by year's end.

IBM is known to be working on products as a result of its R Star, or Starburst, research project, an outgrowth of the Project R relational data base team effort. Its recent announcement of the Distributed Data Management (DDM) system for the PC "is a harbinger of things to come," says Peter Levine, vice-president of the Gartner Group, Inc., in Stamford, Conn. IBM is likely to extend the reach of its SQL soon to non-370 machines, which would provide a common data access language across multiple operating systems the way PC DDM is supposed to allow a PC programmer to access files across System/36, 38 and 370 family hosts.

Although distributed data base products have existed for several years, most of them do not take advantage of relational technology or SQL, which are viewed as providing the most effective underlying technology for distributed data bases. The nonrelational products have been available since roughly 1982, "but they haven't gone anywhere," Levine says. "We're looking forward to the day when we can access data across divisional lines, and DB2 appears to be a product that will do it," says Joyce Bischoff, senior data base analyst of the multinational firm, ICI Americas, Inc., of Wilmington, Del.

This kind of user appetite is not likely to be satisfied anytime soon, according to IBM observers. Distributed data base products require an active data dictionary, and DB2 is still stuck in the nonactive, catalog stage. Although the catalog lists where data is located, it does not automatically incorporate additions or changes to the data base, and it is not integrated with DB2 applications, says Shaku Atre, president of Atre International in Rye, N.Y.

The two pioneers of distributed data base, Oracle and RTI offer data dictionaries with their SQL-based, relational DBMS, but in Oracle's case, each node on the SQLStar network has its own dictionary, with the network querying each site to find where data is located.

With Ingres/Star from RTI, the dictionary functions more as a central repository — sitting on one node — but it still falls short of the global dictionary that would be able to locate data anywhere on the network controlling related functions and updating local dictionaries.

"If you're going to solve 100% of the problem, you must have a global dictionary," says Nick C. Rini, president of Business Software Technology, Inc. in Westboro, Mass., and former Cullinet vice-president for software development.

> "GOOD data base design is important for a centralized DBMS. It's even more important with distributed DBMS."
>
> STEPHEN A. FOX
> COMPUTER CORPORATION OF AMERICA

IBM, with its multiple hardware systems, is judged by many to face the greatest challenge in coming up with a global dictionary. Because of this, Atre says, DB2 is "three or four releases away" from offering full distributed DBMS capabilities. "I don't see how IBM can get a product out before late 1988," adds the Gartner Group's Levine.

Another obstacle is updating the data on related data bases. Although no insuperable technical obstacle exists, the update process must cope with the hazard that the system at one site will fail as other data bases are changed, leading to inconsistent data.

While both Oracle's SQLStar and Ingres/Star are advertised for their ability to read data at multiple sites, they get around the many technical requirements of multisite updating by executing one update at a time.

Stephen A. Fox, director of a project at CCA to develop an Ada relational data base management system, says the still unannounced product will be able to execute multisite updates through a locking technique that freezes access to the target records, checks to make certain each site is able to update and then issues a commit order and executes a final check.

Skeptics of distributed data bases say such extensive locking systems are likely to leave records frozen at multiple sites if one site fails until the down site can be re-established. Fox claims CCA has found a way to complete or cancel the update across a failed site.

Some of the technical problems are going to have to be minimized by the way distributed DBMS is implemented, Fox says. "Good data base design is important for a centralized DBMS. It's even more important with distributed DBMS," he adds.

He and other sources claim the chief aim of distributed data base designers should be to maximize processing at local sites and minimize the amount of time needed on the network reading remote data and updating it.

Each vendor sells a networking product that ties the DBMS to other DBMSs in the distributed system. ADR, Cincom and Information Builders, Inc. have announced support for IBM's LU6.2 peer-to-peer networking protocols, which are widely expected to be the basis for IBM's own distributed product.

In another realm, IBM has sown confusion by leaving in doubt how many product lines will be included in its distributed approach. Its DDM product for the personal computer allows a PC user to download data from other nodes, but PCs cannot make their data bases available to other systems. IBM 370s make their data bases available but cannot access other systems' data. As a result, only System/36s and 38s can function as full, distributed nodes, and Cincom is steering clear of DDM for now, says Vicky Duckworth, data communications product manager.

Cullinet, which plans to bring out a relational DBMS for the DEC VAX this fall, is going to follow it up with a similar DBMS for the IBM 9370 low-end mainframe. It expects to then start offering pieces of a global dictionary that will help distributed DBMSs span the two hardware worlds, says Vice-President for Marketing Jeff Papows.

In a similar vein, RTI is working on an IBM VM/CMS version of Ingres/Net, which would allow Ingres to run on the 9370 and one day tie into the popular version of Ingres on the VAX. Information Builders is aiming to provide a distributed version of its Focus fourth-generation language and DBMS that will be able to access a wide range of other DBMSs. But full capability will take years to implement, Information Builders President Gerald Cohen says.

Such use of distributed data bases on a large scale, however, is still several years off. Few customers are buying SQLStar for that purpose, says Oracle's Vice-President of Marketing Peter Tierney. "VAXes haven't been integrated into the glass house yet," he says.

Judge throws out shrink-wrap law

BY PEGGY WATT
CW STAFF

NEW ORLEANS — A federal district judge recently tossed out a Louisiana law that validated shrink-wrap software licenses, saying the legislation violated federal copyright law that lets users make back-up copies of programs.

Vault, Inc., located in Westlake Village, Calif., which develops copy-protection schemes, is expected to appeal the ruling.

Vault took the issue to court nearly two years ago in the first test of the law. Vault sued Quaid Software Ltd. of Toronto regarding Quaid's Copywrite program, which allows users to make backups of copy-protected software.

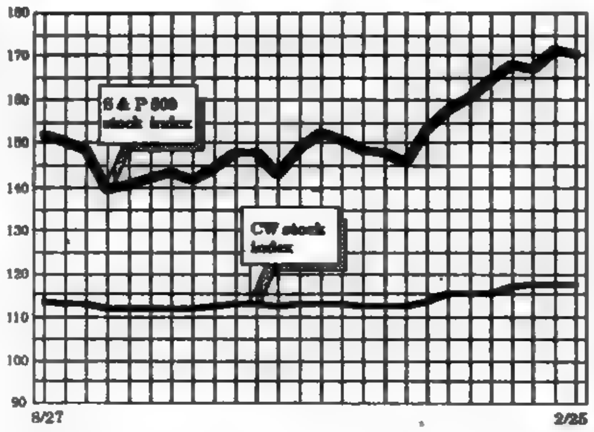
The statute, which was the first of its kind in the country, prohibited unauthorized duplication and distribution of software under the terms of the so-called shrink-wrap license contained in software packages.

Judge Frederick J. Heebe's ruling, issued nearly a year after testimony ended, cited a federal copyright statute that states a user may make archival backups if the property being copied is subject to mechanical or electrical failure, according to attorneys involved in the case.

Vault attorney Jarrell Godfrey contended the federal law should not apply to diskettes.

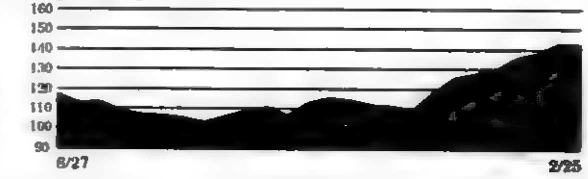
"We stuck a pencil through one diskette in court, stuck it in the computer, and it worked," he said. "We contend diskettes aren't subject to such damage and protected under that federal law."

STOCK TRADING INDEX

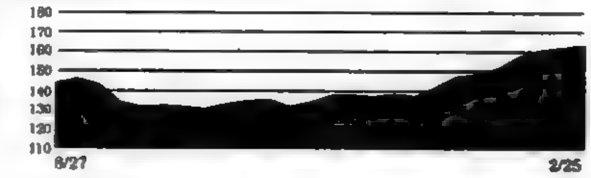


Indexes	*Last Week*	*This Week*
Computer Systems	142.5	**142.2**
Supplies & Accessories	161.7	**163.0**
Software & DP Services	132.2	**131.5**
Semiconductors	106.1	**106.2**
Peripherals & Subsystems	129.7	**127.8**
Leasing Companies	121.1	**119.0**
Composite Index	117.2	**117.1**
S&P 500 Index	170.7	**169.8**

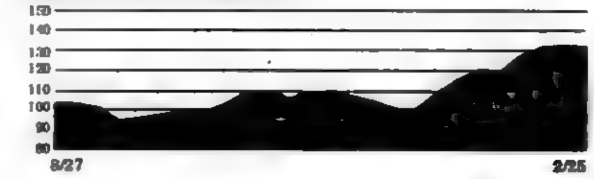
Computer Systems



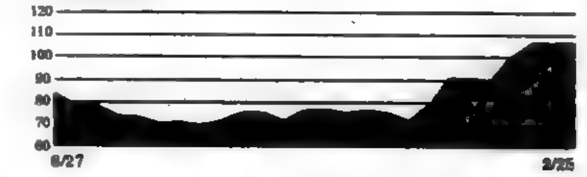
Supplies and Accessories



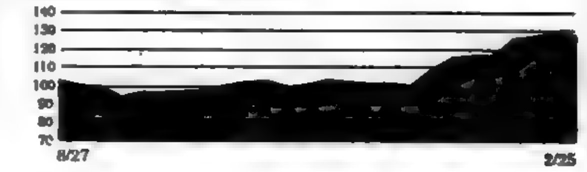
Software and DP Services



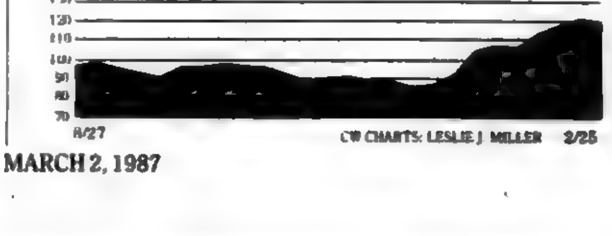
Semiconductors



Peripherals and Subsystems



Leasing Companies



CW CHARTS: LESLIE J. MILLER

Stock trading summary

CLOSING PRICES WEDNESDAY, FEBRUARY 25, 1987

Computer Systems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4.75	+0.3	+5.6
O	ALTOS COMPUTER SYS	19	10	16.75	-0.4	2.2
A	AMDAHL CORP	40	14	38.75	+0.0	+0.0
O	APOLLO COMPUTER INC	23	9	20.88	-0.6	2.9
O	APPLE COMPUTER INC	70	24	69.13	+5.6	+8.9
N	AT&T	28	22	23.25	-0.3	1.1
O	C P T CORP	6	3	4.88	+0.8	+18.2
N	COMPAQ COMPUTER CORP	35	12	32.13	+0.3	+0.8
A	COMPUTER CONSOLES INC	12	6	9.75	-0.5	4.9
O	CONCURRENT COMP CORP	24	11	14.50	-0.5	-3.3
N	CONTROL DATA CORP	31	20	29.75	-0.3	-0.8
O	CONVERGENT TECH	12	4	10.13	-0.5	-4.7
N	CRAY RESH INC	121	65	117.88	+0.4	+0.3
O	DAISY SYS CORP	15	8	11.63	-0.5	-4.1
N	DATA GEN CORP	45	25	35.38	2.3	-6.0
N	DATAPOINT CORP	9	4	5.50	+0.4	+7.3
N	DIGITAL EQUIP CORP	158	76	155.00	+0.0	+0.0
N	FLOATING POINT SYS INC	46	11	15.38	+0.0	+0.0
N	GOULD INC	30	15	19.25	-0.8	3.8
N	HARRIS CORP	40	27	37.38	1.6	4.2
N	HEWLETT PACKARD CO	60	36	54.13	2.6	-4.6
N	HONEYWELL INC	84	58	68.63	-0.4	-0.5
N	IBM	162	116	141.75	-3.8	-2.7
O	IPL SYS INC	4	2	2.75	+0.3	+10.0
N	ITT CORP	64	43	62.13	-0.9	1.4
N	M A COM INC	19	12	14.63	+0.8	+5.4
N	MATSUSHITA ELEC INDL LTD	136	65	122.25	4.8	3.7
O	MENTOR GRAPHICS CORP	29	11	27.88	-0.1	+0.5
N	NBI INC	14	8	10.13	-0.5	-4.7
N	NCR CORP	65	40	64.50	+2.3	+3.6
N	PRIME COMPUTER INC	26	16	21.75	-0.6	2.8
O	STRATUS COMPUTER	34	17	32.75	+0.0	+0.0
O	SYMBOLICS INC	15	4	4.13	-0.3	5.7
O	TANDEM COMPUTERS INC	61	22	59.75	+0.8	+1.3
N	TANDY CORP	55	31	52.75	-0.6	1.2
N	TEXAS INSTRS INC	163	103	158.38	1.3	0.8
A	ULTIMATE CORP	35	13	22.63	-0.5	2.2
N	UNISYS	113	58	108.38	3.0	2.7
A	WANG LABS INC - B	22	11	15.00	-0.1	-0.8
A	WANG LABS INC C	22	11	14.75	-0.8	-4.8
N	XEROX CORP	75	49	73.75	+0.6	+0.9

Supplies & Accessories

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	31.00	+0.3	+0.8
N	BARRY WRIGHT CORP	25	14	19.00	+0.1	+0.7
A	DUPLEX PRODS INC	23	18	21.00	+0.5	+2.4
N	ENNIS BUSINESS FORMS INC	34	22	31.88	-0.8	2.3
N	3M CO	140	95	127.50	5.3	4.0
N	MOORE LTD	28	20	23.88	1.0	4.0
O	STANDARD REGISTER CO	50	32	48.25	+3.5	+7.8
N	WALLACE COMPUTER SVCS	50	37	47.25	+2.4	+5.3

Software & DP Services

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	4.00	-0.3	5.9
N	ADVANCED SYS INC	21	12	19.38	1.0	4.9
N	AGS COMPUTERS INC	37	17	36.00	-0.8	-2.1
O	AMERICAN MGMT SYS INC	31	13	29.25	+0.5	+1.7
O	AMERICAN SOFTWARE INC	23	9	22.75	-0.0	-0.0
N	ANACOMP INC	7	3	6.25	-0.3	-4.2
O	ANALYSTS INTL CORP	11	4	10.25	-0.6	5.7
O	ASHTON TATE	30	10	26.50	-0.5	1.9
O	ASK COMPUTER SYS INC	17	9	16.25	-0.6	3.7
O	ASTRADYNE COMP IND	3	1	1.84	-0.0	1.7
N	AUTOMATIC DATA PROC	47	29	44.88	-0.5	1.1
O	BOOLE & BABBAGE INC	11	4	9.00	0.5	5.3
N	COMPUTER ASSOC INTL INC	44	17	39.63	-0.3	0.6
O	COMPUTER HORIZONS CORP	15	10	13.75	0.4	2.7
O	COMPUTER NETWORK TECH	10	4	4.75	0.4	8.4
N	COMPUTER SCIENCES CORP	54	30	49.75	2.5	4.8
O	COMPUTER TASK GROUP INC	19	11	15.63	1.1	6.7
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	16	10	13.00	1.8	11.9
N	CULLINET SOFTWARE INC	16	6	10.38	-0.3	2.4
O	CYCARE SYS INC	17	7	9.25	+0.4	+4.2
O	DUQUESNE SYS INC	33	18	47.50	+2.0	+4.4
N	GENERAL ELEC CO	104	71	102.75	+0.4	+0.4
N	GENERAL MTRS CORP	50	24	37.25	+0.0	+0.0
O	HOGAN SYS INC	15	7	12.88	-0.8	5.5
O	INFORMATION SCIENCES INC	4	1	1.25	-0.3	-25.0
O	INFOTRON SYS CORP	19	7	9.50	-0.3	2.6
O	KEANE INC	16	5	9.00	-0.3	+2.9
N	LOGICON INC	38	22	26.00	2.1	7.6
O	LOTUS DEV CORP	25	8	23.50	-49.5	67.8
O	MANAGEMENT SCI AMER	21	11	20.13	-0.5	-2.5
O	MCI COMM CORP	13	5	5.38	-0.1	-2.4
O	MICOM SYS INC	19	10	14.75	1.5	9.2
O	MICRO PRO INTL CORP	5	2	4.88	+0.7	+16.4
O	MICROSOFT CORP	78	26	74.50	+2.8	+3.8
O	NATIONAL DATA CORP	27	16	24.88	-0.5	2.0
O	ON LINE SOFTWARE INT	23	10	21.63	+3.1	+16.9
O	ORACLE SYS CORP	38	13	35.50	2.0	5.3
N	PANSOPHIC SYS INC	42	25	38.00	1.9	4.7
O	POLICY MGMT SYS CORP	30	15	29.00	+0.3	+0.9
O	PROGRAMMING & SYS INC	13	8	12.25	+3.3	+36.1
O	REYNOLDS & REYNOLDS CO	42	27	36.00	+0.8	+2.1
O	SCIENTIFIC COMPUTERS INC	8	4	7.75	-0.1	1.6
O	SEI CORP	28	15	23.75	-0.5	-2.1
O	SHARED MED SYS CORP	53	30	37.38	-4.1	9.9
O	SOFTWARE AG SYSTEMS INC	22	10	17.88	+1.9	+11.7
O	SOFTWARE PUBG CORP	15	5	14.63	+1.8	+13.6
A	STERLING SOFTWARE INC	21	10	13.38	+1.1	+9.2
N	SUNGUARD DATA SYSTEMS	20	10	19.50	-0.3	1.3
N	UCCEL CORP	34	17	34.25	+0.5	+1.5
N	URS CORP	22	13	21.13	+1.1	+5.6
O	VM SOFTWARE INC	39	12	35.75	2.5	6.5

Semiconductors

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	34	13	21.50	1.6	7.0
N	ANALOG DEVICES INC	25	14	20.50	1.6	7.3
O	ANALOGIC CORP	14	10	11.38	0.6	5.2
N	APPLIED MAGNETICS CORP	25	13	23.38	0.4	1.6
O	AVANTEK INC	23	14	17.75	0.3	1.4
O	HADCO CORP	6	3	4.88	+0.4	+8.3
O	INTEL CORP	39	16	37.75	+0.8	+2.0
O	MICRO MASK INC	7	2	5.75	+0.8	+15.0
N	MOTOROLA INC	51	34	49.00	1.0	2.0
N	NATIONAL SEMICONDUCTOR	16	8	15.75	+0.4	+2.4
N	TERADYNE INC	30	16	22.75	0.5	2.2

EXCH: N – NEW YORK, A – AMERICAN, P – PACIFIC, B – BOSTON,
L – NATIONAL, M – MIDWEST, O – OVER THE COUNTER, S – SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Peripherals & Subsystems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	9.00	+0.3	+2.9
A	ANDERSON JACOBSON INC	3	1	2.13	+0.0	+0.0
O	AST RESH INC	27	11	18.25	-0.5	2.7
O	AUTOTROL CORP	10	5	8.50	-0.5	5.6
O	AVANT GARDE COMPUTING	7	3	4.00	+0.0	+0.0
O	BANCTEC INC	13	6	11.38	+0.5	+4.6
N	BOLT BERANEK & NEWMAN	60	37	53.75	3.8	6.5
A	CETEC CORP	9	5	5.88	-0.1	-2.1
A	COGNITRONICS CORP	6	2	3.00	-0.1	-4.0
N	COMPUGRAPHIC CORP	27	16	22.25	+0.0	+0.0
N	COMPUTERVISION CORP	23	10	21.00	-0.9	4.0
M	CONRAC CORP	18	12	17.50	+0.9	+5.3
A	DATAPRODUCTS CORP	18	11	14.13	-0.4	2.6
A	DATARAM CORP	18	7	7.25	+0.0	+0.0
O	DATA SWITCH CORP	9	5	6.75	+0.0	+0.0
O	DATUM INC	7	4	6.25	+0.1	+2.0
N	DECISION INDS CORP	15	8	11.50	-0.4	3.2
O	ENDATA INC	9	5	8.75	+0.0	+0.0
O	EMC CORP	34	11	28.75	3.3	10.2
O	EVANS & SUTHERLAND	37	20	34.00	2.3	6.2
N	FLOATING POINT SYS INC	46	11	15.38	+0.0	+0.0
O	GANDALF TECHNOLOGIES	9	5	8.63	+0.3	+3.0
N	GENERAL DATACOMM IND	15	8	11.00	1.5	12.0
N	HAZELTINE CORP	30	16	29.75	+0.0	+0.0
O	ICOT CORP	13	6	11.88	+1.4	+13.1
O	INFORMATION INTL INC	18	13	14.50	+0.3	+1.8
O	INTECOM INC	7	3	3.00	+0.0	+0.0
O	INTERLEAF INC	15	8	10.63	-0.3	2.3
O	MEGADATA CORP	7	2	6.13	+0.1	+2.1
A	MSI DATA CORP	15	10	14.25	-0.4	-2.7
N	NASHUA CORP	29	19	27.38	1.0	3.5
O	NETWORK SYS CORP	19	10	17.13	1.3	6.8
N	NORTH AMERN PHILIPS CORP	48	35	41.75	2.0	4.6
N	NORTHERN TELECOM LTD	45	27	41.88	1.9	4.3
O	NOVELL INC	40	14	37.25	0.8	2.0
N	PARADYNE CORP	11	4	5.88	+0.3	+4.4
A	PENRIL CORP	9	4	4.63	1.3	21.3
N	PLESSEY PLC	38	24	30.00	-3.6	-11.2
O	PRINTRONIX INC	15	10	11.50	1.1	8.3
O	QMS INC	16	10	10.13	+0.0	+0.0
O	RAMTEK CORP	7	3	4.88	-0.1	2.5
N	RECOGNITION EQUIP INC	27	10	20.00	-0.5	2.4
O	SCAN TRON CORP	19	11	11.50	-0.6	-5.7
N	SCIENTIFIC ATLANTA INC	15	9	15.25	+0.4	+2.5
O	SEAGATE TECHNOLOGY	42	9	37.13	2.1	5.4
N	STORAGE TECHNOLOGY	7	2	4.13	0.8	15.4
O	SUN MICROSYSTEM INC	32	11	28.63	2.3	7.3
A	T BAR INC	8	5	7.88	0.1	1.6
A	TAB PRODS CO	18	12	17.88	+0.3	+1.4
O	TANDON CORP	8	2	3.50	-0.1	3.4
A	TEC INC	7	3	3.75	+0.0	+0.0
N	TEKTRONIX INC	43	27	39.75	1.9	4.5
O	TELEVIDEO SYS INC	4	2	2.63	+0.0	+0.0
N	TELEX CORP	97	52	96.88	+6.1	+6.7
N	TIMEPLEX INC	36	14	34.88	+1.1	+3.3
N	TITAN CORP	12	6	7.50	-0.3	3.2
O	VISUAL TECHNOLOGY INC	1	0	0.44	+0.0	+0.0
O	WYSE TECH	28	13	27.75	+0.3	+0.9

Leasing Companies

EXCH		52 WEEK RANGE (1)		PRICE CLOSE FEB 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	27	15	25.63	1.4	5.1
N	CONTINENTAL INFO SYS	14	7	12.25	0.6	5.8
O	FINALCO GROUP INC	5	2	2.88	-0.1	4.2
O	PHOENIX AMERN INC	8	3	6.75	+0.0	+0.0
O	SELECTERM INC	12	5	5.75	-0.3	-4.5
N	U S LEASING	49	38	48.63	+0.0	+0.0

OTC stocks soar

Apple, Microsoft, Tandem achieve 52-week record highs

The national over-the-counter (OTC) composite index reached a record close of 422.93 last Thursday, and, appropriately, three of the index's most popular computer stocks achieved 52-week highs on the same day.

Technology companies make up 24% of the market listings, and the recent strengths of most OTC computer stocks have helped fuel the market surge.

Thursday's big three were Apple Computer, Inc., which achieved its high of 69⅛ on Wednesday and remained unchanged Thursday; Microsoft Corp., which upped 2¾ to 77⅛; and Tandem Computers, Inc., which rose ⅜ to 60⅛.

Joining this elite group with new highs on Thursday were Wyse Technology, up ¼ to 28, and Autodesk, Inc., which rose ¾ to 69¾.

Many other OTC computer issues are trading very close to their highs for the year.

Among them are On-Line Software International, which closed Thursday at 22½; Mentor Graphics Corp., 28⅝; Intel Corp., 38; Evans and Sutherland, 36; and ASK Computer Systems, Inc., at 17.

CLINTON WILDER

Apple brackets Unix, Ethernet

BY PATRICIA KEEFE
CW STAFF

LOS ANGELES — For the second time in little more than a month, Apple Computer, Inc. will highlight connectivity at a major product unveiling.

Along with the new Macintoshes (see story page 1), Apple will unveil both Ethernet and Unix networking products.

Unisoft Corp. has incorporated advanced connectivity features into the A/UX operating system, a Unix implementation developed for Apple by Unisoft.

A/UX features three connectivity modules: Appletalk for Unix; B-Net, Unisoft's implementation of Transmission Control Protocol/Internet Protocol (TCP/IP); and Unisoft NFS, which is licensed from Sun Microsystems, Inc.

Appletalk for Unix allows high-speed remote laser printing and facilitates the connectivity of network applications under Unix, as well as connectivity to other Appletalk networks.

B-Net provides network connectivity to more than 100 other TCP/IP-based Unix and non-Unix computers, Unisoft said.

Unisoft NFS allows transparent file access between itself and heterogeneous computer operating systems — such as Digital Equipment Corp. VMS, Microsoft Corp. MS-DOS, Unix System V and Version 4.2.

However, personal computers and the Macintosh on Appletalk cannot communicate with Appletalk for Unix. This is one area where Apple may choose to add value to A/UX.

Unisoft retains the right to relicense Appletalk for Unix to other manufacturers. This could provide other Unix vendors with an avenue into the Apple world.

Increasing its penetration into the DOS world, Apple will market the $899 Ethertalk card, developed by Ethernet vendor 3Com Corp. in Santa Clara, Calif., for the Macintosh II and SE.

Compatible with 3Com's 3+ software, Ethertalk allows users to exchange files and talk to IBM Personal Computers or Ethernet or Appleshare servers.

The new Macs will also gain indirect access to IBM mainframes as a result of 3Com's recently introduced internetworking capability (see story page 9).

Users of 3Com's 3+ software can internetwork 3Com Ethernet and either 3Com or IBM Token-Ring networks together. This means that Macintosh II or SE users linked to a 3Com Ethernet network can exchange packets with a token-ring network, sending and receiving data to and from an IBM mainframe in this manner, according to a 3Com source.

Mac ripens

FROM PAGE 1

available in the closed Macintosh system.

"Apple got a toe-hold into corporations last year with desktop publishing on the Mac and will continue to pry that door open with these products," said Norm DeWitt, hardware analyst for market research group Dataquest, Inc. in San Jose, Calif.

Expected to make their debuts are the $2,899 Macintosh SE, which has the familiar Mac chassis and Motorola, Inc. 68000-based microprocessor but which now includes a single Apple Desktop Bus (ADB) expansion slot; and the Motorola 68020-based Macintosh II, a three-piece system with six Nubus internal slots and color support.

The Macintosh II sells for $3,899, with a color monitor priced at $999 and a monochrome monitor priced at $399. Each system has a choice of keyboards — the standard Macintosh style for $129 or an extended keyboard with function keys for $229.

The Macintosh SE is scheduled to be available immediately, while Apple representatives said the Macintosh II will not ship until late summer.

Apple is positioning the Macintosh line as a medium to high-end, equivalently priced, alternative technology to the IBM PC, according to Jean-Louis Gassee, Apple's vice-president of product development.

Apple is also slated to offer some new options and add-ons that range from internal hard disk drives for each of the new models to video cards, tape backup systems and controller cards that enable the new models to read MS-DOS format data. However, the new Macintoshes will not be able to run MS-DOS programs. The DOS adapter cards cost $129 for each model, and Apple reported that it will sell an IBM PC-compatible standard external 5¼-in. disk drive for $399.

More connectivity to that PC world is available with a $899 Apple Ethertalk card that reportedly will connect the Macintosh II to any Ethernet network.

Even the MS-DOS file compatibility will not convert heavily IBM shops to Macintosh, but it might eliminate some objections, said Tim Bajarin, executive vice-president of Creative Strategies Research International in San Jose, Calif.

"I don't expect corporate America to turn around and say, 'this is my machine,' " Bajarin said. "But the graphics workstation-based projects and desktop engineering will take a look at the Macintosh II, which will have a crack at some interesting niche markets."

Apple also has the chance to lobby hard while the MS-DOS market is splintered, with users still awaiting a new operating system and IBM dragging its feet about new PC models, commented John Sculley, Apple president and chief executive officer.

The Macintosh's ready availability and built-in system has brought increased interest from third-party developers. Apple said more than three dozen developers have software and accessories for the new Mac line.

The machines were a hot topic at last week's Personal Computer Forum, a conclave of PC industry executives held in Phoenix. "If I was doing a new product line, I would find a way to spend the money to implement it on both the Mac and the IBM PC and let the market decide," said Mitchell Kapor, former chairman of Lotus Development Corp.

Among the third-party products are add-on boards that accelerate performance and provide 80286 coprocessors, high-resolution monitors and applications software new to the Macintosh world. The following are new offerings:

- Radius, Inc. in Sunnyvale, Calif., developed the Full Page Display, a $1,995 15-in. high-resolution monitor that attaches to any model of the Macintosh line, and a 68020-based Performance Accelerator board for the Macintosh SE Plus and 512E.
- General Computer Co. in Cambridge, Mass., plans to come out with the the Hypercharger 020 for the Macintosh SE. This speed-up board reportedly will have a 16-MHz 68020 microprocessor used in the Macintosh II plus 1M byte of memory, upgradable to 4M bytes, and an optional math coprocessor, at a cost of $1,499.
- AST Research, Inc. in Irvine, Calif., has developed five expansion boards to enhance MS-DOS compatibility and speed.
- Dayna Communications in Salt Lake City plans to release the $595 Daynafile, an external smart disk drive that plugs into a Macintosh Plus, SE or II small computer systems interface port to read and write MS-DOS disks.
- Sigma Designs, Inc. in Fremont, Calif., developed 15- and 19-in. high-resolution monitors for the Macintosh line. The company's new *Laserview* display provides 1,664 dots by 1,200 lines and was previously available for MS-DOS systems.

INSIDE LINES

Plenty of cash to play with. A settlement appears to be imminent in the criminal case against Paradyne for allegedly defrauding the U.S. Social Security Administration in 1981. The trial, involving Paradyne and several of its executives, scheduled to begin today in Tampa, Fla., was removed from the trial calendar last week, according to Joe Magri of the U.S. Attorney's Office in Tampa. Paradyne has set aside an $8 million provision for future legal and/or settlement costs and has reiterated to securities analysts last week that it hopes for a pretrial settlement.

IBM holds the keys. According to software developers, IBM is showing beta versions of a low-end Intel 8086-based microcomputer, locked, locked and locked. The machine, aimed at the home and educational markets and, some say, set for an April announcement, is padlocked so developers can't see its inner workings.

Can we talk? Ontio Computer Products, which has developed a $29.95 Lotus 1-2-3 "work-alike," says it is ready to ship, except for one small problem. The firm is unsure whether Lotus intends to sue for copyright infringement. The small company, staffed by former Software Arts executives — the firm that brought us Visicalc — sent a letter more than two weeks ago to Lotus Chairman Jim Manzi, requesting word on whether the product, Ontio 259, is an infringement of Lotus's copyright. No word yet.

We've got good news and bad news. Eastman Kodak, scheduled to unveil optical storage products this week, confirmed that its electronic publishing units will lay off more than 100 employees, or 15% of their combined work forces, by March 13. The layoffs at the Atex and Eikonix subsidiaries stem from consolidating some Atex and Eikonix administrative and manufacturing functions and the refocusing of Atex on newspaper and magazine publishing markets.

To kill a VAX-killer . . . An analyst at Alex Brown & Sons speculates that DEC will release the next version of the Microvax as early as the third quarter of this year. Joseph Payne says the machine may use a new, low-power consumption CMOS chip with doubled performance. The performance of the MOS chip used in the VAX 8300/8200 could also be doubled. Those actions would put the Microvax through VAX 8300 lines in direct, intensified competition with the higher priced IBM 9370 line, Payne says.

Hail Mary! DEC is bringing in a queen to preside over its Decworld Exposition. The luxury cruise ship Queen Elizabeth II will moor at Boston's Commonwealth pier for the show's scheduled two-week run — from Sept. 8 to 18. DEC has decided to hold shows in the U.S. and Europe alternately and hold them for two weeks instead of one. Vertical industries will be invited to participate on particular days.

Let's get physical. Unisoft is involved in "preliminary discussions" with both IBM and Sun Microsystems to launch a project that would port the Network File System, Sun's file-sharing software, to the IBM VM operating system, according to Unisoft's Mark Belinsky, vice-president of marketing and sales. "There's better than a 50% chance that a project will be under way within three to four months," he says. Currently, NFS can be used with various versions of the Unix operating system.

Spreading out. Late last year, Lotus quietly acquired Future Software, a Salt Lake City, Utah-based mainframe spreadsheet software firm and producer of Future-Calc.

You think the action's on Dynasty and Dallas? After a prolonged shakeout and slump in the semiconductor industry, there are apparently a number of partnerships and acquisitions in the works. Sources say that LSI Logic is wooing GE's Intersil Division with an eye toward marriage but that money has been a sticking point. TI and Intel are said to be close to signing an agreement for an exchange of ASIC technologies. And Mostek hopes to make something of a comeback thanks to an agreement it apparently has with VLSI Technology, in which VLSI will license Mostek's ASIC technology.

BELIEF #1:

[illegible]

REALITY:

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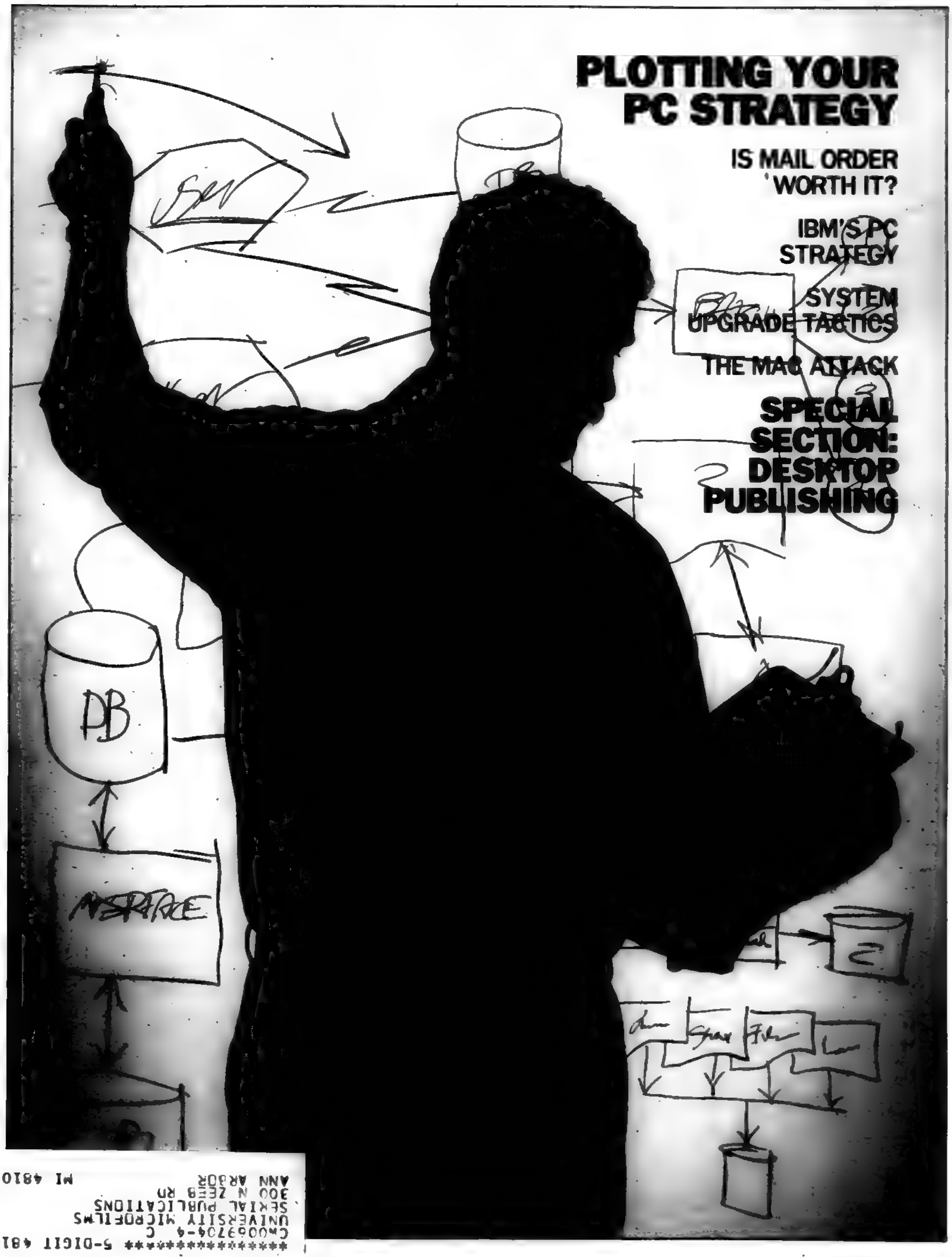

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ABOUT THIS ISSUE

The PC arena is going through another evolution, as you'll find out in this month's issue. In the corporate market, stalwarts like IBM are jockeying for position, while upstarts like Apple with its desktop publishing punch are surging ahead. The 386 continues to get more attention than it does software. And new purchasing channels like mail order give buyers more choices than ever before. Amidst the hubub stands MIS whose job it is to sort through the possibilities and make a smooth transition into the next generation.

Page 36

FEATURES

Is IBM In The PC Business? 15
Brian Jeffery, Jan Lewis and Amy Wohl
Everyone wants to know what the new IBM Personal Computer line will offer. Three noted industry analysts share their predictions about IBM's PC strategy for '87 and beyond.

So, You Want To Be A Beta Site? 19
Stan Kolodziej
Beta testing can provide a competitive edge or be a disaster. Read about companies that have chosen to be beta sites and whether they'd do it again.

The Mac Attack 21
Stan Kolodziej
To the surprise of many, the Apple Macintosh is gaining respect in the business sector. See what has spurred the Mac's growing corporate popularity.

Mail-Order Micros Win Stamp Of Approval 29
Rebecca Hurst
Mail-order firms are starting to make inroads with Fortune 2,000 purchasers. Is this a viable option for MIS, or should it still be a last resort?

Routes To Systems Upgrades 31
Aaron Goldberg
Upgrading your micros for next-generation environments can be a monumental task. This PC analyst explains what such a move entails and if this path is right for your company.

The Strategist And The PC 36
Michael Tucker
Personal computers can make your company more effective, but can they be strategic weapons? Read how users and analysts view the PC and, more important, the information it provides.

Page 23

SPECIAL SECTION:

Desktop Publishing 23
User interest in electronic publishing received its push at the desktop level with the success of the Apple Mac and Laserwriter printer and Aldus Pagemaker software. No matter if an organization's needs are large or small, users' glowing praises for computer-aided publishing abound. Our Special Section story this month, written by *Focus* senior writer Rebecca Hurst, gives you a look at the desktop publishing phenomenon and its future.

Page 7

DEPARTMENTS

Editorial 5
Letters 5
Manager's Corner 6
Q&A 7
Blue Beat 8
Insider 9
News Analysis 11
Products 41
Calendar 44

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Using a PC merely as a stand-alone is rather like using a race car to fetch the groceries. A severe case of under-utilization.

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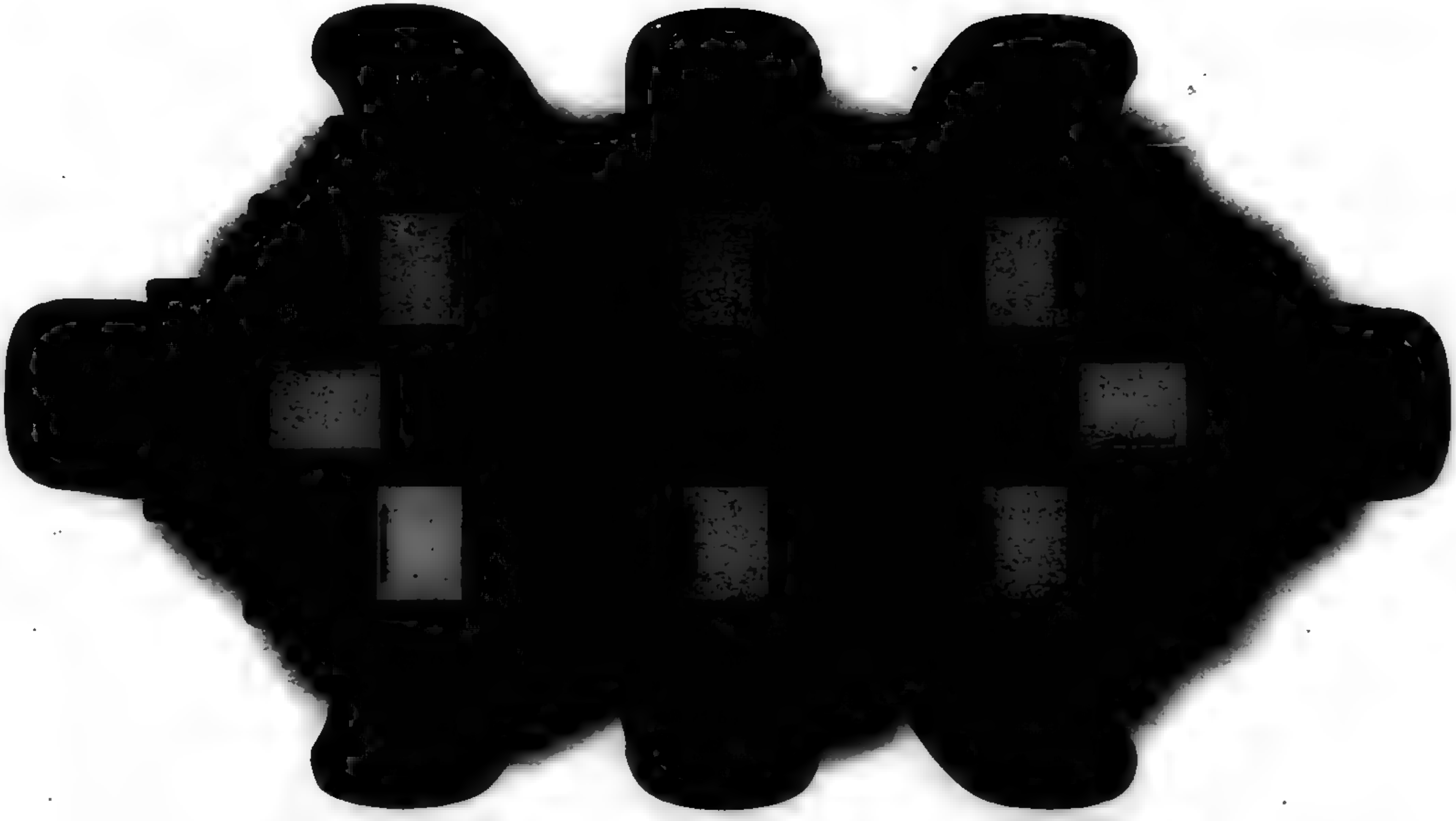

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PC VIEWPOINT

EDITORIAL

MIS Decision Time

MIS managers will be forced to make some hard decisions shortly, and no matter what actions they take, it's unlikely they will emerge unscathed.

A host of personal computer operating systems are due to arrive, each offering specific and very distinct features. These systems include, in addition to the current Microsoft MS-DOS environment, the Apple Macintosh and the IBM soon-to-be-announced, low-end graphics systems. Microsoft's 286 DOS, IBM's Advanced DOS and, eventually, its Intel 80386-based operating system environment are also the subjects of intense speculation.

IBM's operating system for the 386 is expected to be different from Microsoft's 80286 DOS version and also be incompatible with existing applications that do not run in the IBM Advanced DOS mode. This move by IBM is an attempt to close down the clone makers, but it also creates the problem of whether to rewrite incompatible software and how to reformulate it most effectively. Trying to jerry-rig the existing systems probably would either be unsuccessful or would not allow access to some portion of the new capabilities.

On one hand, the new operating systems will offer users increased connectivity and, most important, increased multitasking capabilities that until now were available only on minis and mainframes. On the other hand, migrating to the systems will swallow large amounts of training and support resources and could jeopardize feelings of good will.

PC planners must also commit to the 286 or the 386 system. The shelf life of the 286 must be balanced against the unknown 386 version that is not expected to be introduced for yet another year. MIS must assess whether it is worth the time, expense and confusion to rewrite and upgrade their existing systems to the 286 environment or wait approximately two years or more for the 386 version. This will be one of the most difficult problems to solve in terms of system migration. Few organizations are equipped or willing to make that kind of continuing effort in upgrades for so short a time — especially if the reason for the upgrades is based on a particular vendor's market strategy rather than true user demand.

This is a long-range decision that MIS needs to handle carefully. MIS must continue to establish good working relationships with PC users and managers. If these groups are not offered a smooth, well-planned strategy and transition, MIS/end-user relations could be set back several years. And if large sums of money are sunk into converting systems that only do half the job, MIS/upper management relations are going to be set back, too. MIS managers will be making such long-range decisions amidst a number of unknown variables that may all hold a potential downside.

Ann Dooley

LETTERS

Don't Leave Your Future To Others

I am responding to Kevin Kilpatrick's letter "Graduate Urges Gearing Studies To 'Real World' " in the Jan. 7, 1987 issue of *Computerworld Focus.*

While I do not disagree with Mr. Kilpatrick's assertion that educational institutions do not have enough in the way of co-op programs for providing paid experience, I also believe that institutions are responsive to market forces. Most graduates that I deal with will not consider giving up their summers to pursue co-op programs.

I see an opportunity here for some committed people to get a few business students together to contact companies and set up programs themselves. Market the programs to students, interview candidates, place them in the company and charge a fee. Everybody gains from the experience, and you might even turn a profit.

The bottom line is this: Don't leave your future to others. It is not preordained. Look to your future and invest the sweat today to make it happen. Besides, maybe you'll make my life a little easier when you come to me with some experience that I can leverage into a career position and not "just a job."

Ken Yeager
Executive Recruiter
Data Processing Division
Futures Personnel Services, Inc.

Programmer Knows Cobol Is Healthy

I recently read the "Cobol Shapes Up" article in the Jan. 7, 1987 issue of *Computerworld Focus.* I enjoyed it very much. Of course, as a Cobol programmer for more than 20 years and president of a Cobol tool software house, I already knew that Cobol never died. I now do all my programming on an IBM Personal Computer XT using Realia, Inc. Cobol exclusively.

However, your article omitted Group Operations, Inc.'s Superstructure as one of the automated Cobol restructurers.

David Kleinberg
President
National Database Software, Inc.
West Bloomfield, Mich.

Let's Not Forget Ryan-McFarland

I read with interest the article entitled "Cobol Shapes Up" in the Jan. 7, 1987 issue of *Computerworld Focus* and was somewhat surprised that there was no mention of Ryan-McFarland Corp., supplier of what many consider to be the industry-standard microcomputer Cobol.

Your readers may be interested in the following information about Ryan-McFarland:

- In 1975, Ryan-McFarland developed the first minicomputer 1974 Cobol for NCR Corp.
- In 1977, Ryan-McFarland developed the first microcomputer Cobol for Zilog, Inc.
- Some 500,000 RM Cobols have been installed worldwide since 1978.
- Because it is highly portable, RM Cobol has been verified for more than 250 different CPU operating system environments. Some 3,000 applications have been developed for RM Cobol.
- One of Ryan-McFarland's development team members has long been on the ANSI X3J4 committee that defines and publishes the Cobol standard.

Donald R. Ryan
President
Ryan-McFarland Corp.
Rollings Hills Estates, Calif.

Shown The Errors Of Our Ways

Twice recently you have published statements in *Computerworld Focus* that are directly contrary to widely known facts. In both cases, the statements issue from persons who are presumably experts and probably accepted as such by most of your readers.

You owe it to your readers to set the record straight.

In the article "The Force Behind End-User Computing" [*CW Focus,* Nov. 12, 1986], Aaron Goldberg offers the astounding assertion that "the 386 is the first microprocessor that has full 32-bit data and memory paths." This no doubt comes as a big surprise to Motorola, Inc., National Semiconductor Corp. and AT&T, all of which have had such chips in service for at least two years.

In the article "Blending MS-DOS and Unix" [*CW Focus,* Jan. 7, 1987], Philip Gill contends that Unix "does not run . . . programs such as . . . 1-2-3, Microsoft Word, Multiplan and more." Someone should inform Mr. Gill that dozens of Microsoft Corp. MS-DOS programs have long ago been ported to Unix, including Multiplan and Microsoft Word (which I am using on a Unix machine to write this letter!) The list also includes Ashton-Tate Dbase III, Micropro International Corp. Wordstar 2000 and Computer Associates International, Inc. Supercalc.

W. Brewster Gillett
Portland, Ore.

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Computerworld Focus will be published 12 times in 1987. We welcome letters to the editor and publish those we judge to be of interest to our readers. Letters may be edited for clarity and brevity.

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CW subscribers will continue to receive *Focus* with their subscriptions.

Vendor Support: You Don't Know What You've Got 'Til It's Gone

MANAGER'S CORNER

Jim Young

A good working relationship between MIS and a vendor should be based on trust, understanding and cooperation. Unfortunately, in times of stress and change, relationships can sour and deteriorate. For a business, such circumstances can be tragic because it takes time, money and effort to rebuild a partnership or search for a new one.

Many MIS managers take their vendors for granted. Managers know their hardware vendors supply equipment maintenance and repair services; if problems should arise, managers expect that the vendor will handle the problems quickly, inexpensively and correctly.

The same may be said of major software suppliers. As long as a package works from day to day, MIS takes the vendor for granted and assumes that problem correction, planned modifications and future support will take care of themselves. The same scenario takes place with other vendors such as contract technical assistance, supplies providers, training and research providers, personnel assistance and others.

Vendor support is important. Indeed, the reason this area frequently reaches crisis proportions is that it is key to keeping equipment running, meeting project deadlines, maintaining budgeted spending, training staff and users and all the other functions that allow the DP department to provide services to a company.

Get out the service contract

If a DP manager feels that a vendor is inattentive to his firm's needs, he may resort to invoking the terms of the service contract. This action will often fail to get satisfying results, however. When defining each party's expectations and responsibilities at the service level, contracts many times only deal in generalities. Moreover, these documents define minimal expectations, if anything. If you must resort to using legal enforcement against a vendor, your relationship is already in serious trouble.

A manager can take preventative steps to optimize the working relationship with a vendor. Here are some ways to keep up a successful vendor relations program:

■ *Define your vendors.*

Make sure you know all those that currently serve you or that may be essential for your company in the future. Separate those vendors of secondary impact from those that require exceptional attention.

■ *Define your vendors' roles.*

First of all, start with a contract. The next step should be to proceed with a face-to-face meeting to determine a mutual understanding of the role each party will play. Get answers to questions about charges, problem evaluation, authorization, billing procedures, training, service and the like.

The other areas you will want to clarify will depend upon the type of vendor, the type and level of service you expect and the experience of other DP shops with this vendor.

■ *Clarify the lines of communication.*

You may want to identify the primary contacts that will collect problems and requests for the other party and screen and respond to requests going back to it. Remember, communication is a two-way street. Vendors trying to serve you will have many requests and requirements to which you will have to respond. For both parties, keeping the requests reasonable and within the rules will be the first mission. Beyond that, someone should track the requests and should keep the appropriate players informed.

■ *Meet periodically.*

Discussions are a healthy way to identify early problems and ensure that service levels are at the top of everyone's agendas. Discussions most typically will focus on the status of specific tasks or requests, but you can also cover items such as general education on organization status, review of past accomplishments and projects and exchange of other information. Each firm's business plan is vital information to share. In this way, you might learn of a vendor's product or service that you may need, while the vendor can identify an evolving need in your company that it may be able to fulfill.

■ *Develop ways to resolve conflict.*

Problems that you cannot resolve through lower level discussions should either be given to management or arbitrated based on rules you have set up. It is important to keep disagreements in perspective and not allow them to destroy an otherwise effective working relationship. Having top management involved in important problems not only minimizes lower level impact but also keeps management aware of vendor service levels.

With everyone aware of the importance of vendor service levels and with defined roles for key people to play to maintain these levels, you can improve your vendor partnership and avoid catastrophes that hit less prepared DP shops.

Young is principal and director of consulting for Arthur Young & Co. in Worcester, Mass. He has worked in the industry for 15 years.

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CIRCLE READER SERVICE NUMBER 259

MMA Member Gross Champions Buyer's Rights

As an executive board member of the Microcomputer Managers Association, Inc. (MMA), Alan Gross protested ADAPSO's controversial hardware lock-and-key proposal until the software vendor group dropped it last July.

Gross has represented the MMA on the Microsoftware Customer/Vendor Advisory Board (MCVAB) since it was founded in April 1986. The group, made up of ADAPSO members and representatives from government, corporate, educational and individual user organizations, meets quarterly to resolve conflicts between vendors and users.

Gross recently spoke with Computerworld Focus *senior writer Rebecca Hurst about the MMA's involvement with the board and the MMA's proposals for solutions to the problems of purchasing and maintaining microcomputer software in a corporate environment.*

What has MCVAB accomplished since it was founded?

The first problem we addressed was the issue of warranties. The "as is" warranties offered by many companies were not enough. We resolved that warranties should at least offer users their money back if they're not satisfied. That is more of an end-user issue. Corporations spend almost 10 times the cost of the product in evaluating it, and we almost always get evaluation copies anyway.

The warranty issue has helped us to set the ground rules for discussing other issues. We've begun working on a buyer's guide for end users, and, at the last meeting, we began to discuss corporate issues.

What corporate issues do you hope to resolve through MCVAB?

The MMA is working for negotiated license agreements to develop a closer relationship between the vendor and customer. We also want to improve a corporation's ability to manage and utilize software. We need different ways to handle agreements within relative guidelines because every company manages and purchases software differently. Additionally, vendors have limitations based on such factors as size and profitability.

There are six subissues related to license agreements: copy protection; training; truth in advertising; the ability to get copies of documentation; bug fixes; and upgrades and distribution. However, the real issue is how to develop these license agreements.

Negotiation is an expensive process: it can cost a company $100,000 to $200,000 [in overall expenses]. Instead of negotiation, we feel, there should be general contract solutions. It could be a menu approach in which the contract lists options and a price tag associated with each option. Users could choose which of the options they want. [Computer Associates International, Inc.] has been doing this with Supercalc for years.

Can't you pattern microcomputer software licenses after mainframe software contracts?

Yes, in part, but maintaining microcomputers is different from managing mainframes. A mainframe is usually a single site. That's much easier to handle than 800 micro installations that may be remotely located or politically separated.

Q&A

Alan Gross

"[Frequency of software releases is a big concern.] After a few little tweaks and features, vendors rush new versions out. . . . It's craziness."

What are the most important licensing issues for micro managers now?

Upgrading and distribution are the biggest concerns for us. One aspect of this is the frequency of releases. After a few little tweaks and features, vendors rush new versions out. Some firms release versions every three months to stay competitive. It's craziness.

A typical corporate environment may have 1,000 personal computers scattered around in 20 to 30 locations. A vendor comes out with a new release of the software, and someone in the company has to test the software. This can take anywhere from one to three months.

Once the company has decided to install the version, the user has to install the product, move data from the old software to the new and remove the old version. A single machine can take from half an hour to three hours or more [to complete this process]. Then multiply that by another 1,000 or so machines.

Also, a lot of users are building automated systems around software products. For example in Lotus Development Corp. 1-2-3, Version 1A, the package has an exit prompt that asks whether you want to leave. Later versions of the application don't ask users [if they wish to exit the program]. If you have built an automated system that waits for the exit prompt, your system no longer works. Rewriting systems for new application versions is a major hidden cost.

What other problems do you encounter with upgrades and distribution?

Two problems are the inability to buy the old versions of products and the vendors' requirements for old disks.

Right now, we're forced to buy the new version of an application as soon as it appears because vendors take the old one off the market. If we buy a computer, we have to get the new software versions for it. Because we try to avoid mixing versions, we have to install the new version on our existing micros as well.

Additionally, some vendors require you to collect used system disks when you upgrade to the new version. There's no way any micro manager can locate them all, though. There may be 50, 100 or 1,000 disks floating around companies. It's a ridiculous waste of effort.

What solutions to these problems do you propose?

Under a license agreement, we could build in an annual fee, and the vendors could build in upgrade consistency. For instance, vendors could design an application so users could upgrade from the first version to the fifth without going through the three versions in the middle. This would allow the vendors to continue their upgrades, but it would allow us to upgrade in a more timely matter.

Corporate users should also be allowed to purchase the older version of an application under the terms of a license. Then users could postpone their move to the newer release until they're ready.

Do managers have any concerns about the products themselves?

One problem we have is getting information from vendors about confirmed software bugs. We can't just call up and get a list of bugs. I'm a programmer; I know all software has bugs. Maybe 90% of them are meaningless, but another 10% are real confirmed problems. Vendors don't have to publicize these bugs, but if I'm building a multimillion-dollar system based on a bug, I need to know.

Vendors should be responsible and ethical enough to provide that kind of information when users are putting their businesses on the line using a product.

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CIRCLE READER SERVICE NUMBER 366

PC VIEWPOINT

Third-Party Pacts Could Ignite IBM's Desktop Publishing Sales

BLUE BEAT

Deidre Depke

IBM's announcement last July that it had formed a unit to pursue the desktop publishing market created a resounding stir throughout the industry. The establishment of the Publishing Systems Business Unit clearly indicates that IBM has chosen to aggressively pursue a market that other firms throughout the industry have found both profitable and important.

IBM's flat sales in 1986 indicate just how much the company needs to build some momentum behind sales of its Personal Computers. And, there's no doubt that the corporate market's 1986 love affair with desktop publishing technology will continue. Market researchers estimate that 72% of Fortune 1,000 firms plan to buy an electronic publishing system this year.

Apple Computer, Inc. has demonstrated just how influential desktop publishing sales can be. Most large corporations with desktop publishing systems installed have purchased the Apple Macintosh as their hardware base. Through the sales of Macintosh machines, the technology of desktop publishing has succeeded in validating Apple's value to corporate America in a way that Apple's marketing strategies never could.

But IBM's success in the desktop publishing marketplace is hardly assured. For IBM to forge any real presence here it must overhaul some of its most basic business strategies, including the way it markets and sells products.

Part of Apple's success in the desktop publishing market is due to its formal and informal alliances with third-party developers. Aldus Corp. with its Pagemaker and Microsoft Corp. with its Windows software packages were instrumental in developing the desktop publishing market and in establishing Apple as the clear leader in the field.

In fact, Apple has learned the value of third-party alliances so well that third-party developers say the software company will announce a formal relationship this month with Digital Equipment Corp. The two firms are expected to jointly market software that allows the Macintosh and DEC VAX minis to communicate.

Given DEC's strength in mid-range system installations and Apple's in desktop publishing installations, IBM is faced with formidable competition for desktop publishing sales.

And IBM has made little headway in this battle. To date, the company has announced just one desktop publishing product — publishing software for the RT Personal Computer. Developed for IBM by Interleaf, Inc., the program is hardly attractive to the general market; it carries a one-time license charge of $8,200.

IBM needs a hardware base

Before it can seriously gain a foothold in the corporate desktop publishing market, IBM must produce a hardware product base. The company needs both a laser printer and a Personal Computer AT enhanced with increased graphics capabilities. Although industry sources have predicted such projects for months, slow-moving IBM has yet to produce them.

But, more important, IBM must learn how to *sell* a desktop publishing system — and that means forming alliances with third-party software vendors. Although the Microsoft MS-DOS version of Pagemaker will certainly move MS-DOS PCs into the offices of desktop publishers, these buyers are just as likely to purchase a clone as they are to purchase an IBM product. For real success, IBM must follow Apple's lead and forge alliances with other key vendors of this technology and market a bundled system.

Last month, IBM did quietly endorse Windows and instructed its direct sales force to market the product to corporate customers.

But that's just an initial step.

A bundled sales strategy is a bitter pill to swallow for IBM, one of the most protectionist of all computer firms. IBM rarely endorses other vendor's products, much less actively markets them.

IBM's success in the desktop publishing market also depends on its ability to sell this technology to corporate America. While the company can turn a portion of this responsibility over to its army of 2,300 computer dealers, much of its success in selling to big business will depend on the efforts of its direct sales force.

That's the same direct sales force that has made something less than a spectacular showing in microcomputer sales to corporate accounts. Sources within the company report that IBM understands this and has made plans to form a division that will market new PC products to corporate clients. One of the group's first charges is to move IBM into the desktop publishing arena, these sources say.

That sales force will have another hurdle to overcome — user perception. There is hardly an artist, copywriter or designer in America who hasn't heard that Apple's Macintosh is the easiest, friendliest computer around. And those users have plenty of influence with corporate purchasers.

That means friendliness is a quality that Charlie Chaplin is going to have to develop.

Depke is editor of "IBM Watch," a biweekly newsletter to be published by CW Communications, Inc. "IBM Watch" will be dedicated to reporting and analyzing IBM news and trends worldwide.

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PC VIEWPOINT

Desktop Publishing Foes IBM, Apple Face A Graphics Showdown

INSIDER

Thomas Roberts

By the looks of it, desktop publishing has descended on the personal computer industry like manna from heaven.

Take Apple Computer, Inc., for example. Desktop publishing is the application most often heralded for saving Apple from the ash heap of computer history. And just when it started to seem that a wave of consolidation was locking out small competitors in the PC software industry, along came innovative companies such as Aldus Corp. and Adobe Systems, Inc. These and other small companies are carving out market positions for themselves simply by offering better methods for placing marks on a page.

But with all the excitement about desktop publishing, it appears that we've lost a sense of perspective. At times, it seems as if the people touting desktop publishing would have you believe that virtually everyone in corporate America is really Gutenberg masquerading in a business suit.

A central question is, How many people really need the capabilities of an entire printing plant sitting on their desks? Of course, for most folks producing manuals, newsletters and the like, high-level features are a must. But the real impact of the desktop publishing revolution is much broader and is already affecting most everyone in business. The broader implications are exemplified by the effect the Apple Macintosh has had on two very different but related areas.

The first is the improvement we have seen in the visual quality of general business correspondence during the past 12 months. The Macintosh and Apple Laserwriter are solely responsible for starting the trend toward business correspondence that goes beyond 10-pitch Courier print. You don't need a page composition program to make letters and reports look better; a simple Mac word processing package will do just fine.

Think about the number of letters, memos and reports you've seen recently that have headings highlighted by different fonts or type sizes. Before the Mac caught on, fancy stuff — like a headline done in 14-point Helvetica type and surrounded by a box — had to be sent out to a typesetter. That option costs time and money, so no one with any business sense thought about lavishing different type styles on run-of-the-mill, in-house reports.

Everyday graphics

With the advent of the Macintosh, however, visual detail became easy to produce and commonplace. The Mac owes much of its success to the broader definition of desktop publishing that says that even simple enhancements are important to the look of printed matter.

With corporate politics and competitiveness being what they are, almost anything that is both easy to use and makes one memo seem more impressive than another is sure to catch on.

That brings us to the second impact of the Mac and desktop publishing. IBM Personal Computers and compatibles are being forced to adopt the same graphically oriented approach to displaying data that the Mac has espoused for the last three years.

One of the essential differences between a Mac and an IBM PC is the way each looks at objects on screen. The Macintosh treats all data on a display as a graphics image. As a result, charts and text can effortlessly coexist on the Mac's screen, and text attributes show up just as they will once they are printed.

In comparison, a PC treats text and graphics as separate entities; therefore, it is sometimes difficult to get the two to mingle on the same screen. When the PC was first introduced, the applications that demanded top priority were number crunching and text processing. Today, however, we are paying for the fact that the IBM PC cannot efficiently handle text and graphics on the same screen.

Some PC software vendors have made an attempt to get around the PC's graphical shortcomings. Several word processing programs — such as Lotus Development Corp.'s Manuscript and Microsoft Corp.'s Microsoft Word — attempt to show text attributes or graphics images on screen. But the problems with the PC's text and graphics integration go far beyond what tricky applications software can solve.

In its attempt to catch up to the Mac, it is essential that the PC adopt a graphically oriented operating system. PC windowing environments such as Microsoft Windows and Digital Research, Inc. Graphics Environment Manager (GEM) operate in graphics mode, thereby solving many of the problems mentioned here. But, no single windowing environment has won market dominance, and as a result, few applications have been written to run under these environments.

Until recently, that is. Two important page composition programs — Aldus's PC Pagemaker and Xerox Corp.'s Ventura Publisher — are designed to run under Windows and GEM, respectively. Let's hope that these programs represent the first wave of software that will operate solely in graphics mode on the PC. For the scores of PC and compatible users, that ability would mean simple desktop features may soon be a reality.

Roberts is manager of personal computer research at International Data Corp., a Framingham, Mass.-based industry research firm.

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NEWS ANALYSIS

Legal Hassles Hinder Micro Software Clone Business

While the hardware microcomputer clone market continues to move onward and upward, the young software clone market might already be in for a rough time. Litigation has been rearing its ugly head lately, and the scene is beginning to read like a who's who in copyright infringement cases.

"What you're seeing are some test cases in the courts that could make software cloning a dangerous business," concludes Paul Cubbage, senior industry analyst at Dataquest, Inc. in San Jose, Calif.

A recent court ruling in Broderbund Software, Inc.'s favor, stating that a competitor was offering a similar product that was too close to the "look and feel" of a Broderbund product, might be a Pandora's box being inched open.

Into the legal breach has come Lotus Development Corp., which is suing both Paperback Software, Inc. and Mosaic Software, Inc. for having their software clones come too close to the look and feel of the 1-2-3 product.

If Lotus is using the trials as a means of frightening the competition away, however, it isn't necessarily working, at least in the Paperback case involving its VP Planner package.

"What this whole thing has given us is the opportunity to show how good our product [VP Planner] is," declares Adam Osborne, Paperback president. "[The case] might just work against Lotus."

If the ruling is in Lotus's favor, it could put a real damper on a new, growing, third-party software clone market that has been trying to finally break the price barrier of mainstream microcomputer software. Most of the software clones or compatibles on the market are priced well below the retail cost of the original products that, unlike the hardware market, have been unusually resistant to user pressure and competition to lower prices.

'In a funny state'

"The PC software market is in a funny state," Cubbage explains. "The clones copy the dominant [de facto] software standards out there because that's where the money is. But that spells trouble now. On the other hand, there is little room for expansion into other, more innovative areas. Companies can't bring out a new kind of data base, for example, because the market is saturated."

The market, however, is changing, Cubbage says. Users are becoming dubious about high micro software prices and are more willing now to accept clones.

"When [Micropro International Corp.'s] Wordstar was a big seller, a few clones were being sold as work-alikes, but they didn't do well," Cubbage says. "They may have been ahead of their time."

In the meantime, some big name software vendors are getting into the clone market. Ashton-Tate's Rapidfile is a paler version of the company's Dbase product that is attempting to head off some stiff competition from vendors such as Software Publishing Corp. with its PFS:File and Alpha Software Corp. with its Alpha Three.

Lifetree Software, Inc. has taken aim at 1-2-3 with Words & Figures, a low-cost compatible, and Lotus itself has reached agreement with Reading, Mass.-based Addison-Wesley Publishing Co. to produce a 1-2-3 clone aimed at the educational market.

"Clones can do well," Cubbage says. "Look at VP Planner; it's a best-seller. But that's also the reason it's drawn fire from Lotus."

S.K.

PERSONAL COMPUTER UPDATE

Laptop Units Set For Bullish Year

While the advent of Intel Corp. 80386-based computers garners its share of the trade press, the year of the laptop quietly unfolds.

Laptop portables are finally producing sales, and researchers are bullish. Dataquest, Inc. of San Jose, Calif., projects a five-year growth in laptop shipments from an estimated 400,000 units in 1986 to 600,000 units in 1987 to 2.4 million in 1990.

Why the sudden interest in laptops? Price for one. Laptops have been riding the price curve downward with all other personal computers.

Another reason is advancing technology. So-called supertwist screens improve on LCD technology by making the screens more readable; devices allow safe and easy data transfer between 3½-in. laptop drives and the conventional 5¼-in. PC drives; memory add-ins can push addressable memory up to 1M byte in some cases; and leaps in miniaturization enable inclusion of internal drives while still bringing the unit's weight down to around 10 pounds.

Tom Roberts, manager of personal computer research at International Data Corp. (IDC), a research concern in Framingham, Mass., says to look for good sales from Zenith Data Systems Corp.'s Z-181 and Toshiba America, Inc.'s T1100 laptops during 1987.

Though IBM has come out with enhancements to its laptop, such as an improved LCD with supertwist technology, optional internal modem and optional 256K-byte memory card, it could be a slow year for the PC Convertible, which only shipped about 23,000 units in 1986, according to IDC.

386 Industry Eyes IBM's Moves

The Intel Corp. 80386-based computer market continues to expand (see chart this page), but it has entered a lull, and all eyes are turned toward two players: IBM, with its imminent 386 machine, and Microsoft Corp., with its advanced MS-DOS system.

Rumors of IBM 386 prototypes being shown to select corporate customers keep circulating, but if IBM is set to launch its final version, the vendor is not letting anyone know.

There is a wait-and-see attitude in the world of IBM Personal Computer hardware clones. IBM's projected low-end PC clone buster is fast fading from the lips of industry observers who are now saying IBM will instead focus exclusively on the high-end 80386 market, leaving its old Intel 8086-based PC to die a natural death or be eaten by the clones.

Many say the clone market is about as tight as it can be now. Profit margins are being squeezed, and production crunches are resulting in delayed deliveries and angry customers, Leading Edge Products, Inc. and other vendors are discovering.

The entrance of Businessland, Inc. and Computerland Corp. chains into the clone arena is making it even tighter. With bargain basement prices hitting bedrock and more players coming in, shakeout might become a clone catchword.

Mart Shows Keen Interest In HAL

Perhaps the software product that has grabbed the most attention lately is HAL, Lotus Development Corp.'s memory-resident package that works directly with its 1-2-3 to create and manipulate work sheets through English language phrases.

Tom Roberts, manager of personal computer research at Framingham, Mass.-based International Data Corp., and Susan Messenheimer, president of Natick, Mass.-based Artificial Intelligence Corp., see HAL as an important software product for different reasons.

Roberts thinks that HAL, along with other Lotus products such as Freelance and Manuscript, is a successful attempt by Lotus to build a fortress of products around 1-2-3 and keep the huge installed base of 1-2-3 users under Lotus's wing.

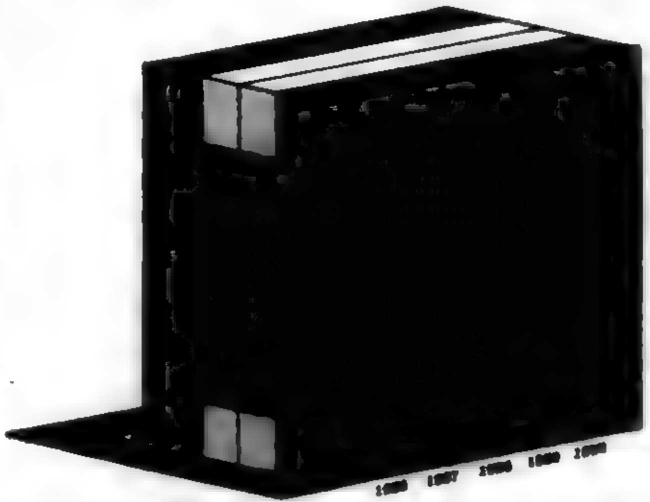
Messenheimer, however, sees HAL as the harbinger of the melding of artificial intelligence and micro software, which, to date, has been a failure.

"HAL," Messenheimer explains, "is an example of AI with a specific purpose in commercial use. It's a front-end Help package designed specifically for those thousands of 1-2-3 users who really don't know how to use 1-2-3."

Messenheimer says Lotus researched its user base and was surprised to discover just how many people were having trouble with 1-2-3. HAL, which works with English statements as does AI, takes users through the spreadsheet.

"What software vendors are finally understanding, and HAL is pointing out, is that users are not ready for a change in software architecture, which is what artificial intelligence has offered so far," according to Messenheimer.

"People can barely use existing software, and a new architecture is too disruptive. HAL is a good introduction to artificial intelligence and will be the first of many embedded artificial intelligence software products that will serve as Help aids to existing software," she says.



*Intel Corp. 80386-based computers

Information provided by Dataquest, Inc.

VARs, Mail Order Hurt Retailers

There are some interesting changes under way in personal computer software and hardware distribution channels. Enter the age of the value-added reseller and mail-order firms (see story page 29) and the demise of the traditional retail outfits.

A switch in corporate purchasing habits is fueling the change, according to Steve Bosley, International Data Corp. analyst and manager of the Framingham, Mass.-based research house's VAR program.

"Mail-order purchasing satisfies the corporate craving for better deals," Bosley says, "and VARs satisfy their growing need to install complete solutions with vertical software applications. Retailers, whose overhead requires big markups and whose lack of expertise prevents them from competing with VARs, are squeezed in the middle."

Jumping on the VAR bandwagon are vendors such as AT&T and ITT Courier Terminal Systems, Inc., which have rebounded from poor micro sales with retail outlets and direct sales forces and into more profitable VAR channels. Ironically, some clone makers might also find VARs a refuge from a clone market on the point of boiling over.

"Clones," Bosley says, "have been more accepted by VARs because VARs are selling more through solutions and not through brand names or price."

In the meantime, retailers see the writing on the wall. Bosley says some of the biggest retailers have been buying outside expertise and training in-house sales people to be more like consultants or, in Bosley's words, more like VARs.

Both the Businessland and Computerland stores are busy putting in place networking knowledge, vertical applications and direct sales forces.

This change is going to require a lot of resources and money, and only the biggest retailers can make the switch. For those that can't afford it, 1987 could be the year of the dog.

S.K.

NEWS ANALYSIS

IBM's Next PC Could Spell Doom For Microcomputer Managers

The industry is waiting for IBM's next-generation Personal Computer. While people speculate about its technical features, many analysts are suggesting that this PC will have more to do with marketing politics than technology: the product will be nothing less than a carefully calculated blow to micro managers.

By making micros an integral part of the mainframe world, IBM is placing them under the control of mainframe managers, to wit, MIS officers. At a time when micro managers are struggling to escape the power of the MIS world, IBM may have stepped in to effectively cripple the profession.

Why should IBM turn on the micro professionals who have — far more than MIS — been responsible for introducing IBM PCs to the corporate world? The accepted wisdom is that IBM has set out to crush the micro managers because although they made the PC popular, they are now trying to get rid of it. Where MIS has a history of being true Blue, the micro professionals have discovered clones. It is micro managers who are leading their firms to purchase huge numbers of compatibles and to drain much-needed profits from IBM. So, IBM has set out to remove these managers.

At least, that's one theory.

Of course, it could be that all this speculation is pure paranoia. There is no hard evidence that IBM is about to try to abort the emerging power of an entire profession. The 32-bit PC may indeed contain proprietary connectivity technology, but that content may be the result of nothing more than user demand.

Give users what they want

After all, micro-to-mainframe links are what buyers want. If, because of those links, micro managers become subordinate to MIS people, maybe that was inevitable, too. Maybe the inescapable result of distributed processing is that somebody has to become the person responsible for linking it all together, and that person might as well be the MIS officer.

Even assuming there is a deliberate IBM plot to overthrow micro managers, then the company would only be acting in its own best interests. It would be rewarding its loyal MIS customers and declining to pander to its bad. If any other company than IBM were to do the same thing, no one would raise an eyebrow.

IBM is on very dangerous ground no matter what it does. If it doesn't confront the clone makers and their best customers, the micro managers, it will continue to lose revenue at a time when it cannot afford to do so. On the other hand, if it too seriously wounds the micro community, Big Blue will win a Pyrrhic victory.

M.T.

Licensing On Site, Not On Target

Last year, after a long period of pressure from users, major microcomputer software vendors such as Lifetree Software, Inc., Lotus Development Corp., Ashton-Tate, Microsoft Corp. and others gave in. Copy protection was dropped altogether or embedded within site licenses.

Site licensing was something everyone thought users wanted because it would benefit users in two ways. First, it would enable them to make copies of programs and program documentation up to a certain number without crossing the line into illegal program copying. Second, it would enable users to avoid the high costs of buying single program copies.

The reasons sound good, but it appears that after a year, a lot of site licensing agreements remain virtually unused.

Lifetree Software, for example, says the response to its two-year license plan has slowed considerably. The company has lowered its copy number to 400 to help increase the number of users qualifying under the plan. Lotus also says its Multi-Value Plan license agreement has not had the support the firm expected.

Many large corporate users seem to be opting for individually tailored volume discounts instead of site licensing.

'That's all we need'

"We've agreed to buy at least 100 copies |of Lifetree's Volkswriter| a year at a discount," explains a departmental user at Citicorp in New York. "That's all we need. We don't need a large deal."

Criticism has also been aimed at site licensing plans considered too exclusive, catering only to the largest users.

"No wonder there's more interest in volume discounts," explains Julien Lange, president and chief executive officer of Ontio Computer Products Corp. of Cambridge, Mass. "The feedback we've had from corporate users large and small is that they don't meet the cutoff points for most site licenses. How many companies are going to need 500 copies of 1-2-3 for their analysts? What about the company that only has 10 analysts?"

Lange says he is one of the newcomers about to change that situation. Ontio's site licensing plan will discount its Ontio 259, a Lotus 1-2-3 clone whose single copies now cost $29.95 with manual, to $23.50 per copy to a maximum of 10; $15 per copy to a maximum of 100; and $13.40 per copy to a maximum of 1,000.

S.K.

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CIRCLE READER SERVICE NUMBER 262

NEWS ANALYSIS

'Superchips' Challenge The 386

Could the Intel Corp. 80386 and all the machines based on it already be obsolete?

In recent months, the computer world has been obsessed with the 32-bit Intel 386 and the emerging class of IBM Personal Computer-compatible machines that use it. As the 386 comes to market, however, so do a group of 32-bit reduced instruction set computer (RISC) processors, which far exceed the power of the Intel product.

In just the last year, Fairchild Semiconductor Corp., headquartered in Cupertino, Calif., shipped a microprocessor that displays large machine performance. The product is actually a chip set, collectively known as the Clipper, composed of two cache memory management chips and a CPU. The three are connected via twin 32-bit buses that allow extremely fast operation. The company claims that the Clipper is capable of sustained performance greater than five million instructions per second (MIPS).

Fairchild offers optimizing C, Fortran and Pascal compilers for the Clipper. It also markets a Unix-derived operating system, Clix, for the processor, and other operating systems may soon be available.

Where MIS fits In

Fascinating as these facts may be to computer designers, the Clipper becomes interesting to MIS only when it is incorporated into complete systems. Even then, the Clipper is most often considered a processor for technical and engineering workstations — machines far removed from real-life corporate DP.

But what the Clipper could mean to desktop computing can be seen in two add-in boards for the PC introduced at January's Uniforum 1987, The International Conference of Unix Users.

One of these is the Series 300 Personal Mainframe from Cupertino-based Opus Systems. Essentially, the Series 300 grafts the Clipper onto a coprocessor board that plugs into a PC expansion slot. Special Opus software then converts the PC's native Intel 80186 into an I/O processor.

The resulting Unix-based hybrid is effectively a 32-bit workstation that Opus compares with a Digitial Equipment Corp. Microvax. In OEM quantities, the Series 300 is priced at $3,000 and up.

Another Clipper-based system is the Zaiaz 933 Computer Engine from Zaiaz International, Inc. located in Huntsville, Ala. Meant for Personal Computer ATs, the 933 is a two-board set consisting of a Clipper-based CPU and a memory board with 4M to 16M bytes of dynamic random-access memory. The $9,750 933 converts the PC AT's Intel 80286 into an I/O processor in much the same way that the Opus system does.

Meanwhile, Sunnyvale, Calif.-based Mips Computer Systems, Inc. has been shipping a family of superchips, the RISC-based R2000 series, since March 1986. At their fastest, the chips are said to run at 10 MIPS. The chips already have buyers at Natick, Mass.-based Prime Computer, Inc. and Mountain View, Calif.-based Silicon Graphics Computer Systems. Some analysts call the workstations using these chips "personal supercomputers."

Mips sells its products in a number of different forms, depending on a buyer's needs. For the designer working on a board level, Mips provides component kits consisting of little more than an R2000 chip. For the systems integrator, Mips has CPU boards. And, for the end user, complete systems are available.

Again, these are the characteristics of a scientific or engineering product and not an MIS-oriented machine. In fact, no one is currently marketing an add-in board for the PC based on a R2000 chip of any type. However, Mips's current line of CPU boards, which allow an integrator to build a computer by doing little more than adding a power supply and a chassis, provide a powerful model for building such a PC-based product.

Finally, the PC's long-term outlook may be seen in the recent 64-bit microprocessor debut from Weitek Corp. of Sunnyvale. In October 1986, Weitek announced the Accel group of microprocessors. The low end of these is the Accel 8000, a 32-bit machine that the vendor said provides a sustained speed of 5 MIPS and costs $600 in quantities of 100. In the middle, at a cost of $1,000 in quantities of 100, is the Accel 8032, a 32-bit processor with a 64-bit data path.

Both the 8000 and the 8032 were available to developers last year; this year, Weitek hopes to ship the Accel 8064. With three chips, the Accel 8064 will provide 64-bit processing with a 64-bit data path at a cost of $1,500 in quantities of 100.

As impressive as these microprocessors are, they are not particularly exotic. In the not-too-distant future, CPUs will be based on really exotic technologies such as gallium arsinide semiconductors.

All of this would suggest that even the most advanced 386 machine is already obsolete. Increasingly, end users will have to decide whether it is wiser to purchase any PC based on an Intel product or go with a RISC-based workstation. Abandoning Intel might be particularly tempting now that such workstations can be easily cobbled together out of expansion boards and inexpensive PC clones.

M.T.

Developer Interest In Windows Piqued; Topview, GEM Struggle For Position

Microsoft Corp. has whipped up a whirlwind of interest in its Windows interface, but actual implementations of the product have yet to gain momentum. That appears to be the conclusion of industry watchers, though their perceptions on Microsoft's stronghold vary.

Microsoft has won the battle with developers, according to Robert Lefkowits, an independent consultant based in Palo Alto, Calif. There are several Microsoft MS-DOS-based application vendors interested in Windows, he notes.

Even Apple Computer, Inc. Macintosh application developers are interested. According to Lefkowits, three or four Mac package developers report that they plan to create Windows-based versions of their software for IBM PCs and compatibles. "With its graphic interface, Windows is the way to go."

Microsoft has a list of vendors who are planning to develop applications for Windows, says Walter Kozachek, an analyst with Delran, N.J.-based Datapro Research Corp. However, he cautions, "the question is if they'll actually write the applications. That is a big 'if.' "

A lot of developers are enthusiastic about Microsoft's product, but many others are not, Kozachek notes, attributing the disparity to the trade-offs of writing to Windows. Microsoft claims that vendors who write for Windows no longer have to worry about changes to MS-DOS because Windows will address those changes.

Windows applications harder to write

Application developers, according to Kozachek, feel that it is harder to write to Windows than it is to MS-DOS. "The learning curve is about two months," he says. "That's a lot of time."

Even if Kozachek does not feel Windows is a clear winner yet, he agrees that it is positioned better than such competing products as IBM's Topview and Digital Research, Inc.'s Graphics Environment Manager (GEM).

Digital Research is a jump ahead of Microsoft and Windows, Kozachek says, because it already has a version of GEM for the Intel Corp. 80386. However, Microsoft reportedly has a 386 version of Windows ready or near completion, Kozachek adds.

Getting to market first with a 386 windowing interface is a feather in Digital Research's cap, but the company does not have the marketing resources of Microsoft. "Microsoft is behind Windows, and it's controlling MS-DOS, the dominant operating system for Intel-based computers," Kozachek says.

"Many vendors are banking on Microsoft to make Windows compatible with the Intel chips and MS-DOS," Lefkowits agrees. "Developers are largely going on Microsoft's reputation." Moreover, Microsoft has the money and clout to push Windows as a standard, notes Frank Wirsh, a research analyst with San Jose, Calif.-based Dataquest, Inc.

Topview drawbacks

The view is less optimistic for Topview. While IBM has plenty of money and clout, it does not have have a competitive windowing interface. "Topview has not been received well at all," Kozachek says. "If Windows is clumsy, Topview is clumsier. Not many vendors are interested in it." Also, IBM only offers Topview on a limited basis, he notes.

IBM may choose to develop a graphics software interface based on Topview, according to Lefkowits. "If IBM is smart, it won't call the product Topview. That has a bad name in the marketplace."

Even with a proprietary interface, however, there is enough momentum behind Windows that the IBM graphics environment will have to support it, he speculates.

R.H.

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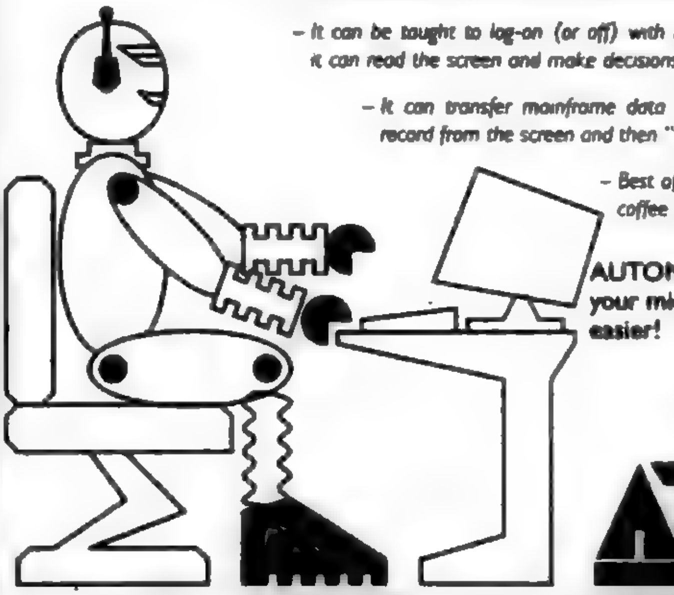

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Microsoft, Interactive Cooperate On Xenix Hybrid For The 386

Microsoft Corp. and Interactive Systems Corp. have embarked on a path of greater cooperation in the Unix mart with a joint development and marketing pact.

According to the agreement, Microsoft and Interactive will cooperate in developing a version of Microsoft Xenix based on AT&T's Unix System V.3 for the Intel Corp. 80386 processor. This version will reportedly retain Xenix's Microsoft MS-DOS application development capabilities and support the VP/IX MS-DOS emulation software developed by Interactive and Phoenix Technologies, Ltd.

Some in the industry question how compatible this hybrid Xenix will be with the current Xenix-based applications running on thousands of personal computers from vendors such as IBM, Tandy Corp. and Altos Computer Systems, Inc. The ultimate Xenix product should offer full backward compatibility with both Xenix for the 80286 and 386 as well as AT&T Unix V.3, according to Betty Niimi, Interactive's vice-president of systems development.

However, compatibility has different meanings, says Doug Michels, vice-president of the Santa Cruz Operation, Inc., which also has cooperative Xenix marketing and development agreements with Microsoft. Xenix has always been source code compatible with other implentations of Unix, he notes. With source code compatibility, applications must be recompiled to run.

The hybrid Xenix for the 386 will be binary compatible with AT&T Unix System V.2-based Xenix for the 386 due later this year, Michels states. This binary compatibility will allow applications to run directly on either version without recompilation.

Meg Lewis, vice-president of Dallas-based consulting firm Future Computing, Inc., questions whether the hybrid Xenix can really provide full backward compatiblity with Xenix or Interactive's PC/IX. There are many incompatibilities among the Unix versions, she says.

With some tough problems ahead and limited compatibility, why is Microsoft developing the hybrid Xenix with Interactive? Xenix is being redesigned so that it is compatible with future versions of AT&T Unix, according to Michels. "AT&T Unix V.3 is a fairly extensively modified version of Unix. It has been separated into modules for easier expansion down the road." The impact of the hybrid Xenix version will been seen in the future rather than today, he says.

Also, there are large numbers of corporate users with Xenix, according to Bruce Kin Huie, a senior analyst with Framingham, Mass.-based International Data Corp. Microsoft needs to keep these users by providing application portability and adhering to evolving Unix standards, he says.

A contender on the scene

One factor troubling Microsoft is competition from Microport Systems, Inc. (working with Locus Computing Corp.), which has unveiled Merge 386. The 386 operating system offers coresident MS-DOS and Unix System V.3 and costs a few hundred dollars less than Xenix.

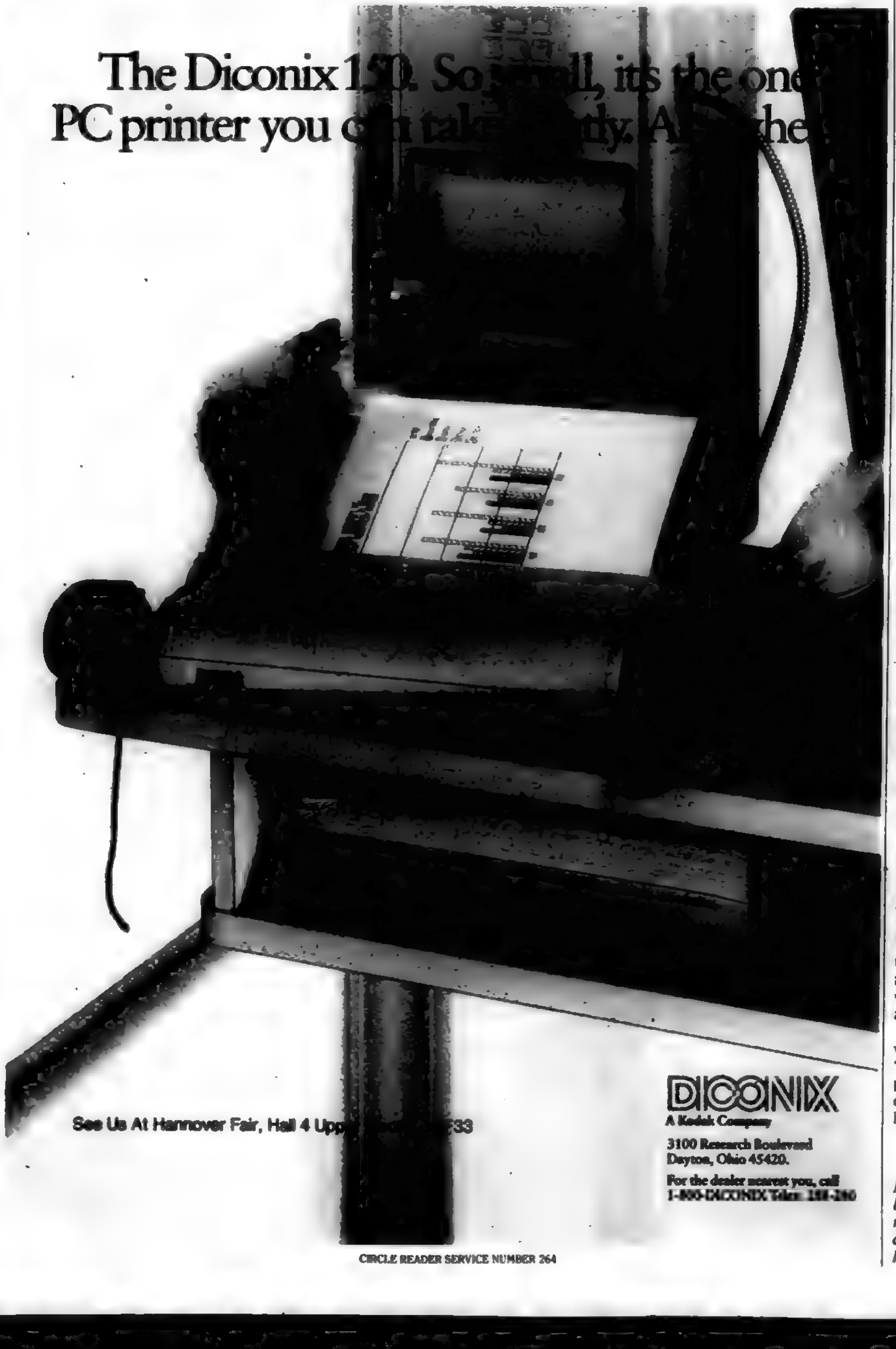
Microport also appears to have time on its side. Reportedly, Merge 386 is ready and waiting for AT&T's certification while the availability of the Xenix hybrid is a larger unknown. Microsoft and Interactive's announcement was merely a statement of intent, and the vendors have not publicly agreed on an introduction date.

Perhaps one sure thing is the validity of such an agreement. "It makes sense for the major players in the Unix market to cooperate," Future Computing's Lewis concludes.

R.H.

* * *

News Analysis section written by Computerworld Focus *staff members Stan Kolodziej, Michael Tucker and Rebecca Hurst.*



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CIRCLE READER SERVICE NUMBER 264

VENDOR ANALYSIS

Is IBM In The PC Business?

IBM's plans for its PCs may be the best kept secret in the industry, but three top consultants — Brian Jeffery, Jan Lewis and Amy Wohl — will help unravel the mystery with their predictions.

BRIAN JEFFERY:

IBM's plans for its Personal Computer line amount to nothing. Big Blue has ostensibly gotten out of the PC business and is focusing on the workstation arena.

IBM is working on a generic set of workstations, some of which are intelligent (that is, run DOS in ASCII mode), and all of which share the same hardware and much of the same functionality.

This workstation line is built around IBM's 3270 standard, and most of the dumb versions of the line have already been introduced during 1986 as the 3193, 3194 and 3196.

IBM's Communication Products Division out of Raleigh, N.C., is performing the work on these machines. The once-proud Entry Systems Division is now little more than an appendage to the Communication Products Division and looks after details like hardware engineering and talking to software developers.

IBM has organizationally already merged the PCs with its line of 3270 terminals; product mergers will follow. In 1986, the architectures, software components and functionality of IBM PCs were redefined in eight sets of announcements that essentially covered IBM's entire midrange, workstation and local-area network (LAN) lines.

IBM has come a long way.

The company entered the PC market in 1981 as part of a series of entrepreneurial diversifications. Its independent business unit strategy was fashionable then, and the new Entry Systems unit was given free rein to develop and market its own product. Entry Systems and PCs were IBM's great successes.

By 1986, IBM had shipped more than three million PCs, PC XTs and ATs, the vast majority of which were shipped in the U.S. to Fortune 2,000 users who formed the backbone of IBM's large systems markets.

In the process, the IBM PC line has become a workstation standard. Purchases of PCs by large users have exceeded purchases of dumb and low-cost

3270 terminals.

Of equal significance is that since its debut, the PC has nurtured a new set of users — managers, professionals and administrative personnel who had never been users of dumb terminals.

PC base key to IBM strategy

The PC's base has become immensely significant to the whole of IBM's strategy. The development of complex networks, the use of mainframe systems, the concept of departmental computing and the advent of LANs are going to be increasingly dependent on the individual workstation user, and that user had become a Personal Computer user.

Today, IBM's objective is to incorporate PCs, as workstations, into a broader environment.

The PC is the point at which a user gains access to the full range of information processing resources available within a large organization's network. Everything IBM offers, its full range of standards and architectures, services and types of information, must all be accessible from the PC.

For users and MIS, IBM's thrust means the Personal Computer line will feature support for the following:

■ **Advanced 3270 Systems Network Architecture (SNA).** IBM is referring to this complex when it talks about comprehensive electronic documents. This complex include support for LU6.2 as well as image, text, voice, graphics and programmed symbol sets.

Despite the science fiction sound of such claims, IBM can reach this point. During 1986, IBM brought in its 3117 and 3118 scanners, which handle input of images to PCs and to the latest 3270s.

Voice was given a trial run with the PC Voice Communications Option introduced in 1985.

PC Voice did not catch on, however, and IBM appears to be trying a new approach in that technology this year. Whereas PC Voice was primarily connected to the System/36 in the IBM Distributed Office Support System environment, the new PC Voice approach will be more closely linked to the 9370/VM environment and the Token-Ring and the Rolm Corp. CBX 3 private branch exchange.

IBM is still weak in the area of color graphics, but next-generation Personal Computers should have the ability to talk between the PC's Enhanced Graphics Adapter and IBM host graphics under the Graphical Data Display Manager. Programmed symbol capability, under 3270 protocols, should permit users to utilize light pens, mice, tablets and the like to add scratch-mark information onto text and image documents.

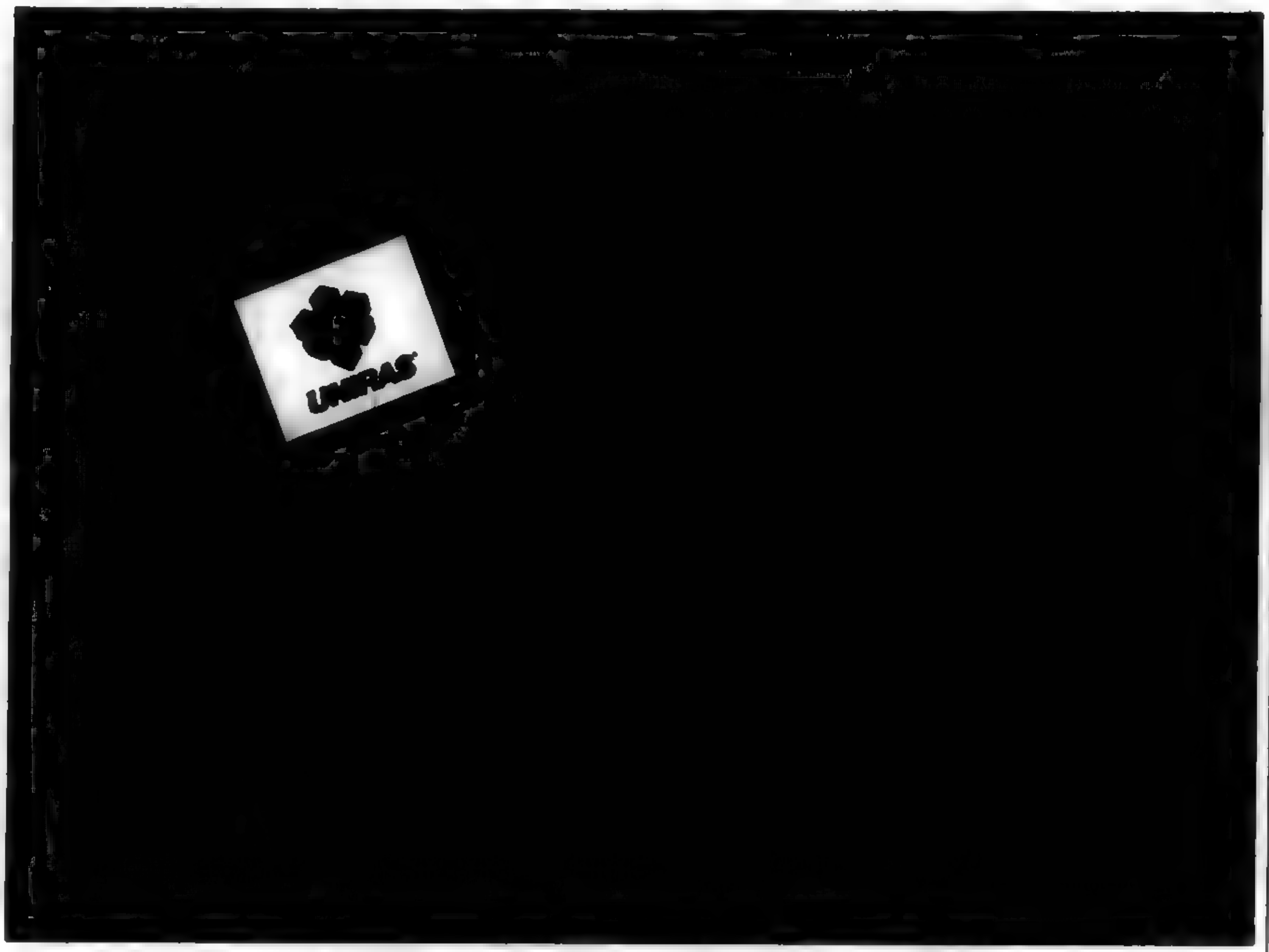
Brian Jeffery

The key feature of these capabilities is that they are integrated under IBM's SNA, which means that it will become feasible for users to create, edit, file and transmit documents incorporating the different types of information.

When the IBM scenario is complete, these Personal Computer capabilities will be fully supported by corresponding software applications on mid-range systems (including the 9370 and the latest System/36 and 38 models) and mainframes. The PC will support this multilevel complex to the same extent as the latest 3270 devices introduced in 1986.

■ **Enhanced Connectivity Facilities.** In 1986, IBM introduced the Enhanced Connectivity Facilities for applications linking Personal Computers, mid-range systems and mainframes and as the main axis for coprocessing between PCs and larger systems.

In an initial form — the Host Data Base View product — the offering is being implemented to support data transfers between IBM's relational data base management systems — DB2 (on mainframes) and SQL/DS (on 9370s) — and leading PC software applications such as Lotus Development Corp.'s 1-2-3, Ashton-Tate's Dbase line and



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   - 21 Dir., Mgr., Suprv. IS/MIS/DP Services
   - 22 Dir., Mgr., Suprv. of Operations, Planning, Adm. Services
   - 23 Dir., Mgr., Suprv. Analyst of Systems
   - 31 Dir., Mgr., Suprv. of Programming
   - 32 Programmer, Methods Analyst
   - 35 Dir., Mgr., Suprv. OA/WP
   - 38 Data Comm. Network/Systems Mgt
   - OTHER COMPANY MANAGEMENT
   - 11 President, Owner/Partner, General Mgr
   - 12 Vice President/Asst. VP
   - 13 Treasurer, Controller, Financial Officer
   - ENGINEERING
   - 41 Engineering, Scientific, R & D, Tech. Mgt
   - SALES
   - 51 Manufacturing Sales Reps., Sales/Mktg. Mgt
   - OTHER PROFESSIONALS
   - 60 Consulting Mgt
   - 70 Medical, Legal, Accounting Mgt
   - 80 Educators, Journalist, Librarians, Students
   - 90 Others ________ (Please specify)
3. COMPUTER INVOLVEMENT (Circle all that apply)
   Types of equipment with which you are personally involved either as a user, vendor, or consultant
   - A Mainframes/Superminis
   - B Minicomputers/Small Business Computers
   - C Microcomputers/Desktops
   - D Communications Systems
   - E Office Automation Systems
   - F No Computer Involvement

3317-6537

Microsoft Corp.'s Multiplan.

Lotus, Ashton-Tate, Microsoft and numerous other PC vendors will be working to support IBM standards, ultimately allowing PC users to effect two-way file transfers and data dumps between IBM DBMS environments and programs running on PCs under Microsoft MS-DOS. The Enhanced Connectivity Facilities product standard will also be extended to handle a range of transformations between PC- and IBM systems-based data formats.

■ **PC support.** "PC support" is a generic term for IBM software and standards permitting PC users to maintain virtual disks and diskettes on larger IBM systems, initiate mainframe or departmental system applications and use various decision support facilities.

Worth noting is that MIS and users now have a range of IBM products, such as PC Support/36, PC Support/38, VM PC Bond on the 9370 and Enhanced Connectivity Facilities on mainframes, that give PC users the ability to use large systems capability as an option to perform tasks locally under MS-DOS.

■ **Windowing.** When IBM talks windows, the company is not thinking about MS-DOS 4.0 or 5.0 or whatever else Microsoft may be cooking up. The IBM version of windows was originally offered on the 3270 Personal Computer and involves the ability to run multiple host sessions on a single workstation.

These sessions are reflected in multiple on-screen windows between which the user can adjust and transfer data. IBM's emphasis is on windows that contain data from different systems rather than from different MS-DOS sessions. Users can achieve this setup if they load microcode into the workstation (as IBM has done with the 3270-PC and with its latest 3270 terminals). IBM will include this feature in its next-generation PCs.

■ **The Token-Ring Network.** IBM's much-vaunted LAN is not doing well in the market, but this is not a major fact for IBM. Big Blue has never liked the idea of stand-alone LANs; what IBM did with the 9370 is representative of its strategy in the Token-Ring area.

Users may attach the Token-Ring Network via an integrated I/O adapter on a 9370. The Token-Ring becomes a means of attaching PCs to a 9370, which acts as a server, and the LAN and departmental system are effectively bundled. IBM, of course, would much rather sell a mid-range system with all the trimmings than a LAN, which consists of adapters, software packages and wires. For IBM, supporting the Token-Ring on PCs is a means of selling 9370s, not Token-Rings.

The effect of this approach is that IBM is reducing PCs to the status of network workstations, distinctive in that users can also utilize them to run ASCII DOS applications but otherwise part of a generic set of IBM workstation offerings. PCs will become the same as 3270 terminals, except that 3270s cannot run PC software.

Anyone who wishes to know what next-generation IBM PCs will be like has only to look at what IBM has been doing with the 3270 line, which has 3270-format CRTs with multiple windowing SNA, programmed symbols, support for the 3117 and 3118 scanners and diskette-loaded microcode.

Add an ASCII DOS box with an Intel Corp. CPU to a 3194 or a 3196 terminal and one has a reasonable approximation of next-generation IBM PCs. Add to that software that gives the individual a direct hook into larger IBM systems, and the picture shapes up.

IBM's design parameters for PCs no longer focus on the original Intel/Microsoft architecture but rather on the accessibility of network facilities derived from SNA, the 370 architecture and the rest of the mainstream IBM product complex. The ASCII DOS component remains as an open architecture, but it is an exercise in tolerance rather than commitment.

In IBM's view, that component is for those who still wish to run their personal applications on their personal machine. But the way IBM sees it, there will be fewer and fewer such users. Users will spend less and less time on personal applications and more and more time on-line to other systems in a network. And, who knows, maybe one day the habit of running DOS will die out altogether.

JAN LEWIS:

If you think IBM has lost control of the Personal Computer market and the market can only look forward to following a different leader, think again. 1987 may bring some surprises.

IBM would rather forget 1985, a time marked by sinking stock prices, dismal earnings, early retirement plans and ever-increasing competition in the low-, middle- and high-end product lines.

The last few years have been tough for IBM. The company made no moves to block the clones through either a price or hardware lockout. No long-rumored, next-generation PC materialized. Even Apple Computer, Inc. was putting pressure on Big Blue, entering IBM's corporate pasture in desktop publishing clothing.

Compaq breaks with tradition

Compaq Computer Corp. broke with its tradition by not waiting for IBM to announce an Intel Corp. 80386-based PC before announcing its own. PC clones were everywhere from large outlets like Computerland to mail-order marvels and kitchen table entrepreneurs. Mass-market masters like Atari Corp. and Commodore Business Machines, Inc. announced their own clones.

The bottom line clearly reflected the results of these forces. IBM's prices eroded and the company's share of the PC market went with them. Even more importantly, IBM appeared to be a sluggish corpocracy unable to fight back.

However, because IBM is so large (even in bad times it grossed $51 billion), analysts underestimate its agility and power to react. Historically, IBM has responded to a crowded market by leapfrogging to a new generation of technology, using its considerable manufacturing and silicon muscle to cut costs and dramatically raise functionality. The erosion of its PC market indicates to me that the time is right for drastic action. The most frequently mentioned solution is to close the PC. However, the clone market has enough momentum that such action might not be effective, and even worse, it could split standards and weaken the overall market.

Jan Lewis

A proprietary disaster

If IBM buried enough of the operating system deep in read-only memory or silicon to prevent legal emulation, it would follow the strategy of companies like Apple. But again, the market momentum is so strong that closing the PC just to prevent its reproduction could be a disaster. A proprietary PC must offer better functionality for IBM to recapture its market lead.

Last year's reorganizations and early retirement plans (with another 5% of IBM employees scheduled to retire in 1987) may appear to be merely cost-cutting moves, but the results will have even greater impact. These moves allow IBM to change its sales strategy and become more reliant on third-party resellers.

IBM's traditional methods of selling have become too expensive. As technology ushered in low-priced, mid-range systems and inexpensive PCs, small systems were unable to support the hand-holding and long sales cycle used in the large and mid-size system areas. And that area is exactly where the geographical reorganization of sales should pay off for IBM in 1987 and beyond.

To help it sell more efficiently, IBM has moved considerable resources and responsibilities from its direct sales force to third parties like value-added resellers, systems integrators and turnkey software vendors. Programs for cooperation can replace and supplement high-cost direct sales techniques and system support. In this manner, IBM is actually moving closer to smaller systems and small-size customers rather than backing away from them.

IBM may surprise you

As the stand-alone PC evolves into a networked microframe, users will demand more support services, ranging from installation to system management, which are IBM's strong points. With the help of third parties, the company will be able to deliver support at a price justified by the lower cost systems. Vendors that expected less competition from IBM because of the company's cost-cutting, may come across just the opposite.

IBM has not been able to compete with the clone makers — even though the company now primarily assembles its machines from the same sources. IBM may reverse this strategy in the future, however.

Although the Japanese were expected to be the chip leaders, IBM was not only the first to offer 1M-bit dynamic random access memory (RAM) in a mid-range product but has already announced the next generation. The memory-hungry desktop publishing and artificial intelligence applications areas will welcome a cheap 1M-bit dynamic RAM chip.

What had appeared to be IBM's greatest weakness could be its greatest strength. But don't expect IBM to be the lowest cost supplier. The best strategy is to use the low-cost production to offer the most functionality for the price.

IBM has done it before. I look for improved functionality once again to be IBM's best defense and offense. Besides more bandwidth, storage and peripherals for the dollar, that functionality will be delivered by connectivity — and connectivity can solve the problems of price and cloning.

IBM is first and foremost a systems company with the ability to provide and manage the interconnection of different levels of hardware, software and peripherals. I look for IBM to implement in silicon LU6.2, Systems Network Architecture support, networking, Advanced Program-to-Program Communications (APPC) and protocols. Silicon brings the vital benefits of lower manufacturing costs and proprietary protection. Silicon raises the manufacturing ante far beyond the stakes of the average clone vendor and leaves these firms legally vulnerable.

In the future, buying a desktop microcomputer without built-in LU6.2, APPC and Token-Ring support will be like buying a telephone without a standard RJ-11 jack. Combine this universal connectivity with the power of an 80386-based system or IBM RT Personal Computer engine, and Big Blue could jump over its competitors and set the standards for price, performance, connectivity and distribution.

So, those who believe that IBM is too big to be competitive from the mid-range on down may find 1987 to be an interesting year indeed.

AMY WOHL:

The personal computer industry was largely built by IBM. But Big Blue has left the PC marketplace in a lurch lately. Intel Corp.'s 80386 processor technology is here, but not for IBM-faithful PC buyers.

Other vendors, convinced that IBM will follow established rules to stay in a game that Big Blue no longer entirely controls, have been unwilling to wait. They have jumped into the marketplace with 80386-based products that assume the next generation of personal computers will be more of the same — bigger, faster, more capable but firmly rooted in IBM-defined origins.

In fact, competitors have already placed big bets in the 386 sweepstakes. They are gambling on certain suppositions:

■ That IBM has no choice but to follow the open PC hardware and software standards with which it has already been so successful.

■ That customers will rebel and buy from the 386 standard-bearers if IBM created a new PC environment.

■ That IBM has a stake in the continuation of an orderly market of multiple, successful PC-compatible and clone vendors because it is the combination of the IBM PC market and this compatible/clone market that entices the continuation of a rich third-party market in IBM PC-based hardware and software.

■ That IBM wants and needs to stay in the personal computer business — that is, the business of selling individual PCs into a competitive market in which others sell similar or identical products on a highly price-oriented basis.

I see it differently.

IBM has been telling analysts and customers for some time that it will withdraw from the PC business or the appropriate

VENDOR ANALYSIS

parts of the market should the business reduce itself to a price-only decision. IBM may want to be the low-cost producer in the markets it pursues, but it also needs to make its traditional margins.

This scenario seems to suggest that IBM will grow less and less interested in the commodity part of the market and move toward a strong emphasis on high-end personal computers. But IBM must be mindful of the fact that high-end computers will stay profitably priced only if the commodity discounters stay out of that market.

There are only a few ways that IBM can keep these discounters at bay:

■ *Create legal barriers.*

Close the IBM machine with proprietary hardware and software and protect it by legal barriers such as patents and copyrights. However, this strategy could mean an end to third-party hardware and software, both of which have contributed significantly to IBM's success.

■ *Use fast-changing technology.*

Close the IBM machine by using proprietary, custom, very large-scale integration technology and change the technology often enough so the clones cannot follow. But it seems unlikely that IBM can move as fast as it would like. Speed and flexibility are the advantages of the young and small — and IBM is neither.

■ *Push a new operating system.*

Amy Wohl

Close the IBM machine by using a new, proprietary or IBM-controlled operating system. IBM would enjoy this plan, especially if Big Blue could accomplish this through MVS. It could offer a single operating system from workstation to large mainframe, thereby giving the company opportunities to engage its rival Digital Equipment Corp. in a new dance.

However, this situation seems unlikely. It would cost IBM considerable capabilities in the area of ongoing software development. In fact, PCs may be fated to be single-user machines, in which case MVS would be an entirely inappropriate environment however compatible it might be with larger systems.

Now, the Conspiracy Theory from the Society of Paranoid Competitors says that the long wait for an IBM-labeled 386 PC is simply a plot. It is IBM's intention, this story goes, to wait until all of its competitors have bought the Compaq Computer Corp. Theory of the Universe, which relies on the premise that IBM has established a standard and, having established it, must never stray for fear of losing its market. And when all of IBM's competitors have invested their money in products and documentation and marketing campaigns, then, and only then, will IBM strike, announcing a machine that puts them all out of business.

Of course, this theory has a few holes in it, too.

Because IBM is too big and too structured to be very flexible, whatever it has decided to do about 386 machines was decided a long time ago, presumably before any 386s were announced. Therefore, IBM is not susceptible to much change in either product content or timing.

It is IBM's competitors that have the flexibility to take advantage of marketplace changes — not IBM.

IBM is bound by the success of its PC-DOS standard. Any system the firm offers based on newer technology will, out of necessity, have to support older PC-DOS programs and will be compatible with the early 386 offerings at some level.

A two-flavor machine

IBM could choose to offer a two-flavor machine with PC-DOS and something else. In fact, I suspect it will. But if all the exciting new software and all the established old software run on the PC-DOS side, IBM will have to do something spectacular with the proprietary side of the machine to find a strong marketplace.

Most likely, this situation will point in the direction of upward integration with larger IBM systems (the market IBM cares about) and will not necessarily matter much to IBM users who buy PC-DOS-compatible local-area networks as their integration schemes. This scheme would leave plenty of room for IBM's competitors to maneuver. Compaq, with its success in large, IBM customer organizations, would probably be the vendor most affected.

Taking heart in hand, I predict that IBM will announce a 386 machine in 1987, that it will not deliver that machine in quantity during the first half of this year, that the machine will run both current PC- and MS-DOS software faster but otherwise not remarkably differently and that IBM will offer an environment designed to have special appeal to large IBM mainframe customers.

And there's certainly nothing surprising here. In fact, the IBM 386 announcement is likely to be the biggest anticlimax of 1987.

Go ahead, IBM — Surprise me! Please, do something else! ■

Jeffery is managing director and co-founder of Los Altos, Calif.-based International Technology Group, a computer industry research firm.

Lewis is president of the Palo Alto Research Group, a market research firm based in Palo Alto, Calif.

Wohl is the president of Wohl Associates, a consulting firm located in Bala Cynwyd, Pa.

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CIRCLE READER SERVICE NUMBER 266

IMPLEMENTATION TACTICS

So, You Want To Be A Beta Site?

BY STAN KOLODZIEJ

In this age of vaporware, delayed product announcements and product recalls, personal computer hardware and software vendors are under the gun to produce more trouble-free products before they're shipped to commercial users.

Beta testing is an important avenue for vendors to achieve a more finished prerelease product. Vendors are keen on beta sites because they can better simulate true working conditions to test products. They can also gather beta results to iron out problems that were overlooked or did not appear in their development cycle.

The users of beta products also benefit. They can get a jump on other users (and competitors) with upcoming offerings. They can also cement close relationships with vendors during the beta phase that can pay dividends later with discounted software and extra support.

But beta testing is hardly a path strewn with roses. At best, it is still a trade-off, with any benefits gained by the beta user tied closely to the amount of work and resources put into the testing. At worst, it can be an experience ending in frustration for both parties.

"All I can say is if you are thinking of becoming a beta test site user, you'd better be prepared," explains John Vanderwerf, senior systems analyst in the technical services and development department at Technology and Information Educational Services in St. Paul, Minn.

Vanderwerf, whose company beta tested Ryan-McFarland Corp.'s RM Cobol 85 compiler for two months in 1986 and has been a beta site for previous mainframe software products, says he has been fortunate in suffering few major problems.

"We've been in the middle of major software development in the past, developing our own [school program scheduling] applications with the same software we were beta testing," he explains. "It's a risky business, but, for us, the benefits outweigh the risks."

For Vanderwerf, those benefits are obvious. "In the case of RM Cobol 85, it means getting lead time on the rest of the market on a product that should become a standard for micro Cobol compilers. Working with a standard means we shouldn't have to reconvert our applications again in the future."

Ideally, beta testing should benefit both vendors and users. "There is a gray area with beta problems because the hardware and software configurations a tester uses in-house often don't parallel those used by the vendor," explains Alan Carl, president of Automation Consultants of Menlo Park, Calif., a beta test site for Pick Systems software. "In the end, it's instructive for both sides."

Brian Lloyd, president of Renaissance Designs, a software developer in Germantown, Md., advises potential beta testers not to underestimate their influence on vendors.

"Having experienced it from both sides, as vendor and user," Lloyd says, "I can tell you that finding good beta test users is like finding gold. Vendors cultivate beta sites because they can benefit [the vendors] immensely in the way of real-world testing of their products, improved product documentation and improved rapport with top clients.

"Conversely, users can get

JON MCINTOSH ILLUSTRATION

the jump on their competition, free copies of the final product and, hopefully, better support during and after the beta tests. Beta users have to remember they are doing vendors a favor by testing their products," Lloyd explains.

Roger Sparks, vice-president of marketing at Thoroughbred Software, a Somerville, N.J.-based firm that has just finished coordinating beta tests for its relational data base management system, says that beta testing its products through selected value-added resellers and end users is a major part of its product strategy.

"We value the input of beta test sites," Sparks says. "They simply can cover some of the angles we can miss in testing."

Setbacks

Though the problems experienced with beta testing microcomputer products are usually of a lesser degree than those with larger mainframe software and hardware products, these products can still cause setbacks.

"We always had problems when beta testing," explains Randy Wiseman, coordinator of PC product support at Chevron Information Technology Co., located in San Ramon, Calif. "At the end of one beta test with [Lifetree Software, Inc.'s] Volkswriter, the company pulled a switch on us and changed the user interface. What it amounted to was the product we were working on was not the one that was eventually released. It wasn't disastrous, but it sure upset us. We had put in a lot of work with that original design."

Another beta user, Ed Fisher, senior systems analyst at United Airlines Travel Systems in Austin, Texas, says he has been beta testing various micro software offerings for about two years as part of a major project to provide accounting systems for travel agents. Every so often, Fisher says, his company will experience bugs in the programs bad enough to cause major problems.

"It'll set us back, but we're in a competitive field. The advantages of getting first crack at leading-edge, prerelease software are still way ahead of the minuses," he claims.

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>
> *'Beta testing is more for the guy who likes to work and experiment and knows the ins and outs of a system.'*
>
> **— Brian Lloyd**
> **Renaissance Designs**

Beta testers that were contacted by *Computerworld Focus* were in agreement that only certain companies should consent to becoming beta sites. The first prerequisite, they say, should be having the necessary equipment and people to conduct testing adequately.

"It's a given that first-time beta testers will underestimate the time and human resources required for testing," explains Bill Coberly, director of the Center for Microcomputer Applications at the University of Tulsa in Oklahoma. The center is conducting a beta test for an IBM Personal Computer XT clone from Tulsa-based Telex Computer Products, Inc.

"You can't do it part time, and you have to have a good deal of in-house expertise. Another requirement is to have a set of testing parameters in place before the product is brought in. Otherwise, you'll waste valuable time," he says.

Coberly advises, however, not to worry about making the testing that strenuous. "The vendor will have its own set of beta tests that it wants users to handle. In most cases, if a particular user doesn't want to follow a vendor's list, the vendor will field those other tests to other users."

One beta test user at a large Midwest chemical company says that his company tested a Volkswriter package for six weeks with its own test requirements for functionality, features and ease of use. The test parameters were not specifically those the vendor requested.

Beta testers agree that users must have more than just average programming or computer operating skills. Users have to know how the systems work.

"This isn't for the average user who thinks that something is going to run right out of the box," Renaissance Designs' Lloyd explains. "Beta testing is more for the guy who likes to work and experiment and knows the ins and outs of a system."

Along with those qualifications comes the right temperament. Patience seems to be a virtue in beta testing. "You definitely need a certain emotional outlook for this," Coberly says. "If you're easily frustrated, don't try [it]." Lloyd adds that the beta user should be the type who derives some intrinsic satisfaction from experimenting with something new. "You have to like tinkering."

Not all those who have the ability to beta test are eager to do so, however. Dennis Lockard, manager of end-user support services at Corning Glass Works in Corning, N.Y., says beta testing takes up too many resources while the potential returns are not that great.

"We have an unwritten rule in our data center that says we don't implement anything until six months after its release date," Lockard explains. "We try a balanced approach. We want to be current, and we don't want to become obsolete, but we also want to avoid early beta problems."

Alan Gross, executive board member of the New York-based Microcomputer Managers Association, Inc., says beta testing is too time-consuming a process. "I don't have the time. We're not on the leading edge of technology here. We just did a beta test of a printer/plotter and knocked it around for a week. It's exhausting," Gross explains.

Doesn't want the hassles

Neil Donat of Farmtec, Inc., a San Leandro, Calif.-based provider of pest control equipment, says he would never consider becoming a beta test site user, citing a lack of good in-house programming experience and the abundant availability of qualified outside consultants to produce applications and test software packages for the firm. "I just don't want to go through the [beta] hassles," Donat says.

Do vendors use beta input to change their products before commercial release? Apparently so. Ashton-Tate recently delayed introducing its Rapidfile software due to problems experienced with the package at many beta sites. Lockard says Compaq Computer Corp. took results from Corning and nearly 75 other beta sites into the vendor's laboratories to strengthen the Compaq Deskpro 386's IBM Personal Computer compatibility features.

Another beta user in the Midwest says that Lifetree incorporated the changes she and her colleagues suggested into its Volkswriter software.

One thing beta testers caution against, however, is tying the beta test product too closely with the day-to-day operations of the company or department. "Throwing a beta test product right into a production environment is a whole different problem," Automation Consultants' Carl explains. "It could affect your entire operation."

Carl and Lloyd suggest that the real crunching of a beta product should be left in the hands of the vendor and third-party software developers, not end users. "A lot of software developers tend to be at the leading edge of the hardware side," Carl explains. "We will push the hardware and software to the limits and beyond to squeeze out that extra bit of performance. That's what we aim at."

Lloyd says that he will try to break beta software just to see how far it can be pushed. "End users don't have the same kind of facilities to do that. And they shouldn't have to."

Even though there are a number of drawbacks to beta testing, users are quick to point out the positive elements they receive during and after the beta testing.

'Individual rewards'

"I think each beta user gets individual rewards from testing," Vanderwerf says. "In our case, beta testing has given us a better understanding of the product, and at the same time, a better understanding of our own needs and abilities. It's also helped us develop closer relations with vendors."

Fisher points out that during the years beta testing has helped his group focus its long-range product planning. "If I can see a product six months before it's commercially released, then I can see how our own future product development falls together," he claims.

According to the Microcomputer Managers Association's Gross, "Beta testing in the micro area usually isn't like [beta testing] IBM products. IBM gives out four or five prototypes of one product, and you're not sure the one you're testing will be the one it actually releases. With most micro vendors, however, what you see is what you'll get. The only caveat with any testing is that you have to be interested in the product. Don't do it as an intellectual exercise."

Another beta tester says the experience has given his organization longer lead times, which offset user training later on and cut down on escalating training costs.

Corning's Lockard explains that micro software vendors carry on beta testing in a less formal manner than mainframe vendors. "A lot [more PC] vendors distribute prerelease hardware and software versions than in the mainframe area. The mainframe beta field requires a great deal more work to implement. Micro vendors such as SAS Institute, Inc., however, will make available and ship beta versions to anyone who wants them," he says.

"These are not formal beta sites, and you might not get the same kind of quick beta bug fixes from vendors, but it opens up the beta field to many users who might not otherwise be able to participate," Lockard explains.

Above all, though, beta users stress that users be prepared for the unexpected. "You better expect problems and be prepared to deal with them. If you go into [beta tests] blindly," Vanderwerf warns, "you might get a big, unpleasant surprise." ■

Kolodziej is Computerworld Focus *senior editor.*

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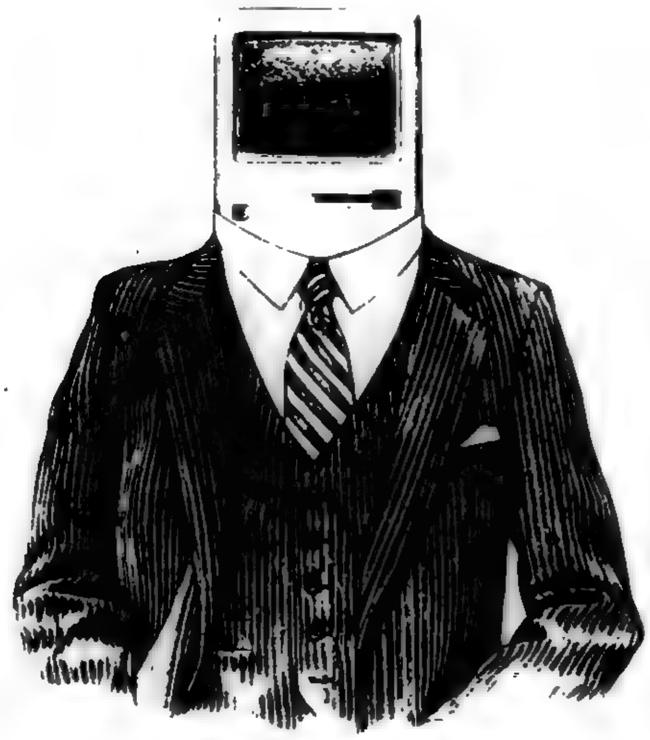

MATTHEW PIPPIN ILLUSTRATION

The Mac Attack

BY • STAN • KOLODZIEJ

Two years ago, Apple Computer, Inc. was all but written off as a serious contender to IBM in the coveted Fortune 500 microcomputing arena. At the same time, the Cupertino, Calif.-based company was suffering disruptions within its top management that were casting doubts on the company's ability to survive.

Priority 1, repairing torn executive seams, has apparently been accomplished with the final consolidation of power by Apple President John Sculley following the departure of cofounder Steven Jobs.

Priority 2, perhaps requiring more dexterity, has been the task of lifting the Apple Macintosh — and the company's image with it — out of IBM's Personal Computer shadow and into the front ranks of large business microcomputing. It appears Apple is doing just that, having entered the micro heavyweight division swinging.

It is the quickness of Apple's market thrust that has caught the attention of the press and Wall Street investors. Even the most Apple-enamored industry watchers are struck by the suddenness of Apple's gains.

"I think its success has surprised a lot of people," says Marty Gruhn, vice-president of Tempe, Ariz.-based Sierra Group.

Larry Magid, senior analyst at the Seybold Group in San Jose, Calif., estimates there are one million Macintoshes currently installed in U.S. businesses. Research firm Future Computing, Inc. of Dallas is predicting 270,000 Mac units will be shipped in 1987. (This latter figure does not include possible shipments of Apple's Open Macintoshes, two 32-bit Macintosh upgrades that are slated to debut early this year.)

These figures indicate that Apple is not going to dislodge IBM's stranglehold on business microcomputing soon but that Apple's profit line is on a steep rise while IBM's is sliding.

Apple's success is all the more surprising because it runs counter to a U.S. corporate attitude grown chary of micro purchases, inclined to capital cutbacks and aimed at remaining with the micro status quo. On the other hand, it might be the same attitude that is pushing the Mac's success.

"Apple's success has to do with the whole micro phenomenon, which is winding down," Gruhn says. "The micro market is no longer hardware driven. The industry and users are now looking for solutions. People want to squeeze more out of what they have. In 1987, the industry will shift to proprietary PCs, and users will be looking for value added by vendors. Apple will do well in that market."

Value added in the case of the

Macintosh means an easy user interface and some legendary graphics gymnastics that are now making an impact beyond the niche, generally nontechnical pockets of business computing in which the Mac has engendered a loyal following.

Attitudes change

Ironically, it was this same ease of use and emphasis on good graphics that originally helped isolate the Macintosh from the more austere business atmosphere dominated by IBM. Attitudes change. The escalating cost of computer training makes ease of use more attractive, and the push toward quality graphics output and desktop publishing as a way of maximizing micro use have put a productivity spotlight on the Macintosh.

There is an argument that the market has finally caught up to the Macintosh, providing a more receptive stage for the Macintosh to show cost-saving features. In another sense, however, Apple and the Mac are finally catching up to the rest of the computer market.

During the years, the Macintosh languished as a stand-alone, proprietary device while the rest of the world looked to connectivity with other systems, primarily IBM's, through local-area networks (LAN) and other communications links. The Macintosh also suffered from a lack of third-party software vendor support that it needed to produce anywhere near the number of programs that were being developed for the Microsoft Corp. MS-DOS-based PC.

However, the surge in Macintosh sales has lured a growing cadre of these third-party software and hardware add-on vendors that are finding the Mac a lucrative and alternate avenue of revenue away from the intensely competitive and nearly saturated IBM PC market. Such activity is providing more ammunition for Apple to sway the attention of corporate micro buyers away from IBM.

"In the business spreadsheet area, Microsoft's Excel [for the Macintosh] has been hot, the company's Appletalk local-area network is selling well, communication with IBM mainframes through packages like Tops [from Centram Systems West, Inc.] and Macmainframe [from Avatar Technologies, Inc.] is there, and the Small Computer Systems Interface [SCSI] standard is letting the peripheral makers plug into the Mac," Seybold's Magid explains. "They are getting more of the corporate pieces together."

If anything, Apple has been consistent in its strategy under Sculley. Some of these strategies, like any investments, have paid off; some haven't. One big plus paying dividends has been Apple's insistence that software developers writing for the Mac adhere to Apple's strict set of data formatting and command guidelines. This mandate has resulted in a tight intercompatibility of third-party software, which enables users to exchange files across a spectrum of Macintosh applications.

Software compatibility seems to represent a significant plus for Macintosh users contacted by *Computerworld Focus*.

"A standard interface between many software applications was one of the good things about the Macintosh," says Pat Natale, vice-president of auditing at the Prudential Insurance Company of America in Roseland, N.J. "It's minimized our training costs."

Bill Storms, manager of micro resources at Washington state's Department of Transportation, located in Olympia, points out the "seamless interface between Apple software applications. The issue is transparent compatibility. It makes it easier to use with less training. You can be up and running quickly with little overhead."

However, Apple's strategy of closing the Mac's architecture to other hardware vendors may be backfiring. It is virtually impossible for vendors and users to extend and customize the Macintosh. And there is no such thing as a Mac compatible nor will there be soon.

"I don't think it's such a major concern now [with users]," Storms explains. "But the fact is somewhere down the line, if it comes down to price, a lot of MIS departments could opt to go the route of mixing some IBM PCs, some compatibles and maybe some clones and remain in the MS-DOS world simply because there are no Mac compatibles or clones to cut costs."

Apple moved in the direction of a more open architecture in January 1986 with the introduction of the Macintosh Plus, which provides a high-speed socket for limited hardware expansion. However, the real nod to Macintosh expansion is expected with one of two Open Macintoshes, a machine sporting a Motorola Corp. 68020 32-bit processor and numerous expansion slots.

> ”
>
> *Of the various pieces making up the Macintosh's corporate success, desktop publishing is the biggest.*

Products for the Macintosh Plus

In the meantime, some innovative companies are taking advantage of the minimal expansion capabilities of the Macintosh Plus. General Computer Co. of Cambridge, Mass., which was the first to introduce a 20M-byte hard disk drive for the Macintosh, now has a 40M-byte hard-disk offering of its Hyperdrive; Bering Industries, Inc. of Scottsdale, Calif., has introduced a line of removable hard disk drives for the Macintosh; and Radius, Inc., a Sunnyvale, Calif., newcomer, has provided Mac users with a 15-in. screen.

Slow to announce its own in-house communications products, Apple has seen the void filled by third-party vendors that are coming out with an array of Mac-to-IBM mainframe links. It's a good thing. Macterminal, Apple's IBM 3270 terminal emulation facility, is hampered considerably by its inability to transfer data back and forth to the mainframe, while some industry watchers point to indications within Apple that Macterminal enhancements have been harder to put in place than originally expected. (In January, however, Apple did introduce some products that convert data from IBM mainframes and from IBM PCs and compatible word processing programs into a format that Apple's Macwrite word processing software can use.)

Into the breach have come vendors like Avatar Technologies, Inc., a Hopkington, Mass., firm whose Macmainframe package enables IBM mainframes to transfer Macintosh image and data files between IBM hosts and the Macintosh, while it also provides 3270 terminal emulation. Macwindows 3270 from Tri-Data Corp. of Mountain View, Calif., allows a user to conduct up to four concurrent IBM Binary Synchronous Communications and Systems Network Architecture sessions, each within a separate Macintosh screen. Other communications vendors are following suit.

Plans for Appletalk

Apple is also putting in place plans for its Appletalk LAN, especially with its recently introduced Appleshare, a software-only product that converts any Macintosh equipped with a hard disk into a LAN file server. Apple also released the Appletalk PC card that, with software not yet available, will enable IBM PCs to become nodes on Appletalk networks.

To Apple's definite advantage there is also some third-party activity within Appletalk. One company drawing some attention is Centram Systems West, a Berkeley, Calif., company whose Tops for Unix is a software product that offers direct file sharing among Macintoshes, IBM PCs and Unix-based machines over Centram's Tops LAN.

Even Du Pont Co.'s Connector Systems Division in Cumberland, Pa., is scheduled to introduce a connector that will enable Macintoshes on an Appletalk network to use fiber-optic cabling for transmitting data.

Appletalk is a dark horse among LANs. Although the product received relatively little publicity, Dataquest, Inc. of San Jose estimates that there are nearly 200,000 Macintoshes used as nodes in LANs, the majority of which are small Appletalk networks of four to five machines. The days of the Macintosh as a stand-alone whiz seem numbered.

If the Mac-to-IBM mainframe strategy is clear, the one strategy tying the future of the Macintosh with MS-DOS is finally coming into focus. Apple is rumored to be including a coprocessor in its imminent Open Mac announcement to run MS-DOS application software. Another company, Complete Management Systems, Inc. of Costa Mesa, Calif., is getting attention with a hard-disk subsystem called Data Exchange, which enables IBM PCs to share files with Macintoshes through an SCSI bus.

Software vendors that have made a name in the IBM PC field are now turning to the Macintosh. Borland International, Inc. located in Scotts Valley, Calif., will be introducing Reflex, a data base management system for the Mac; Ashton-Tate of Torrance, Calif., is slated to introduce a Mac version of its Dbase package; and Microsoft already has a Macintosh version of its Microsoft Word word processing package.

Just how important it will be to Mac users to run MS-DOS applications might be a moot point, however.

"Software compatibility with MS-DOS would be nice," Natale explains, "but I don't think users would really need it. There are so many good programs written specifically for the Macintosh now. These are two separate systems with separate worlds of users and applications."

Of the various pieces making up the Macintosh's corporate success, desktop publishing is the biggest. By a fortunate mix of the right machine at the right time, Apple has ridden the crest of the desktop publishing phenomenon now sweeping the U.S. In effect, the Macintosh has become the de facto standard in desktop publishing.

The price is right. A working configuration of Macintosh, Apple Laserwriter and desktop publishing software can be purchased for about $15,000 with capabilities beyond the low-end, PC-based systems and with a price tag well below the specialized micro-based publishing systems now on the market.

A landslide of desktop publishing software products for the Macintosh has appeared in the past year, most notably Pagemaker from Seattle-based Aldus Corp. and Illustrator from San Francisco-based Adobe Systems, Inc., which go beyond Apple's own Macdraw in capability.

Mike Bailey, program plans specialist at the Missiles and Space Division of Lockheed Corp., says the Mac publishing software obviates the need for programmers to get involved at stages of report writing, as was the case with mainframe-generated company reports.

Thom Holmes, director of office automation publications at Delran, N.J.-based Datapro Research Corp., says the firm looked at both the Macintosh and IBM PC publishing software before opting for the Macintosh. "The first wave of desktop publishing software for the Mac was really one dimensional, but that changed quickly," Holmes says. "Though PC [publishing] software is getting away from the command-driven mode and interfaces, it still has a way to go."

That gap could be closing, however. IBM has promised greater graphics capability and better user interfaces with upcoming PC product announcements, and a number of software vendors such as Aldus are entering the market with PC versions of their Macintosh publishing packages. Also, the new Intel Corp. 80386-based micros coming out have the power and promise to offer more in the way of graphics and publishing.

Overcoming stereotypes

All of this could take away some of the Mac's thunder in desktop publishing, but that is beside the point. Analysts agree that Apple is going to have to do more than use its desktop publishing hold as a means of multiplying its corporate installations. The Mac might now be facing its biggest barrier: the perception that the Macintosh is still, in the end, a special-purpose micro meeting the needs of only certain business users.

"We had some persuasive users who had Macintoshes at their homes," Storms explains. "They convinced us to look at them. I don't think we [in MIS] would have otherwise."

Gruhn at the Sierra Group says Apple has played the niche game and played it well. "But now everybody is playing the same game," she explains. "One thing is clear: Apple has taken on a more serious business demeanor. But I still don't know if the business community can forget Apple's image." Gruhn says. "Cute and corporate don't go together." ■

Kolodziej is Computerworld Focus *senior editor.*

SPECIAL SECTION

Desktop Publishing

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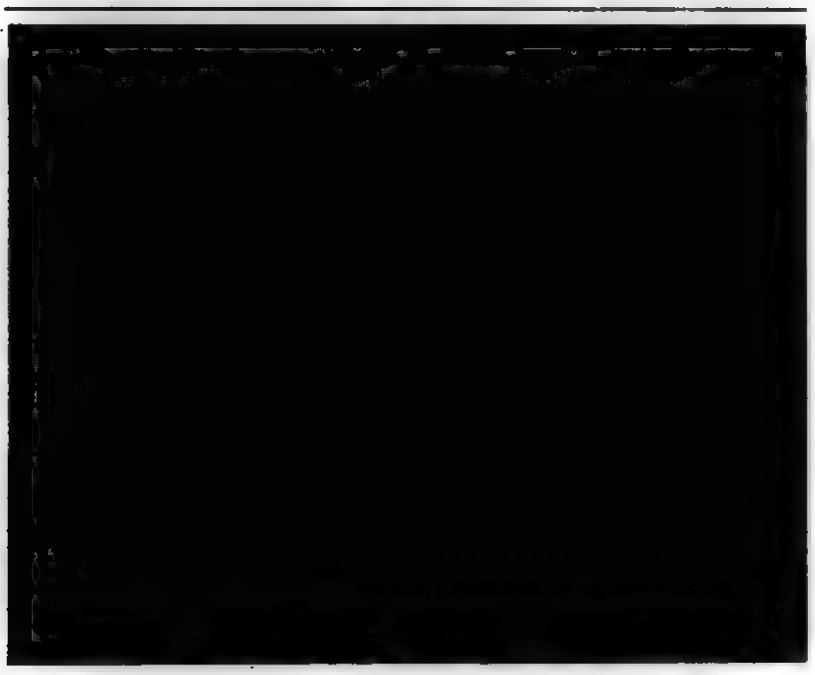

ELECTRONIC PUBLISHING IS THE PRODIGY OF the computer industry. Offering the ability to produce near-typeset-quality publications quickly and cheaply, it has captured the imaginations of thousands of users.

The wave of user interest received its impetus at the desktop level from the terrific trio: Apple Computer, Inc.'s Macintosh computer and Laserwriter printer and Aldus Corp.'s Pagemaker publishing software. For about $10,000, these products provide users with a fairly powerful desktop publishing system.

Interest has also extended to higher end publishing products that cost several times more, particularly among corporations with large-scale in-house publishing demands. Whether an organization has a large or small system, however, most users give computer-aided publishing systems rave reviews.

"Using our Interleaf, Inc. publishing system is 60% faster than using our Honeywell, Inc. computer," says Gail Greenwood, a production artist in the publishing group at McDonnell Douglas Communications Industry Systems Co. in Denver. With the Honeywell system, users had to use a separate program to format their documents, she explains. "If you had to edit it, you then had to rerun

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it through the format program and print the document." With the Interleaf system, a user can edit the formatted document and see how it looks before it is printed, Greenwood notes.

"In the last 20 years, I've had only two clients who could not make substantial improvements in the way they were publishing," says Jonathan Seybold, president of corporate consulting firm Seybold Publications in Malibu, Calif. In both these situations, the technology was not yet available, he explains.

Despite their capabilities, however, publishing systems are just tools, warns Suzanne Watzman, president of Watzman + Keyes, a Cambridge, Mass.-based consulting firm that specializes in developing in-house electronic publishing systems.

To provide a true solution, managers must identify their needs, establish a corporate plan, design standards and train people to use the system in addition to buying the equipment, Watzman advises. "You can't just plunk down $50,000; technology fixes won't do anything." Working out the changes these systems bring takes time, she asserts. Consequently, Watzman notes, "It's not the cost of equipment that does you in; it's the cost of training."

Moreover, managers considering electronic publishing, even a desktop system, should realize that this may alter not only the way materials are printed but also the job structure of the staff producing them, consultants agree. Some jobs may be created, while others are eliminated or redefined.

Updating the process

Electronic publishing does nothing less than change the process by which documents are produced and authorized. Using the old method, a manager would request a brochure, for example. A writer would come up with the copy and hand it to a designer for a mock-up. The writer and designer would then bring the mock-up to the manager for approval. If there were any changes, the whole process would be repeated.

Using an electronic publishing system, the new process is more of a team approach, Watzman asserts. The manager, writer and information designer meet to review the product and goals. Next, the writer works with the page designer on the system. The manager can then view it on the screen and make changes. Not only does this save paper and time, it also means that once the text is done, it's done, Watzman notes.

This process is likely to displace some production jobs, and employees in these areas may end up with positions that are more manual than creative. Writers and artists who were responsible for an organization's documentation and design, respectively, now may be required to know more about each other's roles, says Elizabeth Keyes, executive vice-president of Watzman + Keyes.

Electronic publishing has also created some positions, including information designer, visual editor, keeper of standards and internal consultant.

As the developer of a corporation's design standards, the information designer establishes a working base for employees in the other positions. The information designer is responsible for meshing design and content with corporate identity, according to Keyes. Therefore, the job requires an extensive combination of design, content (writing), graphics, management, engineering and human relations skills. This is a temporary, consulting position.

Once the information designer sets

Lights! Camera! Desktop Video!

WHAT'S THE NEXT step beyond desktop publishing? It is desktop video production, of course.

An entire class of video production machines, mostly based on the IBM Personal Computer AT, has sprung up to service the amateur and professional producer alike. At a cost of only a few thousands dollars (as opposed to hundreds of thousands of dollars for high-end systems), such devices allow the user to edit videotape, perform sound mixing, generate low-end computer graphics like logos and titles, experiment with special effects and turn out quality videos.

We may not be talking George Lucas-class films here, but this can be top-grade stuff. The PC systems are good enough that some TV stations in California use them instead of more expensive facilities. And, according to Gregory Solman, teleproductions editor of New York-based *Millimeter* magazine, a trade publication for television and film professionals, "PC-based systems are being used increasingly for everything from machine control to the production and postproduction environments."

For instance, San Francisco-based Cubicomp Corp. sells a complete turnkey system called Picturemaker for $36,500 and up. The system is an AT-based product that can claim NBC San Francisco affilate, KROM TV, as a user.

Or, if you just want a board-level product that will fit into an IBM PC or compatible that you already own, U.S. Video of Maitland, Fla., will sell you its Overlay 400 board for $1,200. "We've had several customers use the system to produce animated, business presentation graphics," notes David L. Medin, U.S. Video general manager.

So, have your agent look into it. It might be worth a screen test.

— Michael Tucker

MAKE
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corporate publishing standards, a company may hire a full-time visual editor to uphold these standards. The visual editor acts as a liaison between the writers and production artists, Keyes says. The job requires someone who understands both editorial and visual concepts.

A related position is that of the keeper of standards. This person ensures that the image a company presents is consistent, Keyes says. Unlike the visual editor, this person views the design standards from a top-level perspective.

In large corporations, the internal consultant assists and trains employees at other locations in how to apply the standards set by the information designer, Keyes says. "They're critical in making the whole thing work." This consulting position may be held by one or more people in the central publishing department who understand standards, the company's product and writing.

Also, in setting up the publishing system, companies will probably need a technically oriented employee or consultant to implement the typesetting and design codes in the publishing system.

An audit of company needs

Given the potential for far-reaching impact within a company, managers considering an electronic publishing system need to do an objective audit of the company's needs, Watzman and Keyes recommend. "They need to ask what their available resources are, what they want the system to do and what the system can't do yet," Watzman says.

Managers should also look at the different materials they are producing, Keyes says. "Look at the end-user needs and the corporate position," she suggests. "You may have been using 10 formats, but you probably only need two or three." A team that includes representatives from customer support and field sales as well as people from product development, publishing and corporate management should ask these types of questions. "The people who work with the end user know how well the materials are working," Keyes states.

Remaining objective during this internal audit can be tricky. Staff members must maintain their regular deadlines and do not have extra time for a full audit, Keyes says.

While self-auditing can be difficult, there are five steps users can take in choosing and implementing an electronic publishing system, Seybold suggests.

See **PUBLISHING** page 27

Scanners See Market Rise

THE FUTURE LOOKS BRIGHT for another side of desktop publishing — scanners.

Scanners are devices that take text and/or images on paper and convert them to electronic media. Depending on one's definition, scanners will range from machines that are similar to desktop copiers to optical character recognition (OCR) units.

Combinations of desktop copiers and OCRs are also showing up in the market, but for now they can be regarded as separate technologies.

A complex and still-experimental technology, OCR attempts to read text — that is, to recognize individual letters — and translate the text to ASCII code in which it can be managed by word processors.

OCR units are particularly useful in operations in which large masses of data from disparate printed matter must be converted to some standard electronic form for further manipulation. As such, these machines are already becoming important to large-scale publishing operations. They may become even more important to the chief information officer, whose job it is to manage diverse data to gain a strategic advantage.

However, OCRs may be less useful to desktop publishing, an area that is not as much interested in the strategic manipulation of data as in its what-you-see-is-what-you-get presentation. For the average desktop publisher, an image scanner, which simply takes the image of a document and converts it to a bit-map display, may be the better tool. With a scanner, pictures or text can be taken from almost any source and faithfully reproduced by laser, ion deposition or even impact printer.

The importance of scanners to desktop publishing may best be seen in the recent alliance of Aldus Corp., Hewlett-Packard Co. and Microsoft Corp. Under the terms of a pact announced in last October, the three firms will cooperate in the production of a desktop publishing kit with Aldus supplying its Pagemaker desktop publishing software, HP providing computing and printing hardware and Microsoft contributing its Windows operating environment and word processing software.

This month, HP will also announce Scanjet, an IBM Personal Computer-compatible desktop scanner. Scanjet is bound to strengthen the already forbidding Aldus/HP/Microsoft front. Equally important is that the product is one of a new generation of scanners that are so inexpensive and user-friendly that even the desks of quite small desktop publishers can support them.

Indeed, Scanjet's introduction raises the interesting question of whether scanners of some sort will not eventually be a standard component of everyday word processing, the way that printers are already.

— **Michael Tucker**

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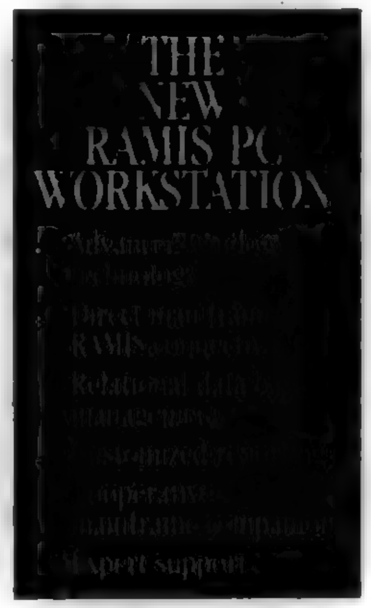

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CIRCLE READER SERVICE NUMBER 268

Jose Ramos, Publisher of "WYSIWIG"[1]	Ease of use	Sophistication of graphics capabilities	Sophistication of text functions	Ability to import and export documents	Overall performance, power and reliability
Apple Computer, Inc. Macintosh Packages					
Aldus Corp. Pagemaker 1.2	3	2	2	2	3
Letraset[2] Ready-Set-Go 3.0	3	3	3	2	3
P.S. Publishing, Inc. P.S. Compose	3	0	3	2	2
Microsoft Corp. MS-DOS Packages					
Aldus Pagemaker 1.0	3	2	3	2	3
Studio Software Corp. Front Page 1.1	2	2	2	1	2

[1] "WYSIWYG" is a newsletter for computer-aided publishing.
[2] Developed by Manhattan Graphics Corp.

Keith Thompson, President of Lexington Research, Inc.[1]	Ease of use	Sophistication of graphics capabilities	Sophistication of text functions	Ability to import and export documents	Overall performance, power and reliability
Apple Computer, Inc. Macintosh Packages					
Aldus Corp. Pagemaker 1.2	4	3	2½	2½	3
Letraset[2] Ready-Set-Go 3.0	2½	1	3	3	2½
Boston Software Publishers Macpublisher II 2.69	1	2½	2	2	2½
Microsoft Corp. MS-DOS Packages					
Software Publishing Corp. Clickart Personal Publisher	3	2½	2	2½	3
Xerox Corp. Xerox Ventura Publisher 1.0	2½	3	3	4	3½

[1] Lexington Research provides application evaluations.
[2] Developed by Manhattan Graphics Corp.

TAKING A CUE FROM such venerable movie critic teams as Chicago-based Gene Siskel and Roger Ebert, *Computerworld Focus* asked two desktop publishing software experts to rate some of the better known packages on the market today.

Jose Ramos is an industry consultant and the publisher of "WYSIWYG," an electronic publishing newsletter located in Redwood City, Calif. Keith Thompson is the president of Lexington Research, Inc. in Lexington, Mass., where he evaluates applications, including several publishing packages.

Ramos and Thompson each rated five publishing applications on a scale of 1 to 4 (see chart above). The following are specific comments by both men about the packages they rated.

JR: "Pagemaker 1.2 is the best first-generation desktop publishing package. It provides page layout, but it doesn't incorporate word processing."

KT: "Pagemaker 1.2 is the easiest to learn, but it does not export anything to other packages."

•

JR: "Ready-Set-Go is shaping up to be the best second-generation publishing package, and it's the best package for the Mac. It provides word processing as well as hyphenation and justification. Ready-Set-Go is beginning to move toward third-generation software, which will have greatly improved graphics."

KT: "Ready-Set-Go is the fastest thing on the Macintosh. It's not as reliable as it could be or hopefully will be, though. Also, users can't copy a graphics element and use it elsewhere; they have to recreate it. This should be relatively easy to correct."

•

JR: "PS Compose is not in the same league [as the other two Macintosh packages]. It started off as a code-driven typesetting package that was improved for desktop publishing, but PS Compose doesn't offer the functionality of, say, Ready-Set-Go."

•

JR: "Pagemaker 1.0 on the PC might be good if users already have Pagemaker running on Macintoshes and want to integrate Macintosh and Personal Computer files. But it's slower on the PC than it is on the Mac, and it's still a first-generation package."

•

JR: "I like [Frontpage 1.1], but a lot of the icons are confusing because they were designed for graphics artists. These are so ingrained in the program, it would be hard to tear them out."

•

KT: "The Ventura Publisher 1.0 product has a full range of graphics tools and very sophisticated kerning. It also can import and export files from popular word processing software packages. Ventura is not for the casual user; someone without layout experience will have problems."

JR: "Ventura is the best publishing package for the IBM PC."

•

KT: "Macpublisher II is rather confusing and takes a long time to learn. It doesn't follow the conventions of most Macintosh programs."

•

KT: "Clickart Personal Publisher is a fun program, but its performance should not be compared with the other applications. It's a lightweight package and is not really intended for documents of more than two pages. It performs nicely, though, and has an uncanny resemblance to Macintosh packages."

Desktop Publishing Packages: Feature Comparison

Company/Product	System Runs On	Price	Memory Required	Pages Per File Supported	Hard Disk Required	Full Page View	H&J[1]	Interactive WYSIWYG[2]	Automatic Pagination	Text Wraps Around Graphics	Kerning[3]	Graphics Cards Supported
Aldus Corp. Pagemaker 1.2	Apple Computer, Inc. Macintosh	$495	512K bytes	16	no	yes	no	yes	yes	no	yes	N/A[4]
Aldus Corp. Pagemaker 1.0	IBM Personal Computer XT, AT or compatible	$695	512K bytes	128	yes	yes	yes	yes	yes	no	yes	Hercules[5] EGA[6]
Boston Software Publishers Macpublisher II 2.69	Macintosh	$195	512K bytes	100	no	yes	no	yes	yes	no	yes	N/A
Letraset Ready-Set-Go 3.0[7]	Macintosh	$295	512K bytes	limited by memory	no	yes	yes	yes	yes	yes	yes	N/A
P.S. Publishing, Inc. P.S. Compose	Macintosh	$800	512K bytes	200	no	yes	yes	yes	yes	yes	yes	N/A
Software Publishing Corp. Clickart Personal Publisher	IBM PC or compatible	$185	512K bytes	99	no	yes	no	yes	no	no	no	Hercules, EGA, CGA[8]
Studio Software Corp. Frontpage 1.1	IBM PC XT, AT or compatible	$695	512K bytes	8 per job	yes	yes	yes	yes	no[9]	yes	yes	Hercules, EGA, CGA
Xerox Corp. Xerox Ventura Publisher 1.0	IBM PC XT, AT or compatible	$895	640K bytes	120	yes	yes	yes	no	yes	yes	yes	Hercules, EGA, CGA

[1] Hyphenation and justification
[2] What you see is what you get
[3] Kerning is the reduction of space between characters
[4] Not applicable for Macintosh packages
[5] Hercules Computer Technology, Inc.
[6] Enhanced graphics adapter
[7] Developed by Manhattan Graphics Corp.
[8] Color graphics adapter
[9] Provides automatic page numbering but not page jumping

PUBLISHING from page 25

Like Watzman and Keyes, he recommends focusing on the publishing process and the people involved.

The first step managers need to make is to take a systems view of the entire publishing process, from creating information to putting it in the recipient's hands, Seybold states.

The nature of the documents will affect the publishing process. Some may be published only once; others more frequently. The key is to understand the whole process. "The biggest mistake is to automate only part of the process," Seybold warns.

Second, managers need to make a mental model of how they would like the process to work. "To create this model, companies should form a small task force," Seybold recommends. This task force should consist of employees who represent the different constituencies involved in the publishing process. "The leader of the group should have an analytical frame of mind and the ability to take a broad view," Seybold says. "Most people get mired in the details and lose sight of crucial factors."

Don't get sidetracked

For example, one client Seybold assisted had a task force that was focusing its attention on text composition systems. When Seybold's analysts asked them about their documentation, though, they took great pride in describing their graphics. "Graphics was their greatest cost, but they were looking at a text system."

The third step company managers must take is to analyze the cost per benefit. The real reasons why users want to improve the publishing process include better control, faster turnaround time and improved quality, Seybold claims. However, these reasons are not easily quantifiable in terms of cost.

Instead, he says, managers should look at values that can be quantified, such as the cost of purchasing outside services vs. providing them in house. Most people then use these hard numbers as the basis for the budget they present to upper management, Seybold says. Some daring employees will assign a value to control or timeliness, he notes, "but if you can cost-justify the system without that, it's a lot less debatable."

Fourth, managers need to identify the combination of publishing procedures and electronic publishing system best suited for the firm's applications. Different software packages are better for different publishing requirements, Seybold notes. "Aldus Pagemaker and Xerox Corp. Ventura Publishing Software are both good programs with specific sets of strengths and weaknesses," he points out. "There are many situations where Pagemaker is better and many others where Ventura is."

For example, the Ventura package works on the IBM PC, can be difficult to

PCs Drive Mag's Composition

ONE STORY THAT SAYS much about the fate of desktop publishing technology is that of Roger Black, art director for *Newsweek* magazine.

Black was recently asked to become a consultant to *Eco*, a general-interest publication based in Mexico City. At his suggestion, *Eco* is using the Ventura desktop publishing system from Xerox Corp. of El Segundo, Calif. "Ventura didn't seem right for *Newsweek*, which is a very big operation with its own dedicated Atex Corp. system," Black says. "But for a new launch, it seemed appropriate."

Black recommended a personal computer-based system due to the unusual economic requirments of the start-up publishing venture. "*Eco* was interested in PC-based systems for two reasons," he says. "First, it couldn't afford a minicomputer-based system and, second, the pool of journalistic talent in Mexico is small. So, handing out PCs to everyone is interesting. You can increase the productivity of the staff you do have."

And, in turn, Black was interested in *Eco* as a proof of desktop publishing as a technology. "I knew that if it would work in there, it would work anywhere."

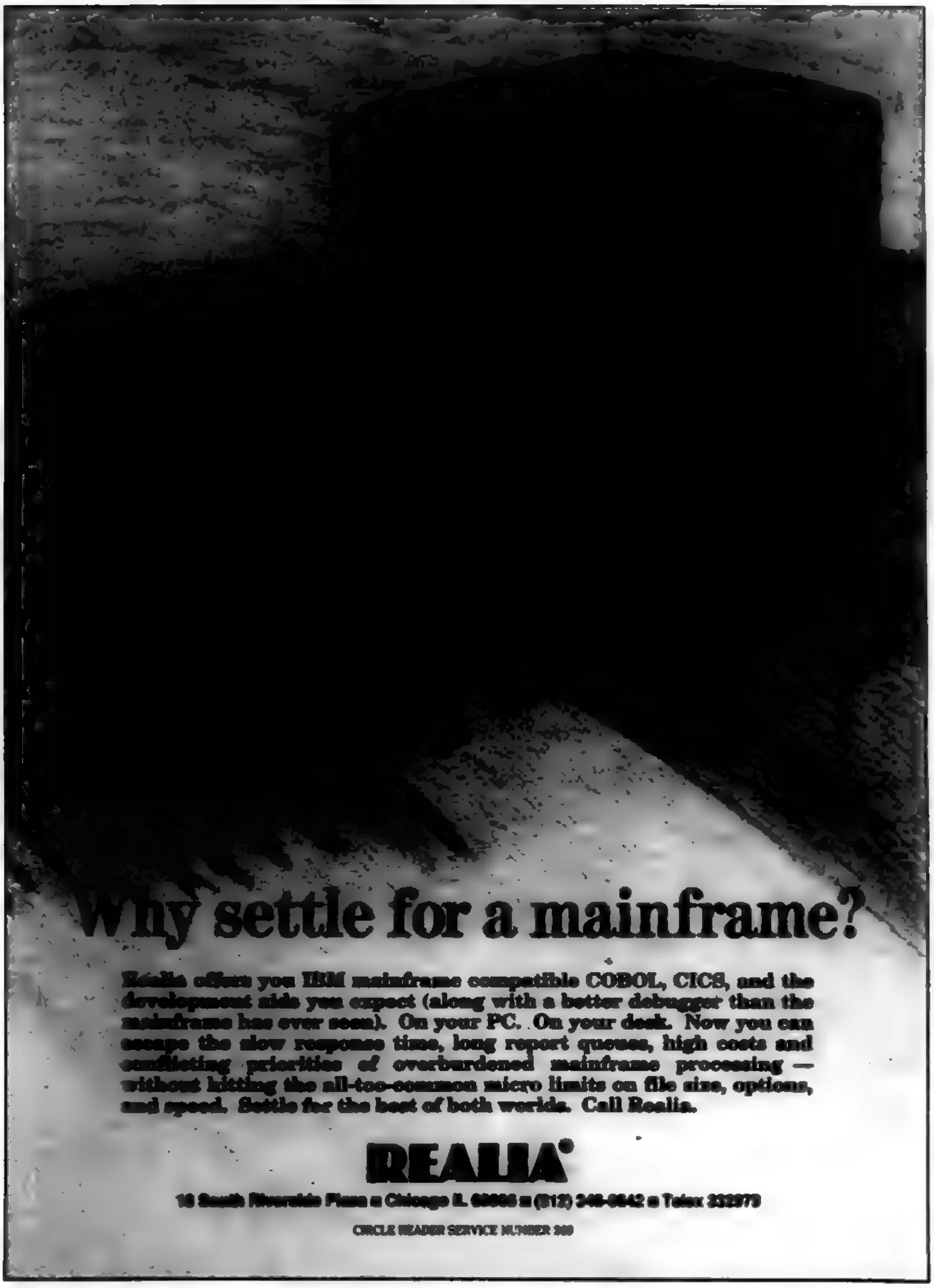
Roger Black

By January, Black had the proof he wanted. *Eco* was set to publish using five Ventura systems and a laser printer/typesetter. To keep cost and complexity down, the machines will not be networked, rather, documents will be transferred by the physical exchange of floppy disks and telecommunications will consist of a modem. It all worked and did so very inexpensively. "The whole setup is probably going to cost less than $100,000 . . . and for that we're going to be doing typesetting as well as all editorial functions in-house."

Ventura did have its failings. Black notes "the drawbacks we found were in handling pictures. At this point, it looks like we won't be doing extensive photo layout with the Ventura."

However, overall, Black is pleased with Ventura. If he could, he would introduce it to *Newsweek*. "If we could find a PC-based system that did layout as well as Ventura and that could link up with the Atex system, we'd buy it today."

—Michael Tucker



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PC System Gets High Nielsen Ratings For Production Control

DESKTOP PUBLISHING HAS firmly established itself as a major industry and an important tool for computer users in the corporate world.

A. C. Nielsen Co. of North Brook, Ill., produces documentation for mainframe and IBM Personal Computer software. Traditionally, the firm has used a professional typesetter to turn its documents into printed matter. However, in 1986, Nielsen decided to experiment with Superpage II, a $7,000 high-end, PC-based system from Bestinfo of Springfield, Pa.

"Last year, we did a 2,700-page manual for some mainframe software," says Nielsen senior writer Mike Ellsworth. "This year, we're bringing out a PC-based version of the software. Before, we [did] the manual with a typesetting company, but this time, we're doing it in-house with Superpage."

Why go with a desktop system when Nielsen could easily afford a professional typesetter? "Control as much as anything," Ellsworth explains. "Our experience with typesetters was probably better than average, but that still wasn't very good." Specifically, Nielsen found its galleys tended to return from the professional typesetting company swarming with errors. The problem wasn't incompetence, only that communication between Nielsen and the typesetter broke down occasionally.

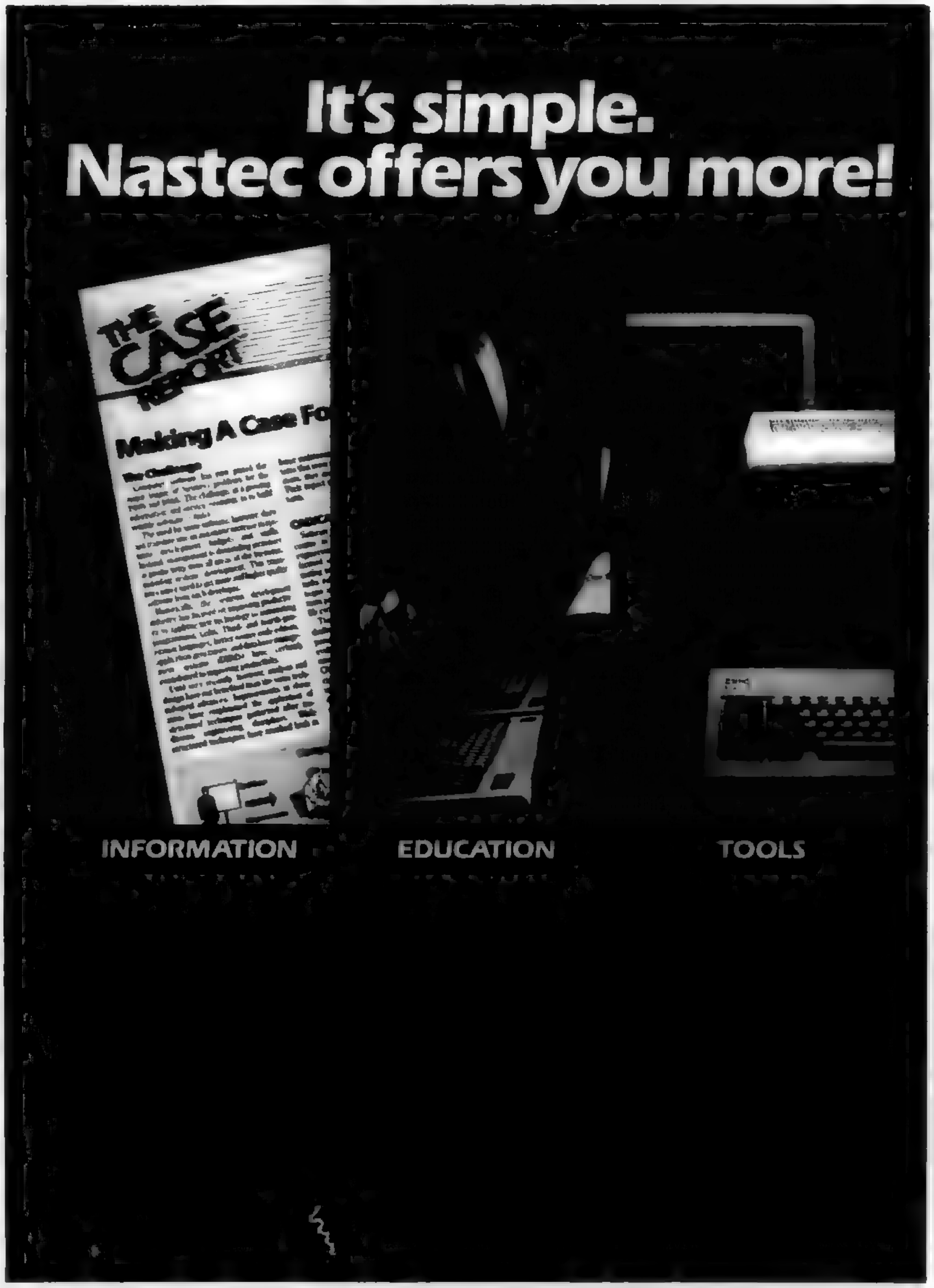
So, Nielsen took its typesetting operation in-house, where mistakes would occur but not as often. "We also hope to save a little money," Ellsworth notes.

Ellsworth says that there have been some problems with the Bestinfo product. "We have Superpage 2, and when that first came out, it was full of bugs. But, the company came out with a corrected version and that seems far better," he says.

There are also some features Ellsworth would like to have seen in Superpage. "We'd like to have a way to globally delete pages," he says.

On the whole, Ellsworth says he is satisfied with the product. "We're pretty pleased with Superpage. . . . Sometimes I do wonder if it isn't overpriced, now that so many other desktop publishing packages have come out. . . . but it does do what Bestinfo says it does." As for desktop publishing, though, he has no doubts at all. "The control it gives you is enough, even if it doesn't save any money at all."

— Michael Tucker



learn but has some extended functionality. Pagemaker works on Apple or IBM machines, is easier than Ventura to learn but does not offer the same capabilities that the Xerox software does. (See chart page 26.)

In addition to Seybold's guidelines on purchasing software, electronic publishing users have a few of their own suggestions for choosing software. A key strategy is to talk with people who use a software package that you are interested in, says Nancy Cooper, who handles publishing in the Information Systems Group at Hospital Corporation of America in Nashville. "If a vendor won't give you a list of users to talk to, I'd seriously consider another vendor," she states.

Managers should also bring samples of their documentation to the vendors and watch them produce samples on their systems, McDonnell-Douglas's Greenwood recommends. "Look to see if the vendors can reproduce or improve upon what you've brought in."

While reviewing packages, managers should not lose sight of the people who will be using them, Seybold says. "You must look at the people, process and software programs as a whole."

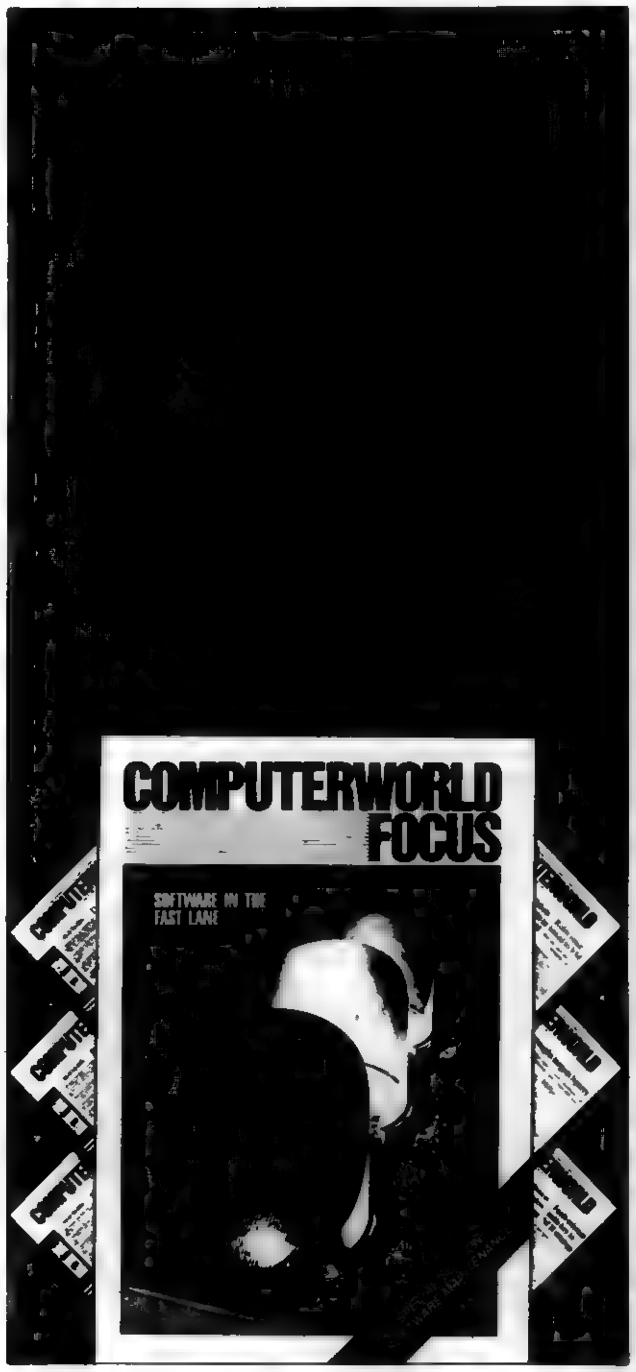
Getting users involved

Fifth and finally, Seybold recommends that managers need to merge their system selection and implementation procedures. "The people who are responsible for implementing the publishing system should be actively involved in selecting it and using it," Seybold says. Users should feel they are working with a system that they helped choose. This user input is significant because the installation of publishing systems is making fundamental changes in the way businesses operate. Therefore, a lot of the system's success depends on the enthusiasm, willingness and creativity of the people in charge of implementing it.

"If users are part of the decision process, they will find all the ways they can to make it work. If it's imposed on them, they'll find every reason for it not to work," Seybold claims.

The same considerations should extend to deciding and implementing design standards, Keyes states. "With any new standards, users have to learn the changes. That's why you encounter resistance," she explains. Managers have to understand these internal politics, she says, and get the right people involved at the right time. ■

Hurst is a Computerworld Focus *senior writer.*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BUYING DECISIONS

Mail-Order Micros Win Stamp Of Approval

BY·REBECCA·HURST

The best buy for the buck. Better service. Wider selection. These are the advantages some mail-order personal computer firms promote and deliver increasingly to corporate buyers.

The fastest growing section of mail-order PC buyers is the Fortune 2,000, claims Michael Dell, president of PC's Limited, an Austin, Texas-based mail-order firm. "Eighty-five percent of our machines are placed in business office sites," he says.

Mail order is a good distribution channel for corporate users, agrees Ian Warhaftig, a senior market analyst at Framingham, Mass.-based International Data Corp. (IDC) and a PC's Limited customer. "There's no sense in paying a computer specialty store's markup if you do not require the support it offers," he says.

Mail-order firms that manufacture their own IBM Personal Computer compatibles can save users 30% to 40% because they eliminate the reseller market cost, Dell notes. By contrast, personal computers from companies such as IBM or Compaq Computer Corp. sell chiefly through retail chains. Of course, IBM and Compaq answer large-volume requests with low-cost direct sales. Even so, some large corporate users are turning to mail-order houses.

Burlington Northern Motor Carriers, Inc. of Fort Worth, Texas, already had purchased 100 to 150 PC ATs directly from IBM when it decided to employ clones for a local-area network (LAN)-based order entry system, says Dennis Styles, Burlington's data center manager. "We felt the nature of our application went with the AT's capabilities," he explains. "We also knew that IBM's support was a carrot dangled in front of us. It was there, but it was difficult to get."

The problem was not maintenance, Styles says, but technical support. "We were doing some leading-edge things," he recalls, "but I wondered whether IBM would provide the support we required." In addition, Styles questioned the conditions of buying directly from IBM. "IBM's volume purchase agreements make us duty bound to buy a certain amount of machines," he explains. "But, we're in a dynamic environment, and I didn't know how many we would need."

After evaluating different AT clone vendors, Burlington chose PC's Limited and installed approximately 80 to 100 units, Styles estimates. "PC's Limited offered pretty good support," he explains. However, the firm needed "national support because our computers are spread [throughout] five states." To provide more extensive support services, Styles contracted Minneapolis-based National Computer Systems, Inc., a computer maintenance organization that was willing to service PC's Limited machines. Since that time, three or four other companies have asked National Computer to support PC's Limited products, he says.

Even without the National Computer contract, Styles says, he still would have gone with PC's Limited. "I figured that if we didn't get a service organization, we could afford to have four or five hot spares lying around in case we had to send a faulty PC back to the company," he explains. "They're inexpensive enough that the justification is just fine."

For companies purchasing smaller volumes of PCs, a chief concern is the business relationship a manager has with a retail store or mail-order firm. "Mail-order firms have far more knowledgeable people than retail stores," claims E. Allan Cariker, director of computer systems for the Dallas Cowboys Football Club, Ltd. in Irving, Texas.

Mail-order companies are also more helpful, Cariker says. "Mail-order people are much more motivated to help you get the answers you need, even if that means telling you to buy from someone else." Retail sales people tend to use delay tactics such as saying they will get back to you, he comments. Also, mail-order vendors will accept a

KATHY BRAY ILLUSTRATION

user's description of a computer problem and take action, Cariker notes.

On the other hand, the retail channel can work *for* business users. The Dallas Cowboys use a combination of name-brand PCs from a local retail store and IBM PC AT and XT clones manufactured and sold by PC Designs, Inc. of Tulsa, Okla. These systems primarily are used for general office applications such as word processing, accounting and data base management. "If I need something right away, I'll use a local dealer because I can usually get a good deal," he says.

The relationship with this dealer works well, in part because of Cariker's tenure as a customer. "The man has dealt with me enough that there are no questions asked," he explains.

Beyond service, another reason for going the mail-order PC route is simply the ability to get the configuration that is right for you. PC Designs' clones are not standard configurations, Cariker explains. For example, some users require high-resolution or desktop publishing monitors and retail stores may not be able to provide these components easily, he says.

The availability of components was also a factor behind Burlington's decision to buy from PC's Limited, according to Styles. At first, Styles evaluated AT clones from Tandy Corp. as well as PC's Limited; however, Tandy could not provide the fully configured system he specified. "We wanted an IBM 5251 terminal emulation card so the PCs could talk to an IBM System/36 or 38," Styles explains. "Tandy didn't have the card, and we didn't want to dedicate our resources to putting them in ourselves." Styles opted for PC's Limited, which purchased 5251 emulation cards from Ideassociates, Inc. and installed them in the micros before shipping them to Burlington.

Too much work for MIS

The desire of Burlington and the Dallas Cowboys for complete systems is shared by most corporate users. A fully configured system should include a monitor, monitor card and serial and parallel ports in addition to the CPU. "MIS directors don't want to bother with building these systems," IDC's Warhaftig states. "They're working 12 hours a day to get their current work done; they don't want any more."

However, corporations with technical or industrial applications often prefer to purchase PC components and build customized systems. DP managers from such companies turn to specialized mail-order firms that provide particular casings, cards, coprocessors and peripherals along with PC-compatible CPUs.

"We don't sell a plain vanilla PC," says Chuck Philyaw, president of ICS Computer Products, Inc. in San Diego. Instead, the systems are often rack mounted and come with a 32-bit coprocessor and 50M to 60M bytes of memory. "A lot of engineering applications are number intensive and load down the PC," Philyaw explains. Also, the large amounts of memory used require more processing power.

Mail-order firms such as ICS will act as systems integrators and provide fully configured computers, but many customers choose to build the systems themselves. "Our customers are typically engineers," Philyaw says. "They like to fiddle with things and customize PCs to suit their purpose."

The Woods Hole Oceanographic Institution in Woods Hole, Mass., purchased components from ICS to build a customized PC that controlled Jason Jr., a vehicle that photographed the *Titanic* shipwreck last summer. "We were already familiar with the PC," explains Jim Newman, a research engineer at Woods Hole. The PC had a twofold purpose, he says. Receiving information from sensors and the joystick that directed Jason, the computer would decide what commands to give the vehicle. In addition, the computer displayed this information to scientists on the ship.

The CPU of the PC that drove Jason was a standard Intel Corp. 8088 with an 8087 coprocessor. However, to be shipshape for the demands of the high seas, the system had to meet several special requirements. "The PC had to be rack mounted, and we wanted a bubble memory disk for reliability," Newman says. "We didn't want a keyboard or any movable parts such as a floppy or hard disk drive."

Initially, Woods Hole looked at IBM's rack-mounted computers, but the institution realized that it would have to go to outside sources for some of the other components, Newman recalls. Then, out of the blue, Newman received an ICS catalog. With ICS, Woods Hole could buy everything it needed from one place, he reports. The institution ordered two PC systems from ICS, one as a backup. "We never needed the backup, but losing a diving expedition costs a lot more than the computer, so we don't just take one of anything," Newman explains.

The computers came as individual parts that plugged into the chassis, but Woods Hole customized the PCs further. "We built an interface board that conditioned the signals coming in from the sensors, added a plug to the chassis and disconnected the ac ground," he reports. "We also added a custom-built graphics card that superimposes video and graphics on a monitor."

Significant cost savings

One experience all three users shared was a significant cost savings. Burlington saved about $1,000 to 1,500 on each of its IBM Personal Computer AT clones, according to Styles. The Dallas Cowboys' Cariker reports similar savings for the football club's AT clones and savings of $600 to $800 for its XT clones. For ICS's rack-mounted PC, Woods Hole's Newman reports even greater savings in the neighborhood of $3,500 over IBM's machine.

While cost is a primary issue for users, it is not to the exclusion of other factors. "There are a lot of mail-order systems out there, but many don't fit the needs of the MIS director in terms of proven name and service," Warhaftig asserts. "I wouldn't buy from any mail-order house, only a few. I don't want a product that's going to give me headaches in two months."

Cariker concurs, saying, "I've bypassed many mail-order firms. I checked the background on PC Designs before buying from the company. I believe they want to deliver a high-quality product at a good price."

However, even reputable firms are likely to raise the eyebrows of upper management. Mail-order computer houses are relatively unknown to corporations, and they don't offer the Big Blue security blanket of IBM. "Management instantly had questions when I decided to go with PC's Limited," Styles reports. "But the organization let me go ahead based on my experience."

While all the users who spoke with *Computerworld Focus* were happy with their mail-order PCs, each reported minor problems. These were primarily compatibility issues common among clones. In some cases, the mail-order vendors quickly provided solutions. In others, users adjusted their use or choice of software.

For example, the BIOS chip on the enhanced graphics adapter card in Warhaftig's PC's Limited computer did not run Microsoft Corp.'s Flight Simulator. However, PC's Limited sent him a replacement BIOS chip that should alleviate the problem, he reports. In addition, Warhaftig's mail-order system has 1M byte of random-access memory. That is a problem for Microsoft Corp.'s Windows, which was written for 640K bytes of memory, he says. "The software gets mixed up by the extra memory," Warhaftig explains. "I solve the problem by loading the system with software; then it works fine."

Burlington also has a software compatibility problem. "Our PC's Limited computers work in all but one situation," Styles reports. "We couldn't use IBM Basic, so we had to go with [Microsoft Corp.'s] GW-Basic."

Motherboard problems

Also, a problem with the systems' motherboard required help from PC's Limited, Styles recalls. The PCs at Burlington are connected to Novell, Inc. LANs through network interface cards. The first PC's Limited AT clone worked fine, but a second test group of four or five computers had different motherboards that were incompatible with the network interface cards, he says.

Thinking the problem was in a read-only memory (ROM) chip, PC's Limited sent Burlington several versions of ROM chips before discovering that the problem lay in the vendor's mini I/O card. Once the mail-order firm switched the settings on the proprietary card, the computers worked in any network configuration, Styles says.

At the Dallas Cowboys headquarters, Cariker discovered that his PC Designs computer would not support the Control Data Corp. 86M-byte disk drive he had installed. "I called PC Designs, and they sent me a new chip overnight," he says.

Users were generally satisfied by the support and response they have gotten from their mail-order vendors, although Burlington's Styles notes that there is room for improvement. "When I call PC's Limited about a problem, I can't go to the person I talked to before," he explains. "IBM is willing to appoint one person who is responsible for my account and any problems I have."

Styles attributes the problem to the mail-order firm's inexperience in dealing with large corporate accounts. "I think it's gotten better," he says, "but this is one area in which the company has to grow to meet large corporate demand." ■

Hurst is a Computerworld Focus *senior writer.*

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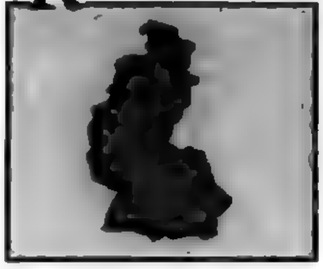

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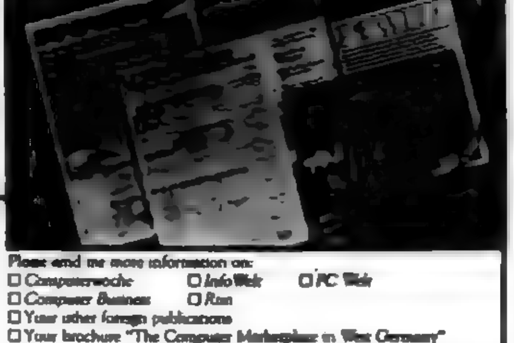

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Routes To System Upgrades

BY AARON GOLDBERG

Extending the life of an organization's personal computer investment is key in these cost-conscious times. Innovations are forcing companies to keep up or flounder, but such products are not cheap. MIS is searching for ways to upgrade existing PC systems and get them ready for the next-generation technology.

Currently, it is not extremely complicated to enhance the utility of existing systems purely for performance. There are two reasons why MIS would get involved in such a move. The first reason is to make older, slower systems more functional for users unhappy with systems performance.

The second reason, and focus of this article, is to take existing products and position them for the new operating environments that should be announced soon.

Before embarking on such an upgrade venture, MIS must understand the categories into which each of its systems falls. It must forge a plan for personal computer usage in which there is clear justification for either a Microsoft Corp. MS-DOS 3.1 performance upgrade or a system replacement with the company's anticipated Advanced DOS or 386 DOS.

MIS must answer preliminary questions before choosing hardware and software. Often, the tendency is to skip the initial steps and just choose the products.

But, until MIS managers discover the answers to the following queries, they should not take out their checkbooks or purchase orders:

■ Do you have a true picture of each application and its use to gauge the need for new environments like Advanced DOS or 386 DOS, and when this need will occur?

■ Do you understand the different PC user types? What are the various needs of power users, support personnel, plant managers and so on?

There is no longer a viable corporatewide standard product in any product area because of the individuality of use and application.

■ Is there a way you can pass down older systems to nonusers or users now sharing PCs, rather than trying to retrofit the systems?

There is a rather smug school of thought that says that the present MS-DOS operating environment is so rich and full that no one could ever need more. This may be true for some groups of users, but technology will always march onward.

Connectivity will always play a large role in upgrade issues. A plan for varying levels of connection must exist as well as for how the integration will be structured.

For instance, MIS managers must take into account whether a user needs four bottom-line numbers monthly from a printout or the ability to run microcomputer versions of mainframe products like Information Builders, Inc.'s Focus or even IBM's future DB2 product.

The next step in discussing a personal computer's upgrade potential is to outline the options and time frame for moving to the next-generation environments. There will be five distinct operating environments: the existing Microsoft MS-DOS 3.1 product set; IBM's new low-end graphics systems; the Apple Computer, Inc. Macintosh; Advanced DOS with greater than 640K bytes of addressable memory and Intel Corp. 80286 protected mode; and the Intel 80386 personal computer operating systems.

The IBM graphics systems should be introduced any day now. This set of products reportedly will use all of the existing MS-DOS or PC-DOS software, will utilize a standard graphics environment (could this be Microsoft Windows' big break?) and will have device drivers for some IBM-developed, application-specific integrated circuits.

This architecture can be viewed as an extension of PC-DOS. Technical capabilities will be virtually identical in terms of memory addressability and system performance.

UPGRADE PLANS

The Macintosh is now a true contender for business microcomputer applications (see story page 21). In many companies, it is impossible to get two hours on a Macintosh, while some IBM Personal Computers sit idle. With Appleshare and the 3270 links that were introduced and some better hooks to the IBM PC-DOS and mainframe worlds, Apple will be the machine of choice, one that cannot be overlooked.

The much-rumored Advanced DOS will provide the first real improvement in MS-DOS's capabilities, but upgrades are likely to be difficult. Advanced DOS will allow the program area to expand beyond the 640K-byte limitation and will make available true multitasking.

A brick wall between environments

On the negative side, old applications will not run in the Advanced DOS mode. The only way to run old applications on an Advanced DOS machine will be to run them as only one task with the 80286 system booted as an old MS-DOS operating system.

There is no chance of loading up a bunch of old applications to run in the available megabytes of memory there are now. There will be a brick wall between the old environment and the new. Applications will have to be rewritten to the level of new binaries to run in the Advanced DOS mode.

The Advanced DOS operating environment should hit the market during the third quarter of 1987, but the confusion surrounding the operating system will likely start much sooner.

The furthest development on the horizon is an 80386 version of the MS-DOS environment. This 80386 product will likely have the best upward migration for existing MS-DOS 3.1 applications because of the virtual machine mode of the 80386.

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Most major vendors and system software companies say that the 80286 will enjoy less than half of the 10-year useful lifetime that they ascribe to the Intel 8088, 8086 and 80386. Indeed, it is this issue of transition from 286 to 386 that is the most puzzling and will have the most impact on system migration. The 386 operating environment will not likely be released before first-quarter 1988.

The real question for systems professionals will be what to do for the upgrade from existing MS- or PC-DOS applications to either the 286 or 386 environments.

The point is moot

Macintosh installations will render this point moot, and the low-end graphics path is not a direction that large organizations should take for the future. Therefore, the problem becomes how to get to Advanced DOS or 386 DOS from a firm's current environment.

Some of you may ask, 'Why not just upgrade old systems into the new environment?' This is not a useful way to deal with more than a handful of systems. What you will be trying to do is take a compatible system, add compatible boards and compatible software to create a system compatible with a new environment.

In the best case, you will have a compromise system that is usable, but still costs an average upgrade configuration price of $2,000, and in the worst case, the resulting setup will not work at all. Considering that the migration from 286 systems to 386 systems may happen in less than two years, will you want to go through another upgrade?

The maxim that "The installed base is gold" fits for nearly all companies but I believe that view is shortsighted. The changes in the MS-DOS environment will be massive, and trying to approximate these changes with modifications to old systems will be equivalent to planting a time bomb for the support organization.

Timing is everything. System migrations should be done when products and applications — not technocrats — demand it. The first vestiges of Advanced DOS will not come before the end of summer and Advanced DOS-based applications products (in any number) will not be available until at least six months after that time. Therefore, there is still about one year to make plans for the product's impact.

In addition, MIS has about one more year after the advent of Advanced DOS before 386 DOS becomes part of the mainstream.

Migration is painful

It is clear that migrating from today's environment to Advanced DOS will be painful, and going from Advanced DOS to 386 DOS will be no less difficult. Therefore, the key question is, What should your company do, hold off for another 18 months and wait for 386 DOS or use Advanced DOS when it is available this fall? Unfortunately, there are no pat answers.

Moving to Advanced DOS will have some important advantages for those that choose this route. It will provide an immediate relief from the 640K-byte limit.

It is also expected to run on existing Personal Computer AT-class systems with little or no hardware changes. Advanced DOS will also allow users to run existing applications on the same system

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in much the same way as today.

Advanced DOS's positive points are primarily in leveraging existing hardware platforms and maintaining some ties with the past. For companies that have segments of end users who are already past the breaking point in terms of MS-DOS limitations, the near-term relief is an important selling point. There should be some interesting applications that will also be developed for this environment. Improvements in operability and the number of options in a specific software product are sure to be main features.

On the negative side, Advanced DOS will have some important limitations. First, backward compatibility will be achieved at the expense of allowing new applications to run. Moving from the old to new environments essentially involves rebooting the system, although this action may not appear as such to the user.

As for hardware, the 80286 is not nearly the ground-breaking processor design that the 8088 or 80386 embody. There are a number of recurring bugs in the processor design that Advanced DOS is proving especially adept at finding.

While the 286 clearly offers the best hope for expanding MS-DOS's limits, this is merely a short-term solution. Long-term efforts almost exclusively surround the 80386 camp. Concerns about Advanced DOS/80286 consist of long-term viability and the amount of software development for the 286 vs. the 386.

It is folly to predict that the PC market will make a major change to one of these environments followed by another major change to a different environment a scant two years later. While it is expected that virtually every major software and hardware developer will have Advanced DOS products, these offerings may merely be rewrites of existing applications and waystations in the product development cycle with true innovation saved for the 386 DOS.

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The issue of 386 DOS is a little harder to evaluate with certainty, given that the product is not yet even fully specified.

On the plus side, 386 DOS will take advantage of full 32-bit addressing; use 386-specific instructions, such as the 4-byte fetch, which will improve applications speed significantly; utilize the virtual mode of the 386 to provide multiple 8086 tasks; eventually allow for a combination of operating environments, such as MS-DOS, Unix and, perhaps, VM on a single system; and take advantage of the truly awesome performance of the Intel 80386 chip.

Clearly, benefits surround the landmark advances in the 386 design. There is no doubt that the 386-based systems will outperform the 286 systems; taking advantage of this fact will be a major factor in the success of 386 DOS.

On the down side, 386 DOS is currently vaporware. In all fairness to Microsoft, it should not be expected that developing as complex a piece of software as 386 DOS would happen overnight, but it is difficult for MIS to plan for an unannounced product far in advance.

In addition, the cost of 386-based hardware platforms is significantly higher than 286-based products, and the range of vendors supplying 386 systems is far narrower. There is also the specter of IBM doing some sort of proprietary add-on to a 386 system that would make buying clones even more confusing.

Primarily, the major problem with the 386 environment is the uncertainty that surrounds it. The 12-month lag time between now and the first possible announcement makes it difficult for MIS to choose the right upgrade path.

The PC upgrade issue is only clear in a few aspects. Two things that do appear certain are that trying to retrofit 8088-based systems is not a wise use of money and that planning for this major system-level upgrade is crucial.

No set upgrade rules

Unfortunately, there is no single general rule that will allow MIS to make the most correct upgrade choice. This problem is exacerbated by the fact that within the same companies there may be some departments or groups needing the immediate relief of the 286 environment, while other groups can be perfectly content to wait for the 386 environment. It is crucial to make planning allowances for these differences.

Such a change will exact a toll in the areas of support, training and new software rather than just in system expenditures.

Therefore, MIS should not make the decision concerning an upgrade lightly. Weigh options carefully because the migration path of your firm's PCs will have long-standing impact on the corporate information systems well into the next decade. ■

Goldberg is vice-president of microcomputer services at International Data Corp., a market research firm based in Framingham, Mass. He has developed strategic implementation plans for end users.

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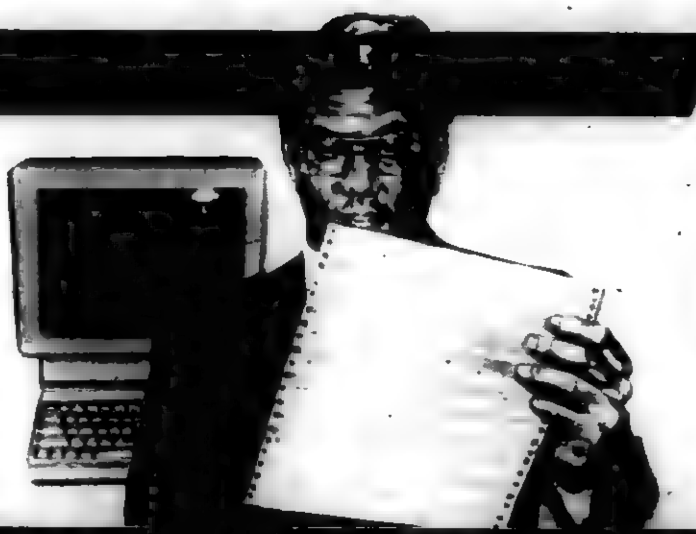

IDG's International Data Corporation managing director **Yugi Ogino** is stopped in his tracks by a flash report on the company's International News Service. *Digital News* has just spotted a potential challenge to IBM's grip on the professional PC market: DEC has announced their Local Area VAX Cluster. Ogino sets up a conference call with *Computerworld Japan* editors to brief them on his analysis.

8:40 A.M. • SYDNEY, AUSTRALIA

At almost the same moment 4,300 miles to the south, *Computerworld Australia* publisher **Susan Coleman** sees the DEC story on her news wire. She calls in **Peter Scott**, her editor, to plan editorial coverage for their market.

11:00 A.M. • HELSINKI, FINLAND

Halfway around the world, **Timo Tolsa**, editor of IDG's Finnish computer newspaper *Tietoviikko Ky*, faxes his comments on the pending story to **Dieter Echbauer**, editor of *Computerwoche* in Germany, who appoints an editorial team to file a comprehensive story for use by all five IDG publications in Germany.

10:10 A.M. • BUENOS AIRES, ARGENTINA

Ruben Argento, the head of IDG's *Computerworld* newspaper in Argentina uncovers a new wrinkle in the rapidly unfolding story–and alerts Doane Perry, senior market consultant at IDC in Framingham, Massachusetts: a DEC competitor in South America is developing a similar cluster product.

world just changed again.

10:30 A.M. ◆ BOSTON, MASSACHUSETTS

IDG reporter **Kathryn Esplin** files a VAX Cluster story for *Digital News*. Her back-up analysis is sent to all publication offices around the world on the company's news wire.

2:00 P.M. ◆ FRAMINGHAM, MASSAC[illegible]TTS

Perry meets with **Bill Ford**, IDC Information Industry Services Chief, to plan a global research report on computer clusters and their potential impact on business users.

4:45 P.M. ◆ PALO ALTO, CALIFORNIA

IDC Research Director **Jean Yates** faxes detailed schedules of the report requirements to IDC research centers in 16 other countries. Deadline: 1 week. Overnight mail announcements of the pending report are mailed to IDC's top 1,000 customers around the world.

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MANAGEMENT STRATEGIES

The Strategist And The PC

Is the PC an executive's key weapon for winning the great information battle?

BY • MICHAEL • TUCKER

PCs are a *strategic* resource.

Heard that one before?

Even before IBM Personal Computers started showing up in such overwhelming numbers on the desks of business users, industry pundits and trade press mavens proclaimed the machines as the new strategic corporate resource.

Personal computers, went the argument, would be part of the attack. By giving every information worker the ability to perform corporate analysis of local data at local sites, desktop computers would thus increase the productivity and competitiveness of U.S. industry.

The idea of the PC as a strategic resource is simple to the point of classical elegance. Explains Bill Kirwin, director of personal computer policy and strategy at Stamford, Conn.-based market research firm Gartner Group, Inc., "What people are trying to say by 'strategic' is that they're treating information as if it were an asset, . . . indeed, an asset like any other, which can be measured, quantified and otherwise treated as though it were no different from capital or raw materials. It's a way of gaining a competitive advantage."

According to Kirwin, there are several different ways to make a company more competitive. "You can lower your labor costs, manage your capital more effectively, manage your raw materials more effectively and so on. But most American companies have already done that, and they've squeezed out about as much as they're going to get from traditional assets. . . . Now they're turning to information to give them an edge," he says.

This awareness of information as a tool has produced first, a new profession, that of the chief information officer, and second, a new concept, the PC as a strategic weapon.

In the ideal case, the PC becomes a desktop data cruncher for the individual executive.

The personal computer allows each and every decision maker to perform specialized analysis of very large data bases, data that could not be examined cost-effectively either by the individual working without computing power or by an MIS department already overwhelmed by more pressing DP tasks such as payroll. "You can identify opportunities that would never have been discovered," Kirwin says.

But are MIS and users in organizations around the country actually using the PC as a strategic weapon?

In a position to know something about the way microcomputers are being used in the world is the U.S. Department of Commerce. Its Office of Productivity, Technology and Innovation (OPTI) is an organization set up precisely for the purpose of introducing innovative techniques to U.S. industry.

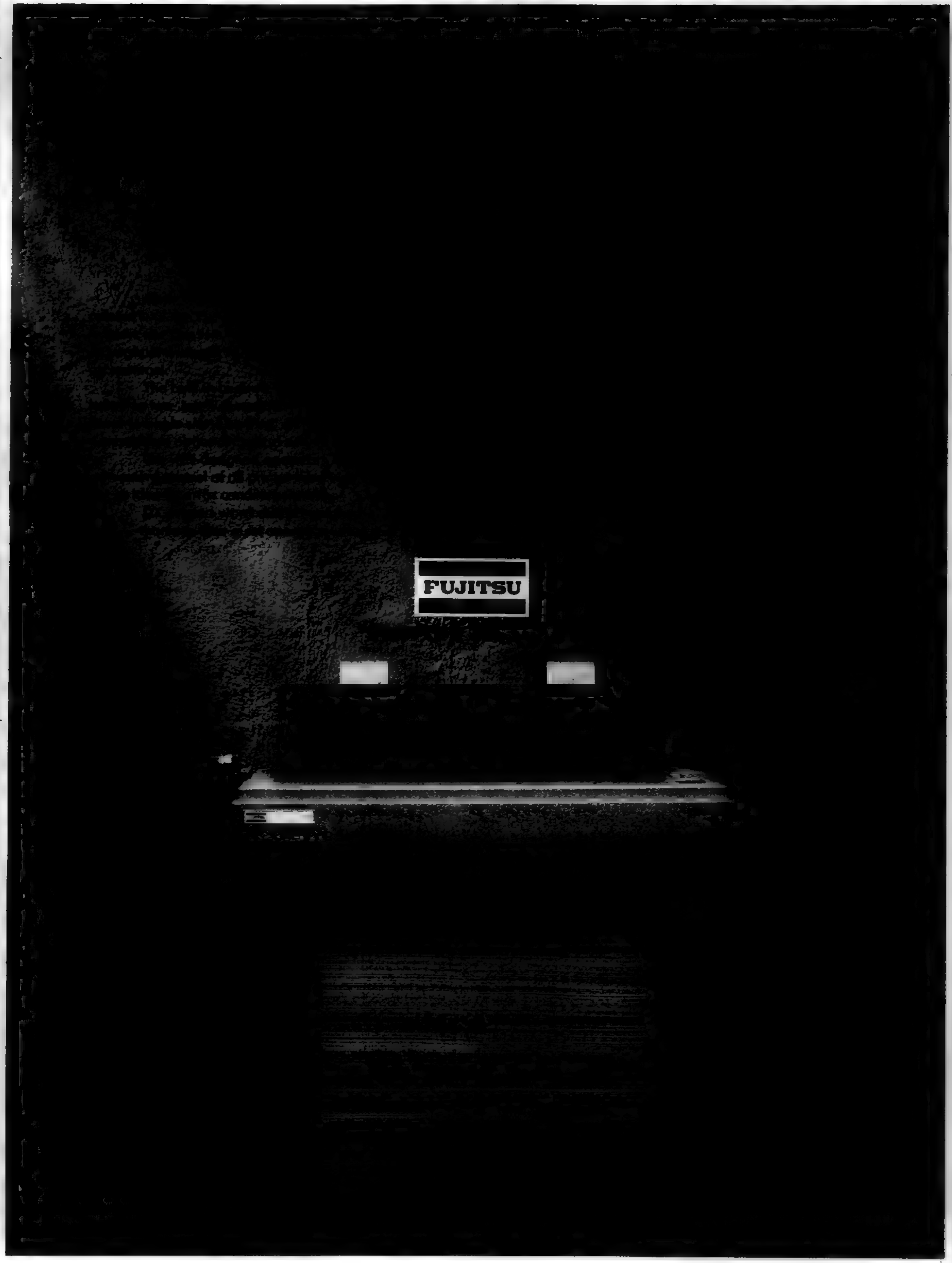
OPTI's director of international operations, G. T. Underwood, notes, "My own observation is that if we set aside the real technologists — that is, scientists and engineers — and the financial industry, which has made a real committment to the machines, then in the business world there are only two areas where people are using computers to increase their productivity, and those areas are word processing and spreadsheets. But, for average middle managers, well, yes, they've got a computer, but as a rule, they're underusing their machines."

A very similar response comes from the market research firm International Data Corp. (IDC) located in Framingham, Mass. Will Zachmann, IDC vice-president of research and technical assessment says bluntly, "Nobody who a buys a PC or anything else, for that matter, is going to say they're just throwing the money away, but, *strategic*? Well, I think it's a nice buzzword."

As for MIS, it tends to be every bit as harsh as the analysts. According to Raymond J. Russell, manager of information systems for New Orleans-based Amoco Production Co., "I would say that all our tools are strategic, but I can't say that I can isolate the PC and say it's more strategic than all the others."

What accounts for the failure of the personal computer to become the intercontinental ballistic missile instead of just the short-range rocket of the business world? Some observers suggest that the problem is inherent in PC technology. OPTI's Underwood suspects the bottleneck may be the keyboard, and if something could be found to replace it, middle managers would be more likely to use the machines.

"Changing the interface media would make an enormous difference. . . . If we could come out with a workable voice response system or something else that looked a bit less secretarial, then the middle managers — the [managers] who are 50 years old or so — will find it easier to relate to," Underwood says. However, he adds, it would probably be easier to keep



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the keyboards, let the current generation of middle managers gradually drift up into upper management or retirement and replace them with executives who have grown up with computers.

'Every user considers them strategic'

There are also those who propose that the difficulty is at the other end of the PC, at the interface between micros and corporate mainframes. "We've got a lot of PCs, and every user considers them strategic," says a large investment bank's vice-president who asked that neither he nor his firm be identified. "But, until you get micro-to-mainframe links, particularly in the [IBM] CICS environment, there really isn't any way to integrate PCs into the strategic operation."

So, have we finally got an answer? Can we say that the strategic PC was a fantastic idea but one that was ahead of its time? Well, no.

Consider the case of Bruce G. Curry, director of the computer resources department at New York-based Big Eight accountancy, Peat, Marwick, Mitchell & Co. "There are a lot of questions of semantics," Curry says. "How do you define strategic and tactical? If a local manager uses his PC to do local planning, is that strategic? But, if I can confine myself to just the top management, leaving out local planning, then very definitely, we do regard PCs as strategic."

In fact, Curry explains, "one of our own vice-chairmen is using his PC in exactly that [strategic] way. He's taking companywide data — in some cases, industrywide data — and using his own machine to generate reports that are meaningful to him in his own specialized segment of the firm."

The vice-chairman can thus take tremendous chunks of raw information, such as detailed records of the services that Peat Marwick delivered to its last few thousand customers, winnow away the details that are unimportant to his own operation and search the remainder for previously undiscovered options to make a profit. It may be that he will be able to uncover the need for a product or service based on customer demand.

That description sounds exactly like what Gartner Group's Kirwin was talking about. So, then, can we say the strategic PC is here? Nope.

Personal, not corporate

If the Peat Marwick system is strategic, then it is exactly the sort of application that even the sternest critics of the word "strategic" propose for the corporate PC.

IDC's Zachmann, for instance, says, "PCs have usually been just exactly what their name suggests, *personal* not corporate. But that doesn't mean they cannot be extremely effective as part of a corporatewide information service."

Peat Marwick's system looks like a corporatewide information service with a vengeance. But, the kicker is that Zachmann does not define a corporatewide information service as being strategic.

Are PCs strategic? If we can't get an unwavering answer, let's take another look at our question. First of all, we've not really defined the word strategic. That is particularly unforgivable because Curry, who says his PCs are strategic, went out of his way to warn us that there are lots of questions about semantics. And, according to Amoco's Russell, who says his PCs aren't strategic, a strategic resource is "something that is going to have an effect on the bottom line of a company, something that would have an adverse effect on the company by its absence." He adds: "We look at the data as being strategic, not the device that is used to read it."

Bingo.

How does Curry's department deal with the data going to its strategic PCs? MIS provides the users with all the basics by making certain that the data is standard across the firm.

There's a common theme here, isn't there? Curry and Russell disagree mightily on the value of local, desktop processors, but on the subject of information they are in complete agreement. Data, they say, is by definition strategic.

All of which suggests that asking, "Are PCs being used as a strategic resource?" is sort of like asking, "Which is more important to your corporate success, ballpoint or felt-tip pens?" Just as what really matters is not the ink but whether the memo gets written, maybe it doesn't matter if executives perform strategic planning with a desktop system or a multiuser one, as long as the planning gets done, as long as managers have some means — terminal, PC, workstation, whatever — of getting at the relevant numbers and crunching them.

Whether the best method of bringing users and corporate information together is a PC or a terminal is a moot point. There are now so many PCs being used as terminals and so many smart terminals that look like diskless PCs that the distinction between the two types of devices is less clear. Increasingly, MIS simply assumes that everyone in its organization will be equipped with some kind of local processor that will eventually be called upon to communicate by some method with a corporate mainframe. Between those processors, the real strategic resource — information — will flow.

The corporate personnel charged with providing what Curry calls the "basics" of that resource are MIS officers.

So whether a personal computer itself is strategic may not really matter. The real issue, the one that could have an effect on the company's bottom line, concerns MIS management and staff. As controllers of the strategic information, they must learn to become corporate strate- *editor.* ■

Tucker is Computerworld Focus *features editor.*

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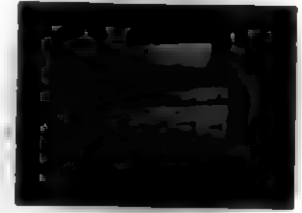
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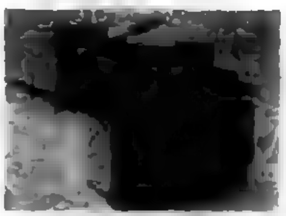
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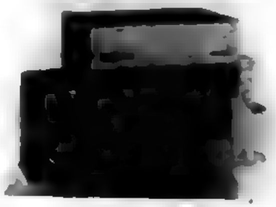
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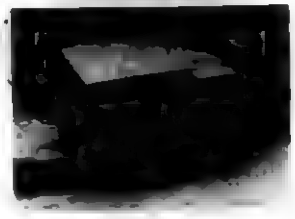
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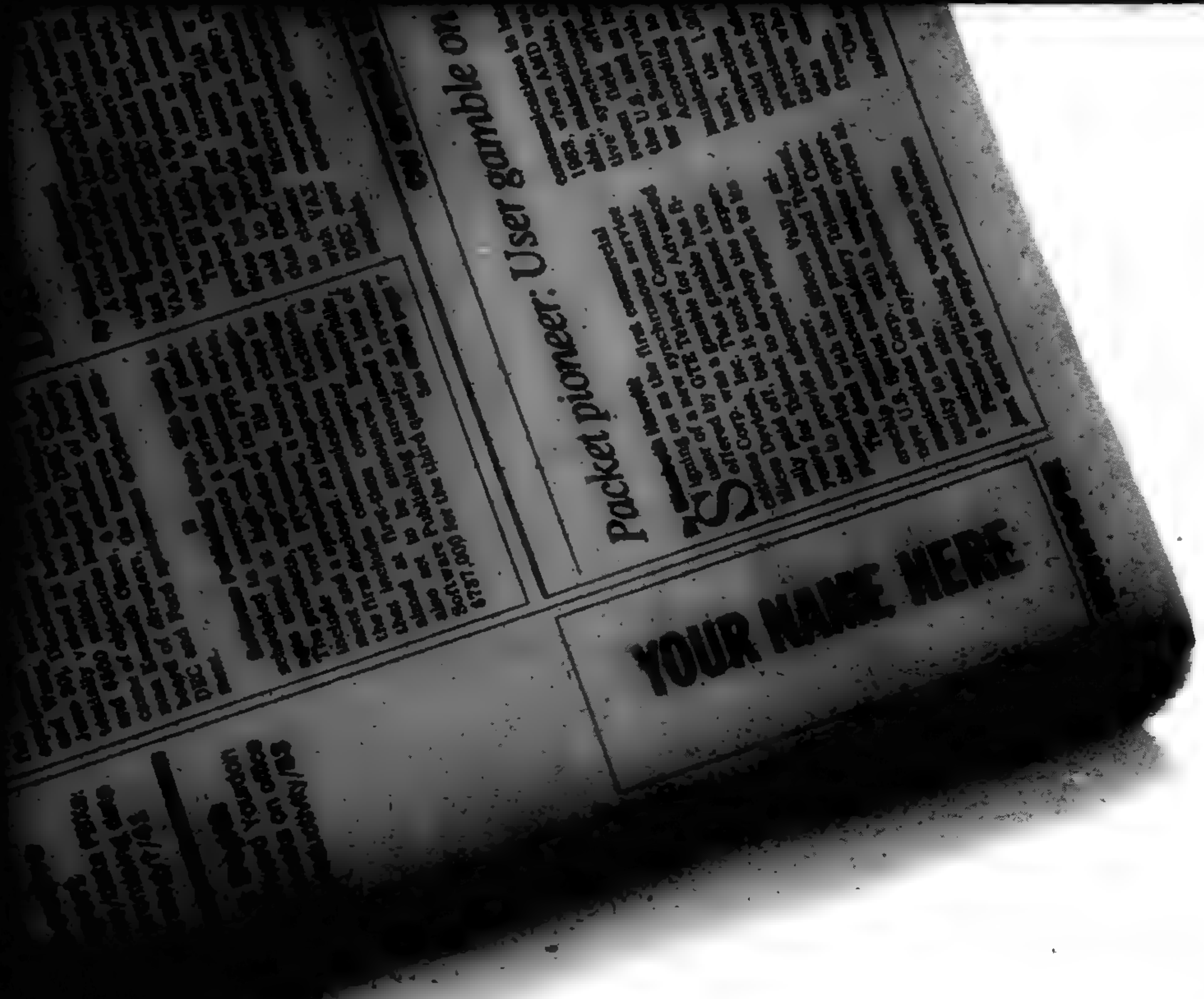

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2	22	42	62	82	102	122	142	162	182	202	222	242	262	282	302	322	342	362	382
3	23	43	63	83	103	123	143	163	183	203	223	243	263	283	303	323	343	363	383
4	24	44	64	84	104	124	144	164	184	204	224	244	264	284	304	324	344	364	384
5	25	45	65	85	105	125	145	165	185	205	225	245	265	285	305	325	345	365	385
6	26	46	66	86	106	126	146	166	186	206	226	246	266	286	306	326	346	366	386
7	27	47	67	87	107	127	147	167	187	207	227	247	267	287	307	327	347	367	387
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PC PRODUCTS

Opus Systems Unveils Series 300 Unix Workstations

CUPERTINO, Calif. — Opus Systems announced its Series 300 Personal Mainframe Unix workstations. The Series 300 is a 32-bit system based on Fairchild Semiconductor Corp. Clipper technology and uses the IBM Personal Computer AT as an I/O processor and subsystem.

The first Series 300 products are the 30-MHz Model 350PM and the 25-MHz 340PM.

The Opus Series 300 workstations reportedly offer 4 million instructions per second (MIPS) to 5 MIPS and 4M to 16M bytes of physical memory in a full 4G-byte virtual address space.

The Personal Mainframes feature Opus's port of AT&T Unix System V Release 3.0, and they can offer concurrent access to Microsoft Corp. MS-DOS, the vendor said.

Compatible with NFS, RFS

The Opus Series 300 machines are also said to be compatible with both Sun Microsystems, Inc.'s Network File System (NFS) and AT&T's Remote File System (RFS).

According to Opus, other standard software includes C and Fortran 77.

Optional software includes Pascal, a series of Green Hills Software Co. optimizing compilers and Visual Engineering, Inc. C-Chart and Prochart packages. Opus also offers a full-featured window system that is an enhancement of MIT's X window system.

OEM quantities of the Series 300 Personal Mainframe are available for less than $3,000 per unit.

For more information, contact Opus Systems, Building 400, 20863 Stevens Creek, Cupertino, Calif. 95014.

Circle Reader Service Number 326

IBM-Compatible 8½-lb Laptop Bows

MOUNTAIN VIEW, Calif. — Grid Systems Corp. has introduced Gridlite, an 8½-lb IBM Personal Computer-compatible laptop computer.

Gridlite features a 10-in. diagonal supertwist LCD screen with an aspect ratio comparable to high-quality CRT screens, the company said. A 1,200/300 bit/sec. internal modem is also available for the machine.

The vendor said Gridlite can be configured with three times more memory than conventional laptops, with 640K bytes of system random-access memory (RAM) and up to 1M byte of internal Lotus/Intel/Microsoft Expanded Memory Specification (EMS) RAM.

EMS can be used as a high-speed RAM disk or as a memory extension for executing standard and custom programs.

Gridlite also has the capacity for eight additional snap-in read-only memory cartridges, up to 1M byte in total.

Gridlite has an Intel Corp. 80C86 microprocessor with 128K bytes of RAM, an optional 640K bytes of RAM and a 3½-in. internal floppy-disk drive with an option for an external 3½-in. floppy-disk drive.

Gridlite has a base price of $1,750. EMS RAM is available at $295 for 0.5M bytes and $395 for 1M byte.

For further information, contact Grid Systems Corp., 2535 Garcia Ave., Mountain View, Calif. 94043.

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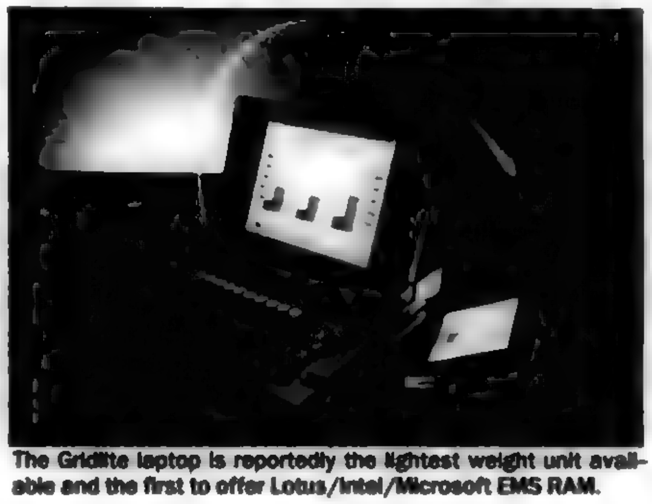
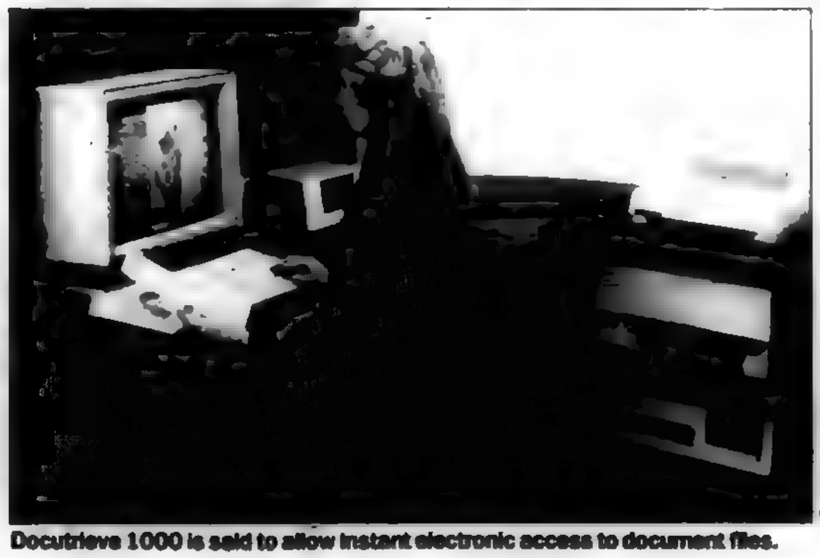


The Gridlite laptop is reportedly the lightest weight unit available and the first to offer Lotus/Intel/Microsoft EMS RAM.

Chorus Data Announces Docutrieve Document Management System

MERRIMACK, N.H. — Chorus Data Systems, Inc. has announced Docutrieve 1000, a document management system that the company claimed allows instant electronic access to document files.



Docutrieve 1000 is said to allow instant electronic access to document files.

Docutrieve consists of a high-resolution document scanner; a CPU for data base management and control; a 20-in., full-page video display; a laser printer; both Winchester and removable write-once optical disks for document and data storage; a special keyboard for easier operation; and specialized hardware and software for high-speed document compression, reconstruction and increased performance.

Reported cost savings

The company said that Docutrieve results in cost savings in storage space, processing, retrieval and improved security. Companies can configure Docutrieve stand-alone for small to medium applications or network it for departmental use. In addition, there are options available for communicating with facsimile machines and remote locations via modem, the vendor said.

Storage capacity can range from 8,000 document pages on-line to millions of document pages that are accessible in less than five seconds, the company claimed.

Other options include sheet-feed or flatbed scanners, higher capacity storage and a specially designed workstation console.

Prices for Docutrieve systems start at $35,000.

For further information, contact Chorus Data Systems, Inc., P.O. Box 370, 6 Continental Blvd., Merrimack, N.H. 03054.

Circle Reader Service Number 328

Data Transfer Product Debuts

WALTHAM, Mass. — Artificial Intelligence Corp. has introduced Intellect PC Link, a product that uses conversational English to bring business information directly to personal computers from mainframe data bases such as IBM's DB2.

Intellect PC Link was designed for use with Artificial Intelligence's Intellect, a natural language interface for IBM and Digital Equipment Corp. data bases. The vendor said its PC Link simplifies data transfer between PCs and mainframes, freeing the business user from dealing with complex programming tasks normally required to move data from a mainframe data base management system to a PC application program.

The company claimed that the product also saves MIS involvement because users can perform the transfer function in English.

PC Link runs in IBM VM/CMS or MVS/TSO environments. It requires an IBM or IBM-compatible mainframe, Series 4341 or larger and an IBM Personal Computer XT; AT or an IBM 3270-PC/AT.

Intellect PC Link is priced at $25,000, including the mainframe portion, with unlimited numbers of PC copies allowed.

For further information, contact Artificial Intelligence Corp., 100 Fifth Ave., Waltham, Mass. 02254.

Circle Reader Service Number 329

Applix Beefs Up Alis OA Software

WESTBORO, Mass. — Applix, Inc. introduced two options, a personal computer connection and a scanned image editing capability, for its Alis integrated office automation software.

PC-Alis is a connection for a Microsoft Corp. MS-DOS-based PC linked to a Unix-based minicomputer or workstation file server through Ethernet.

The product provides PC users access to Alis's integrated multifont word processing, spreadsheet, graphics and data management capabilities.

System requirements

To run, PC-Alis requires a PC with a minimum of 512K bytes of random-access memory, a Hercules Computer Technology, Inc. or enhanced graphics adapter graphics board and a mouse.

Alis's scanned image editing capability is an optional enhancement to Alis's advanced graphics editor. It allows images, including graphs, charts and pictures from scanning devices to be imported to the graphics editor. Imported images with a resolution of up to 300 dot/in. can then be edited.

Pricing varies with the number of users and starts at $1,945 for the Alis host package, $495 for PC-Alis and $950 for the scanned image option. For more information, contact Applix, Inc. at 112 Turnpike Road, Westboro, Mass. 01581.

Circle Reader Service Number 330

To enhance product coverage for our readers, *Computerworld Focus* is instituting a new column in its product section. The column will consist of product- and service-related questions that you, our readers, would like us to ask a particular vendor.

Write us. We'll print the questions and answers we deem of greatest interest to our readership.

Call us, toll free, at 1-800-343-6474. Or, forward your inquiries to Lory Zottola, Managing Editor, *Computerworld Focus*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701-9171.

You'll never know unless you ask.

Computer Friends Unwraps Color Display For Macintosh

PORTLAND, Ore. — Computer Friends, Inc. has introduced Superchroma, a color display for the Apple Computer, Inc. Macintosh.

The Superchroma system includes a video display controller that connects to the modem port on a Macintosh Plus, enhanced Macintosh or 512K-byte Macintosh; a high-resolution red-green-blue (RGB) monitor; and Chromapaint software to run on the Macintosh.

The system contains a Motorola, Inc. 68000 processor and display coprocessor plus 1 million pixels of available display memory and offers a resolution of 640 by 480 pixels. The Superchroma can display 256 simultaneous colors from a palette of 262,144 available colors.

Black and white to color

According to Computer Friends, black-and-white Macpaint files can be transferred to the Superchroma display for coloring.

Superchroma is priced at $2,995 for a system consisting of processor, RGB monitor, cable from a serial port on the Macintosh to the Superchroma processor, cable from a Superchroma processor to a monitor and Chromapaint software.

The enhanced video adapter is $1,500.

For further information, contact Computer Friends, Inc., 14250 NW Science Park Drive, Portland, Ore. 97229.

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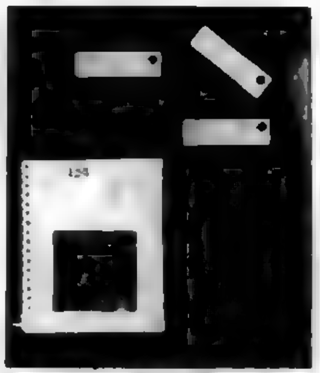
Student 1-2-3 Version Out

READING, Mass. — Addison-Wesley Publishing Co. has introduced Lotus 1-2-3 Student Edition, an education version of Lotus Development Corp.'s 1-2-3 spreadsheet software.

Addison-Wesley said 1-2-3 Student Edition is a fully functional version of 1-2-3 that has been customized for instructional applications. However, although the company said the software includes all the features and functions available with the professional version, spreadsheet capacity is only 64 columns and 256 rows compared with 256 columns and 8,192 rows for 1-2-3. The Student Edition runs on the IBM Personal Computer and compatibles.


Lotus 1-2-3 has been customized for educational use.

Teacher and student manuals included with the product provide instructor-designed laboratory exercises for use with college courses.

The company added that additional courseware developed by instructors and other software developers can be used with the 1-2-3 Student Edition in connection with specific textbooks or courses.

An upgrade coupon is included with the product enabling full-time students to buy the professional version of 1-2-3 at the same price Lotus offers through its educational sales program minus the price of the 1-2-3 Student Edition, according to Addison-Wesley.

1-2-3 Student Edition will be available in April, and pricing is expected to be less than $50.

For further information, contact Addison-Wesley Publishing Co., Reading, Mass. 01867.

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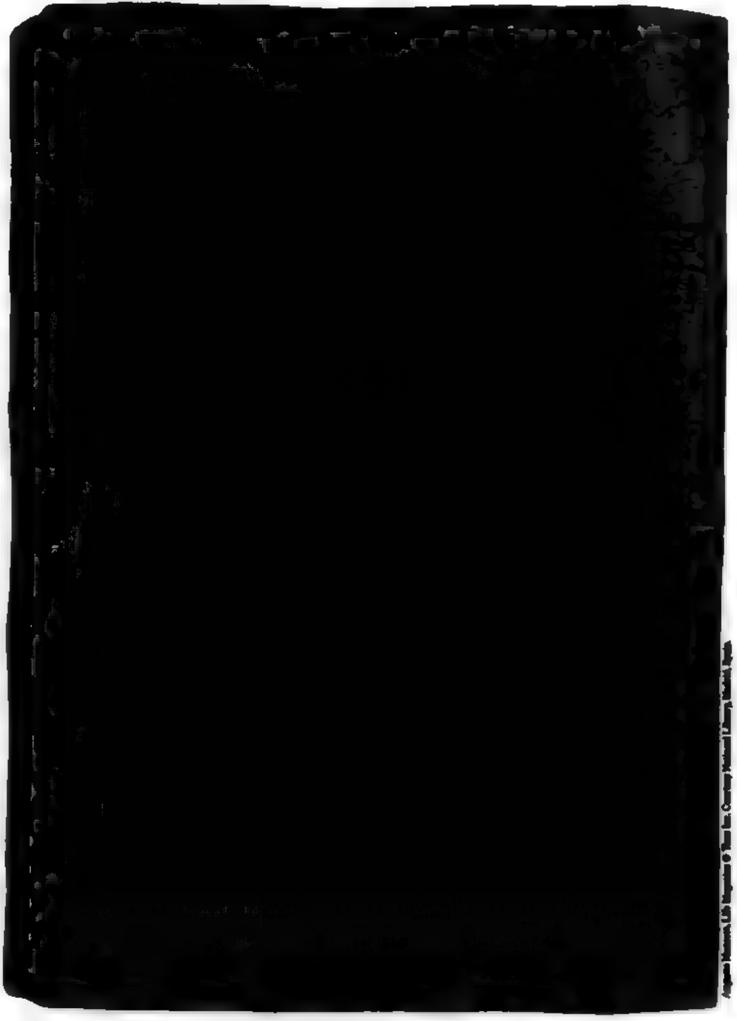

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So whether you're starting from

Lotus Releases Metro Memory-Resident Desktop Manager

CAMBRIDGE, Mass. — Lotus Development Corp. has unveiled Lotus Metro, a memory-resident desktop manager that combines 12 accessories and a macro generator in one program.

A companion to Lotus products 1-2-3, Symphony, Manuscript and Freelance Plus, Metro's memory-resident operating system gives users access to pop-up accessory programs that Lotus said are well behaved and do not alter or interfere with the main application being used.

Lotus said Metro was designed to give users comprehensive application management tools such as a text editor, Microsoft Corp. MS-DOS file manager, clipboard, list manager and comprehensive macro capabilities. The desktop accessories bring the personal computer user time and resource management functions, Lotus said.

Machines Metro runs on

Metro runs on the IBM Personal Computer, PC XT, AT, PC Convertible as well as the Compaq Computer Corp. Portable, Plus and Deskpro computers. It requires two 5½-in., double-sided drives, a minimum of 80K bytes for the stay-resident portion of the program and Microsoft MS-DOS 2.0 or higher. A hard disk is recommended for optimal performance.

Metro is priced at $85. Lotus said an exchange program will be in effect enabling Lotus Spotlight users to purchase Metro at a reduced rate of $40.

For further information, contact Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, Mass. 02142.

Circle Reader Service Number 333

RTI Launches Ingres For PCs

ALAMEDA, Calif. — Relational Technology, Inc. (RTI) introduced Ingres for PCs, a line of relational data base software for IBM Personal Computer XTs, ATs and compatibles.

RTI's line of PC products includes the Ingres relational data base management system, Ingres Star data base networking and Visual Programming, the firm's fourth-generation language and embedded SQL application development tools.

The software fully implements the SQL data base language and is compatible with IBM DB2, American National Standards Institute and X/Open SQL.

In addition, the product provides complete, transparent data and application portability between the PC and Digital Equipment Corp. VAX VMS, IBM mainframe and Unix operating systems.

Four primary applications

The Ingres PC line was designed for four primary applications. It can act as either a stand-alone PC data base system or serve on a network with minicomputers and mainframes as part of a distributed data base system. Ingres for PCs can also act as a bridge, enabling PC users to access Ingres data residing on a minicomputer or mainframe and use it with applications such as Lotus Development Corp. 1-2-3. Finally, the software can be used as a fourth-generation language application development environment for PC, mini or mainframe applications.

Ingres for PCs includes six product modules that can be purchased separately or together, and prices for a typical configuration can range from $800 to $2,000. Ingres software comes with technical documentation and on-line instruction. Also, users can opt to purchase hot-line telephone support and custom on-site training similar to Ingres's support for mini and mainframe products. Delivery begins in March.

For further information, contact Relational Technology, Inc., 1080 Marina Village Pkwy., Alameda, Calif. 94501.

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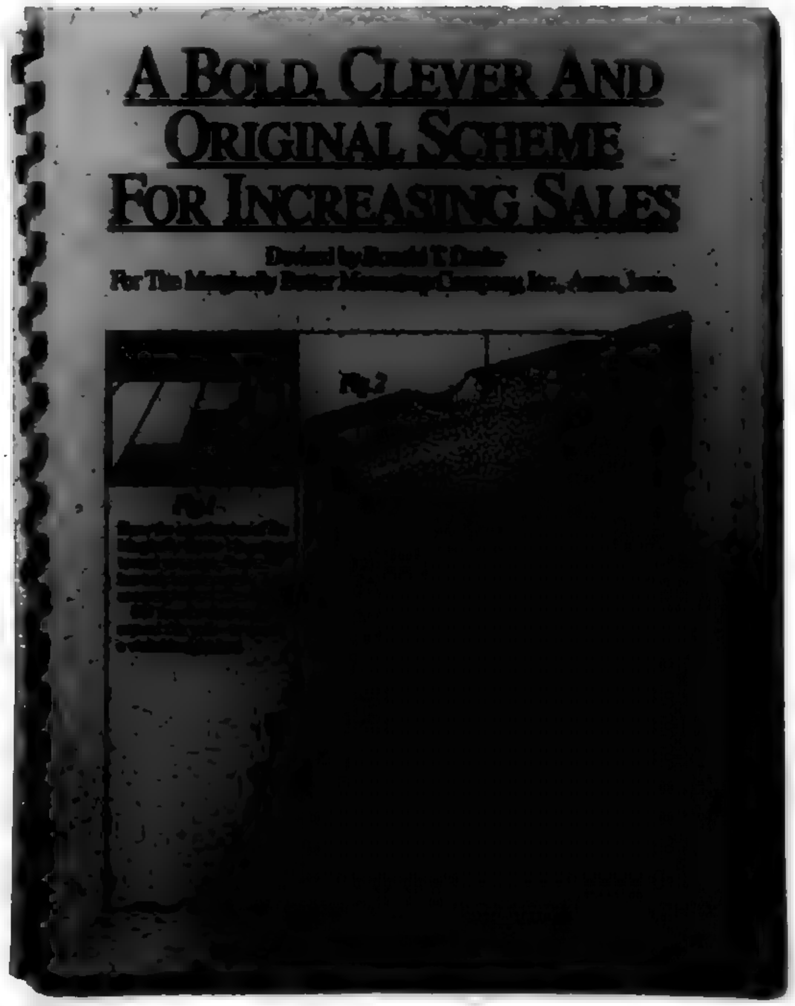

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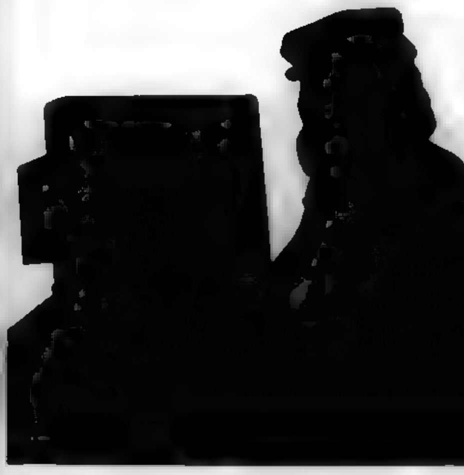

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March 9-11, San Francisco — **Controlling Software Projects: Management, Measurement and Estimation.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

March 9-11, Chicago — **Local Communications Systems.** Also being held April 6-8, San Francisco; May 11-13, New York; June 15-17, Dallas. Contact: Systems Technology Forum, Suite 150, 10201 Lee Highway, Fairfax, Va. 22030.

March 9-11, San Francisco — **T1 Networking.** Also being held April 29-May 1, Chicago; May 27-29, Washington, D.C.. Contact: Systems Technology Forum, Suite 150, 10201 Lee Highway, Fairfax, Va. 22030.

March 9-12, Washington, D.C. — **FOSE Computer Graphics '87.** Contact: National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

March 12-13, Chicago — **Telecom Management Software: How to Plan and Select.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

March 15-18, Atlanta — **The 5th Annual Computer-Based Training Conference and Exposition.** Contact: CBT Conference, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

March 16-18, Washington, D.C. — **Network Protocols and Standards.** Contact: Systems Technology Forum, Suite 150, 10201 Lee Highway, Fairfax, Va. 22030.

March 19-20, Chicago — **Integrated Voice/Data Networks: Strategies and Alternatives.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

March 20-22, New York — **Sixth Annual Office Systems Research Conference.** Contact: Office Systems Research Association, 574 University Center, Cleveland, Ohio 44115.

March 22-26, Philadelphia — **National Computer Graphics Association's Computer Graphics '87.** Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

March 23-25, Boston — **Optimizing Software Productivity and Quality.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

March 24-25, San Francisco — **Contract Negotiation and System Implementation.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

March 24-26, Los Angeles — **Optical Information Systems West '87.** Contact: Conference Management Corp., P.O. Box 4990, 200 Connecticut Ave., Norwalk, Conn. 06856.

March 26-27, New York — **Metropolitan-Area Networks.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

March 30-April 2, Las Vegas — **Interface '87.** Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

April 6-11, Paris — **SICOB '87 International Exhibition of Data Processing, Telematics, Communication, Office Organization and Office Automation.** Contact: SICOB, 4, Place De Valois, 75001 Paris.

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ADVERTISERS INDEX

Adobe Systems Inc.	*415-852-0271*	39
AFIPS	*800-NCC-1987*	12
CGI Systems	*800-PAC-1866; 914-735-5030*	Cover4
CW Circulation	*800-544-3712; in PA, 215-768-0388*	40
CWIMS Germany	*617-879-0700*	30
DataEase International, Inc	*800-334-EASE; 203-374-8000*	Cover 3
Diconix	*800-DICONIX*	14
Epson America, Inc.	*800-421-5426*	32-33
Fibronics	*800-Double; 617-778-0700*	20
Fujitsu America	*800-626-4686*	38
Hewlett-Packard Co.	*800-367-4772, Dept. 132B*	2-3
IDE Associates, Inc.	*800-257-5027; 617-663-6878*	4
Interactive Solutions, Inc	*201-488-3708; 212-475-2400*	13
International Data Group	*617-875-5000*	34-35
Leasametric	*415-574-5797*	6
MCI	*800-345-1043*	8-9
Micro Data Base Systems, Inc.	*800-344-5832; 317-463-2581*	18
Nastec Corp.	*800-872-8296; 313-353-3300*	28
On-Line Software International, Inc.	*800-642-0177; in CANADA, 201-592-0009*	24-25
People Sciences, Inc.	*201-762-8259*	7
Realia	*312-346-0642*	27
Sage Software, Inc.	*800-638-8703; 301-230-3200*	Cover2
SearchLink	*800-843-7337 (THE-SEER)*	10
UNIRAS	*214-980-1600*	16
Xerox Corp.	*800-TEAM-XRX, ext. 172B*	42-43

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COMPUTERWORLD

INSIDE

In Depth — The silent majority of DP shops admits to no formal maintenance procedures. **Page 81**

Executive Report — High technology in banking: Is anyone cashing in? **Page 65**

National Advanced Systems offers 2G bytes of main memory on its Sierra-class mainframes and, in West Germany, announces low-end models to fit between IBM's 4381 and low-end 3090. Page 4.

MCI Communications shifts strategy and calls for total deregulation of AT&T. Page 2.

Merger pain hits home for users of a product acquired and terminated by Uccel. Page 12.

Compaq today is set to replace its Deskpro 286 with a speedier version. Page 7.

Cutbacks cleave through the top ranks of Wang Laboratories. Page 13.

Automating communications with a host is a key feature of a RAM-resident macro generator and programming language expected from Alpha Software. Page 142.

Datapoint must overcome a widespread negative image as it refocuses on an office automation interconnection strategy. Page 113.

DEC asserts price control

Shuffle hikes system prices; memory, disk cuts target add-on competition

BY NINAMARY
BUBA MAGINNIS
CW STAFF

MARLBORO, Mass. — In a major price shuffle, Digital Equipment Corp. last week boosted prices of its high-end VAX computers and low-end VMS software while slashing memory and mass-storage prices by more than 50% in some cases.

DEC's announcements appeared to be the company's response to market incursions by third-party memory and storage vendors. The moves could spark a price war among DEC and those vendors, some of which said they may respond to DEC's moves.

DEC apparently sought to raise prices on products such as CPUs and operating systems, with which it has no third-party competition, while cutting prices in areas such as memory and storage, in which users traditionally seek lower non-DEC prices.

DEC is "rebalancing" prices of its components and VAX systems, said Harvey L. Weiss, vice-president of U.S. operations. "The prices of some of our layered software and some of our processors are being increased to reflect their market value," Weiss said.

Discount structure

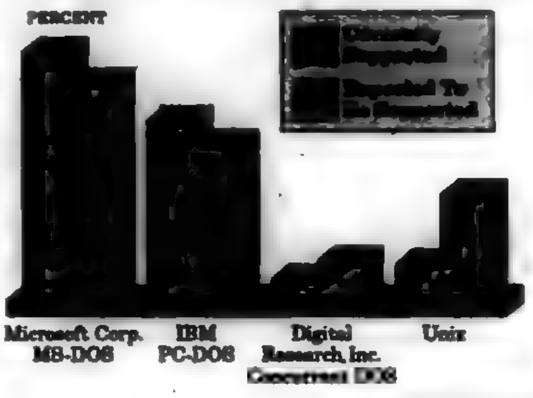
Along with replacements of its VAX 8200, 8300 and 8500 models (see story page 6), DEC also announced a discount structure that applies to both end users and OEMs. The simplified schedule is based on dollar volume alone, with any customer qualifying when more than $500,000 worth of products are purchased, a DEC OEM said.

Although some system prices increased significantly, Weiss said the new discount structure, VAX price/performance improvements, the across-the-board one-year hardware warranty and lower prices for add-on memory and disks would "pro-

Continued on page 6

Unix challenges MS-DOS

Unix paces changes in corporate micro use. Story page 8



CW CHART: MITCHELL J. HAYES

IBM gives Windows subtle nod

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — An IBM independent business unit last week declared its support for Microsoft Corp.'s Windows operating environment as the basis for a future line of desktop publishing products, marking the strongest IBM endorsement yet for Windows.

At the same time, IBM gave its official stamp of approval to Postscript, the page-description language interpreter from Adobe Systems, Inc., which is increasingly gaining momentum as an industry standard.

However, IBM provided few details on forthcoming products and said it does not plan to announce them until later this year. IBM also would not comment on the extent of its commitment to Windows other than to term the environment a "standard."

"We have chosen three standards [for publishing systems], and they are IBM PC-DOS, Microsoft Windows and Adobe

Continued on page 10

Paradyne penalty set

BY JAMES A. MARTIN
CW STAFF

LARGO, Fla. — Ending a four-year controversy, Paradyne Corp. reached an $8 million settlement last week with the Department of Justice regarding a 1985 indictment accusing Paradyne of fraud in a government systems bid.

The settlement dismisses all charges against Paradyne except conspiracy, to which the company pleaded guilty and for

Continued on page 142

MODEL DATA CENTER

The house that MIS built

BY GLENN RIFKIN
CW STAFF

For Jack Owens, the past five years were a disaster waiting to happen. The potential maelstrom was Shearson Lehman Brothers, Inc.'s antiquated data center, an overburdened facility squeezed into 4,000 square feet within one of Shearson's Wall Street sites in Manhattan.

Shearson's Owens

A burgeoning financial services business had forced Shearson to implement six expansions of its data center in seven years to accommodate an explosion of equipment — 35,000 square feet worth — jammed into various parts of the building. "We had so much channel cable that we couldn't get the floor back down anymore," says Owens, Shearson's senior vice-president in charge of information systems. "We had violated so many clearance guidelines squeezing our computers into the space that when we called IBM for service, we told them to send only thin service people.

"There wasn't any emergency power in the building, we didn't have adequate truck docks or freight elevators, and the building wasn't fully sprinkled in case of fire. And there was a greasy-spoon restaurant and a pizza shop in the lobby of the building. Nobody slept very well."

For Owens and Shearson, the nightmare ended in November, when the data center and its 1,250 employees moved into new $200 million quarters north of Wall Street on the border of Soho. With a blank slate and strong upper management support, Owens and his team of engineers constructed a state-of-the-art building

Continued on page 140

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IN THIS ISSUE

Blitzing Big Blue. Industry announcements, including NAS's intermediate mainframe and increased memory capacity of Sierra-class processors, may force IBM to rush products to market. DEC presses for broader price/performance gaps between it and IBM, and NEC attacks with three PC AT compatibles. **Pages 4, 6, 14.**

NEWS

4 U.S. chip makers plan consortium to repel Japanese attack.

6 DEC reverses controversial software licensing policy.

6 Product announcements should help fledgling CD-ROM industry.

7 Corporate users want better service, support from Apple.

7 Compaq replaces Deskpro with speedier line.

8 *Computerworld* readers reveal MIS plans for the coming year.

10 IBM, DEC, Apple take different approaches to desktop publishing market.

12 Uccel will discontinue support for recently acquired Cambridge package.

13 Wang refutes rumors that it ditched vice-presidents and directors.

13 Daisy puts 80386 to work in engineering workstations.

15 Kodak takes stab at image management systems market.

142 Alpha Software develops generator with full-blown programming language.

SOFTWARE & SERVICES

19 Users await IDMS/R compatibility for Cullinet's TAB.

19 Cullinet prepares for launch of DBMSs for IBM 370 low end.

MICROCOMPUTING

31 Javelin addresses 1-2-3 programming problems.

Technology in banking. Page 65.

31 Apple opens floodgate for third-party developers.

NETWORKING

41 Fortune 1,200 firms say the buck stops at MIS.

41 NEC, Northern Telecom reveal ISDN plans.

41 Vendors offer DACS-based T1 systems.

SYSTEMS & PERIPHERALS

57 Insiders predict long life for IBM 3090, no radically new Summit.

57 TI develops LISP-oriented microprocessor.

57 HP entry-level mini premiers.

MANAGEMENT

97 *Time* DP staffers prepare for Florida move.

97 AI specialists remain scarce and expensive.

COMPUTER INDUSTRY

113 Datapoint's misfortunes tie in to firm's decline.

113 CAD/CAM vendors shift focus in wake of declining demand.

113 Ashton-Tate gears up to sell stock, acquire businesses.

EMPLOYMENT TODAY

123 Widespread use of networking operations in banks creates DP positions.

EXECUTIVE REPORT

65 The banking industry is missing an opportunity to use technology to its competitive advantage. By Glenn Rifkin.

IN DEPTH

81 Lots of code, not enough control: When you own 20 billion lines of code, you need better methods of maintaining it. By Richard Harrison.

89 On time, on budget, to spec: Solutions to software project management problems. By William Duncan.

OPINION & ANALYSIS

17 Kirkley cautions MIS managers moving up the corporate ladder.

19 Pfrenzinger clarifies the realm of integrated productivity tools.

31 Zachmann reviews Mindwrite word processor.

41 Keefe wonders if Novell's MHS can compete against Email standard.

57 Connolly watches Cray fend off IBM's advances.

97 Gilliam discusses vendor management.

113 Szuprowicz observes IBM's interest in T1 makers.

DEPARTMENTS

16 Editorial

97 Book Review

108 Calendar

135 Buy Sell Swap

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MCI: Deregulate AT&T

Exec urges FCC to focus on Bell companies

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Blasting away at the Federal Communications Commission, MCI Communications Corp. last week called for total deregulation of AT&T and more regulatory oversight of the divested Bell operating companies.

Separately, AT&T formally proposed on Friday that the FCC "streamline" regulation of the long-distance telecommunications market.

AT&T asked that tariffs be enacted 14 days after filing and that opponents bear the burden of proving that proposed tariffs are unreasonable.

"The FCC has its priorities backwards," said MCI President Bert C. Roberts Jr., "devoting substantial resources to micromanaging the emerging competition in the long-distance industry while advocating that the monopoly providers of local telephone service be unleashed into other industry segments."

In particular, Roberts said MCI is seeking an end to the FCC's policy of setting AT&T's rate of return, which largely determines AT&T's customer rates.

The FCC policy has triggered a series of price cuts by AT&T that has in turn caused MCI to cut prices at the expense of its profit margins.

Deregulation would give AT&T more pricing flexibility, but MCI is betting that AT&T will show more price stability if it is not forced by the FCC to cut rates every time local-access costs are reduced.

Roberts said he was less concerned with the FCC-inspired rate cuts than with the evidence that the divested Bell operating companies have excessive profits and have sharply raised their rates for access to the local loop.

MCI made its recommendations in a filing to the FCC as part of a regulatory proceeding that proposes service-by-service deregulation of AT&T [CW, Dec. 22, 1986].

Roberts said the FCC should stop its piecemeal approach to deregulating AT&T, which he said is creating an "artificial market environment."

Operations seen to offer expanded career paths

BY DAVID A. LUDLUM
CW STAFF

NEW ORLEANS — The rapid evolution of computer technology is radically changing the operations department, requiring managers and staffs with both greater technical acumen and better people skills, according to operations managers.

The evolution of the data center from a production-oriented facility to an on-line, service-oriented one is opening career paths in programming, operations analysis, network management and data-center help desks, according to many at the Association for Computer Operations Managers' seventh annual conference, which drew a record 700 attendees.

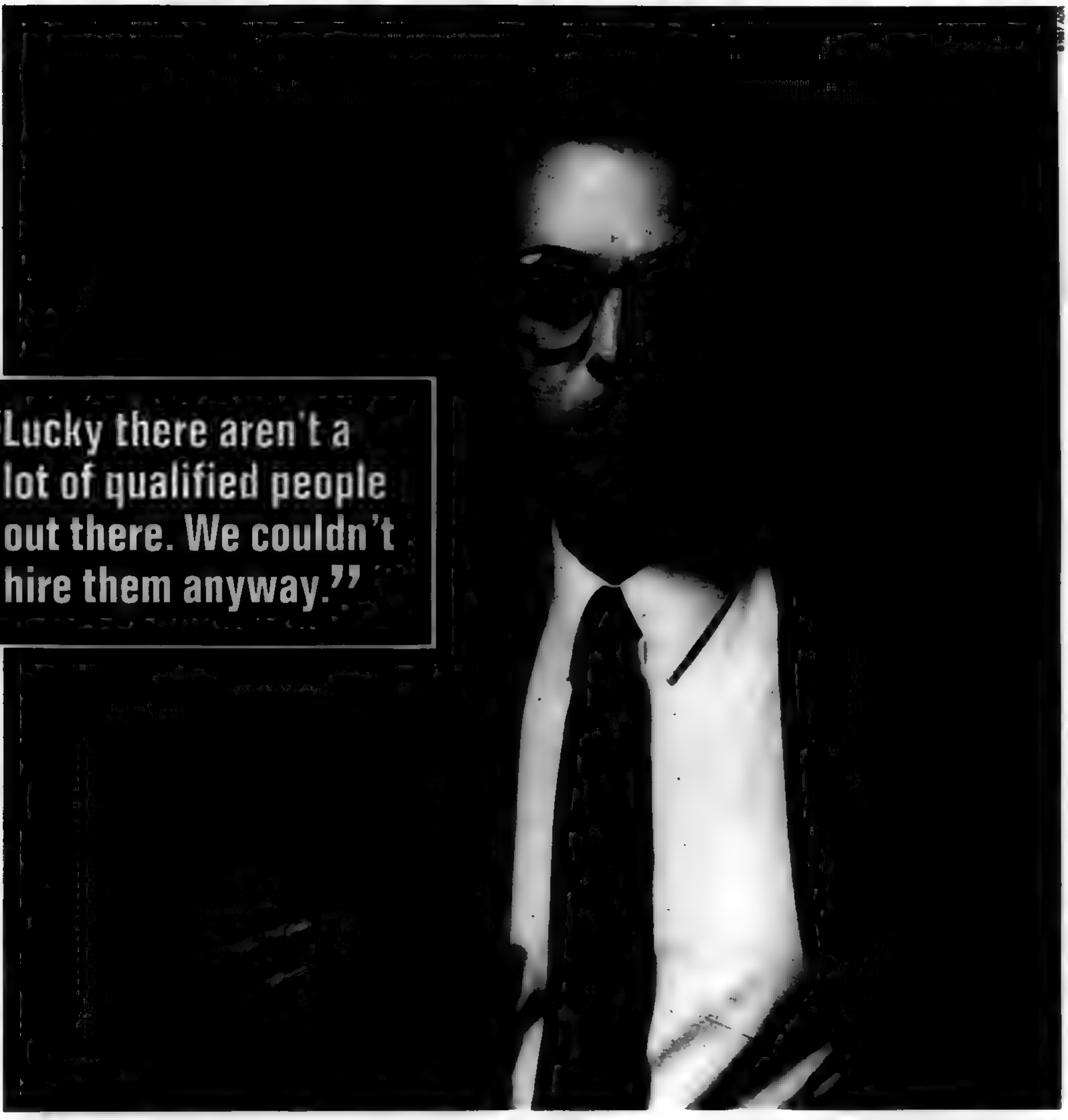
Some operations departments have taken on the relatively sophisticated tasks of systems and maintenance programming from systems programming departments, according to Leonard Eckhaus, president of the association.

Furthermore, increasingly complex configurations have created the need for operations analysts, who often have a programming or systems background and handle performance measurement. That has happened at Amex Systems, Inc. in Edwards, Calif., which does data processing for National Aeronautics and Space Administration research conducted at Edwards Air Force Base, according to Amex operations manager Vickie Morris.

Network management is also providing new career paths in operations at Commonwealth Bank and Trust, N.A. in Williamsport, Pa., operations manager Richard Ludwig said. Such positions require more training than traditional operations jobs, he added.

With on-line processing and local networks requiring data processing professionals to advise end users, operations departments have set up data center and network help desks. "Along with the network come new and additional responsibilities. . . . dealing face to face with end users," said Kerry Jones, operations manager at Life Office Management Association of Atlanta.

At the University of Notre Dame, operations staff members are eager to man the help desk, computing supervisor Reynold Kapsa said. "Operators find it's one of the more rewarding parts of their job. It's not just sitting in front of a console and monitoring something," he added.



“Lucky there aren't a lot of qualified people out there. We couldn't hire them anyway.”

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NAS hits maximum XA memory

BY JEFFRY BEELER
CW STAFF

MOUNTAIN VIEW, Calif.— National Advanced Systems Corp. (NAS) last week quadrupled the maximum main memory capacity of its entire IBM 3090-class processor line and accelerated by three months the delivery timetable for the family's two biggest models.

As a result of the memory enhancements, users of the company's AS/XL-series CPUs can now upgrade their systems to support up to 2G bytes of main storage, the largest amount allowable under IBM's Extended Architecture.

To achieve the increased capacities, NAS has equipped all six of its XL models with 1M-bit random-access memory chips and the industry's first 64K-bit storage protection arrays.

The company has also extended the same improved circuit technology to the machines' expanded memory option, which in the wake of last week's announcement is now scheduled to become available one quarter sooner than expected. Use of the 64K-bit arrays has boosted fourfold the XL's expanded memory and has made capacities on the product line's two largest members — Model 90 and Model 100 — as high as 1.9G bytes.

In addition to enhancing its mainframes, NAS last week ended speculation surrounding its long-awaited cartridge tape subsystem by introducing an IBM 3480-compatible device that reportedly supports 6M byte/sec. channels. The arrival of the vendor's Model 7480 marks the National Semiconductor Corp. subsidiary's debut in the cartridge tape subsystem arena.

Rounding out its latest product announcement, NAS increased the number of channels on its XL-90 and XL-100 from 96 to 128. The XL-90 and -100 are now planned to ship in the second quarter, according to Carl Claunch, NAS's director of systems marketing.

If the firm can fulfill its revised delivery commitments, it will become the first plug-compatible mainframe source to have either a three- or four-way processor complex in customer hands, according to Annex Research, Inc.'s head Bob Djurdjevic. "To create a multiprocessor system is no trivial feat, even if a company has a good uniprocessor," Djurdjevic said.

Because the XL-100 corresponds to IBM's 3090 Model 600E, the acceleration of NAS's delivery dates might force Big Blue to rush its recently announced six-way processor to market faster than originally planned, Djurdjevic speculated. Currently, the 600E is still targeted for first customer shipments during the third quarter.

As for increases in the XL family's main memory, NAS's chief aim is to address users whose applications demand especially large amounts of storage, Claunch said. Familiar examples of such applications include computer-aided design and manufacturing systems and time-sharing options environments that support hundreds of on-line users.

Users who were contacted last week said the large memory size is more than they now need but could be useful in the future. Banks of Iowa Computer Services, Inc., in Cedar Rapids, Iowa, which uses an NAS 9080 mainframe running MVS/XA, supports only 40 to 50 users with a TSO system that requires a mere 40M bytes of internal storage. "But the banking software that we're using here is getting progressively bigger," according to David Edelsperger, the firm's vice-president of customer services.

The XL line's enhancements will also provide much-needed paging relief for users of VM/HPO, which is prohibited by IBM's 370-series architecture from addressing more than 64M bytes of main memory, Claunch added. To circumvent the restriction, VM/HPO needs access to large amounts of expanded memory.

NAS's 7480 tape-cartridge subsystem, meanwhile, is intended to meet the need for peripherals that operate with 6M byte/sec. channels, which the company added to its XL-series in January. The 7480 also has an optional data compression feature that on average doubles a cartridge's effective capacity by eliminating spaces and redundant bits.

A minimum 7480 configuration consists of a $62,000 controller and one $41,000 storage unit with two built-in drives. The data compression option costs $12,220, compared with $8,455 for the magazine loader.

Mainframe memory options from leading vendors

IBM compatible

	MAXIMUM *Main Memory*	*MAXIMUM* *Expanded Memory*
NAS XL 90, 100	2G bytes	1.92G bytes
NAS XL 50, 60, 70, 80	1G byte	960M bytes
IBM 3090E series	256M bytes	1G byte
Amdahl 5890 series	512M bytes	512M bytes

CW CHART

NAS shows 4381 option

BY CLINTON WILDER
CW STAFF

HANNOVER, West Germany — National Advanced Systems Corp. (NAS) announced two intermediate mainframes at Cebit '87, the international technology trade show that opened here last week.

The AS/VL 50 and AS/VL 60 machines fall into a performance range between the high end of the IBM 4381 series and the low end of IBM's 3090 series. The machines are slated to be available in Europe in May on an early-support basis and in the U.S. in the third quarter.

"These are our gap products," said Bernhard Scheer, Frankfurt branch manager for NAS's West German subsidiary. "They give the 4381 user who is near capacity options besides either installing a second 4381 or upgrading to a 3090 Model 150," he said.

The Hitachi Ltd.-developed CPUs were introduced simultaneously at Cebit by Comparex, the new joint venture of West German vendors Siemens AG and BASF AG. Comparex and NAS market private-label Hitachi mainframes in Europe.

Both of the NAS AS/VL processors employ the high-end AS/XL architecture with the 1M-bit metal-oxide semiconductor memory chip used in the in the AS/XL.

The AS/VL 50 offers 2½ times the performance of the AS/6660 with processing speeds of up to 7.5 million instructions per second (MIPS), according to the vendor. The AS/VL 60 can achieve throughput of more than 10 MIPS, NAS said.

Both machines support IBM MVS/XA and have memory configurable in 32M-byte increments up to 128M bytes. The processors can support up to 15 channels configured for transfer rates of 6M bit/sec. or up to 32 channels at block-multiplexer rates, NAS said.

The AS/VL 50 includes dynamic working storage capacity of 256K bits and buffer storage of 32K bits, while the AS/VL 60 offers double that capacity in both categories.The AS/VL 50 is priced in Germany at approximately $93,100.

U.S. chip makers unite to repel Japanese rivals

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Semiconductor Industry Association (SIA) last week announced it plans to establish a research consortium called Sematech to improve U.S. chip manufacturing capabilities but said it has not figured out how to resolve funding and antitrust problems.

SIA officials said they expect to ask the federal government, particularly the Department of Defense, for a major financial contribution. In addition, the venture may need an antitrust exemption from the government.

Industry executives said the Sematech initiative is intended to help the struggling U.S. chip industry stay competitive with Japanese producers.

Sematech, which stands for Semiconductor Manufacturing Technology, is slated to be a nonprofit corporation that will build a prototype low-volume factory to demonstrate next-generation production equipment and manufacturing processes. The advanced technologies developed at Sematech would be transferred to high-volume plants at individual companies participating in the consortium, officials said.

Advances in technology will be sought throughout the manufacturing cycle, including materials, the lithographic process and equipment, defect reduction and quality control, automated manufacturing and computerized data collection, spokesmen said. The concept is supported by the Computer and Business Equipment Manufacturers Association, largely because a robust U.S. chip industry would provide vendors with multiple sources of chips.

Under the board's proposal, the manufacturing consortium would get $200 million a year for five years in government aid, while the private sector would pay $250 million in start-up costs.

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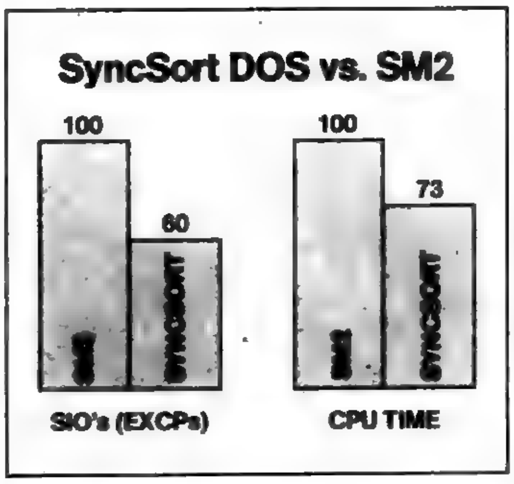

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DEC asserts

FROM PAGE 1

vide our customers with more value for their money."

In a major software price hike, the unlimited VMS software license for a Microvax jumped from $8,000 to $18,000, the vendor said.

Most price increases affected the high-end VAX systems. The just-announced VAX 8530 preconfigured system with 16M-byte memory typically costs $336,000, according to Steve Blanchette, DEC's 8250 and 8350 product manager. DEC said prices for the 8530 start at $291,000, compared with $260,000 for the earlier 8500.

"It's important to note that performance also went up on that system," he noted, referring to the 8530's replacement of the 8500.

A preconfigured 8550 with 32M bytes of memory increased from $398,000 to $464,000. The 8700 with a 32M-byte memory jumped from $483,000 to $546,000, while an 8800 Vaxcluster configuration with a 48M-byte memory soared from $672,000 to $787,000.

In another price move, DEC cut costs for its mid-range VAX systems. The 8250, a replacement for the year-old 8200, was reduced by as much as $19,000, and the 8350, the 8300 replacement, was reduced as much as $26,000, Blanchette said.

Meanwhile, memory and mass storage price cuts have third-party vendors such as Milpitas, Calif.-based System Industries, Inc. and Costa Mesa, Calif.-based Emulex Corp. concerned.

"They're making it very difficult for third parties," observed Larry Tashbook, Emulex director of strategic marketing, storage products.

"The third-party market has clearly demonstrated to DEC that third-party memory was as good or better than what DEC was offering. The issue came down to dollars and cents. Whoever has the lower price will get the business. That's what DEC is reacting to — trying to keep third parties out at whatever cost it takes," he said.

Dan Post, System Industries' director of marketing communications, noted, "We're not particularly worried. Anytime you have a price war in other industries, such as the airline industry, others respond in kind.

"I'm sure other third parties like System Industries will reevaluate their price structures. We intend to remain competitive," Post added. "I think you'll see some aggressive tendencies in our service policies and pricing over the next few months. We consider our primary competitor to be DEC, so we'll make many of those decisions with their announcement in mind."

Price cuts for memory were more significant than price reductions in mass storage. VAX 8250 and 8350 4M-byte memory price dropped from $12,900 to $6,000, Blanchette said. For higher end 8000 systems, which include the 8530, 8550, 8700 and 8800 systems, the 16M-byte memory price was cut from $32,000 to $16,000, he said.

According to a DEC OEM, the Microvax II 8M-byte memory board now costs $2,650, about half its original price. The 4M-byte Microvax II memory board price was cut from $3,500 to $1,350, the OEM said.

The 456M-byte RA81 disk drive price was reduced from $19,000 to $16,000, DEC's Blanchette said. The 2.5G-byte SA482, which was announced in January, retains its $84,000 price tag. The $16,000 price for an RA81 matches the price System Industries announced last month for its RA81 competitor.

Users win license transfer tiff

In response to end-user demands, Digital Equipment Corp. last week reversed a controversial policy prohibiting the transfer of operating system licenses with CPUs sold to a third party.

"We had a lot of discussion with our user community," said Harvey L. Weiss, DEC vice-president of U.S. operations.

"We're reversing our position in the policy. We accept our user concerns and are doing what they asked us to do," he said.

With the new policy, operating systems will be licensed directly to CPUs and transferred automatically with them when systems are sold, Weiss said.

Under the previous licensing policy, which was issued last fall, the original licensee was prohibited from transferring a license to a third party when selling used DEC hardware.

When the previous policy was instituted, the third party was required to obtain a new VMS license directly from DEC.

IBM image

"It was a smart move for them to make, and it did allay fears that DEC was becoming more and more like IBM in a negative sense," said Richard Mikita, a researcher for Framingham, Mass.-based market research firm International Data Corp.

"It is definitely to DEC's credit that they quickly saw that and reversed their position," Mikita said.

Customers under contract with DEC can now move layered software within a company by simply notifying the vendor. Originally, the customer had to request the move.

The new policy covers both DEC VAX and PDP-11 hardware.

NINAMARY BUBA MAGINNIS

DEC wards off 9370 challenge

Mid-range replacements bolster price/performance edge

BY JAMES CONNOLLY
and NINAMARY BUBA
MAGINNIS
CW STAFF

MARLBORO, Mass. — Digital Equipment Corp. moved to fill small holes in its VAX product line last week while also apparently trying to broaden any price/performance gaps between it and IBM.

DEC replaced its year-old VAX 8200 and 8300 departmental systems with the more powerful and less expensive VAX 8250 and 8350, reducing the entry price for the VAX 8000 family from the 8200's $79,000 to $65,000 for the 8250. The company also replaced its mid-range VAX 8500 with a VAX 8530 that provides 33% more power. A typical 8530 configuration costs $336,000, said Steve Blanchette, DEC's 8250 and 8350 product manager. A similar 8500 configuration costs $260,000.

The models were introduced only two weeks after IBM announced that it is speeding up deliveries of its 9370 mid-range system by three months, which means some 9370 configurations will be generally available before June.

While IBM's October 1986 introduction of the 9370 is seen by industry observers as an attempt to cut into DEC's advantage in price per millions of instructions per second (MIPS), DEC's most recent announcements restored some of that edge. The 1.2-MIPS 8250 costs $65,000, compared with $93,000 for the 1.3-MIPS IBM 9375 Model 60.

DEC did not announce an upgrade package to convert an 8200 to an 8250 or 8350, although analysts speculated that such an option may be offered later. Instead, the company emphasized the advantages of replacing a 1-MIPS 8200 with a 2-MIPS, dual-processor 8350.

The 8250 is positioned as a lower cost entry system into the Vaxbus interconnect architecture and high-end Vaxcluster technology, according to William R. Demmer, vice-president of DEC's mid-range systems business group.

The VAX 8350 replaces the 8200 and 8300, providing twice the power of the 8200, Demmer said. He added that the 8350 is positioned as the price/performance leader for systems using Vaxcluster technology.

Demmer said the 8530 delivers four times the performance of the 8200, which reportedly would give it a rating of 4 MIPS. He said it is has microcode enhancements that can be added to the 8500 for field upgrades.

While the 8200 and 8300 cannot be upgraded to the 8250 and 8350, analyst Charles T. Casale, director of research for Boston-based market research firm Yankee Group, said, "It is common practice in the industry to announce new models and at some point to decide to offer customer upgrades. Based on everything I have seen, I would be surprised if DEC alienated their customers over this."

Another analyst, John McCarthy of Forrester Research, Inc. in Cambridge, Mass., added, "I would assume there are some new manufacturing efficiencies in the new boxes. It shows you how short product life cycles are getting and shows you how IBM is going to struggle with its traditional five-year life cycle." But, McCarthy warned, DEC may face a problem in that it is changing machines so quickly that users may lose track of its product offerings.

McCarthy said the lower end 8200 and Microvax II have encountered problems competing with equivalent systems from Wang Laboratories, Inc., Prime Computer, Inc. and Hewlett-Packard Co. The new models will help DEC maintain price/performance advantages over the 9370s, he added.

CD-ROM intrigues Lotus, Microsoft, GE

BY PEGGY WATT
CW STAFF

SEATTLE — The still fledgling compact disk/read-only memory (CD-ROM) industry cautiously spread its wings last week as several major vendors announced products or intentions to enter the market. But most development is still tentative or oriented toward vertical markets, and potential users are proceeding with caution as well.

Lotus Development Corp., RCA Corp., Sun Microsystems, Inc. and General Electric Co. were among the companies announcing ventures at the second annual conference on CD-ROM sponsored by Microsoft Corp., which also presented its first CD-ROM product.

A handful of other firms displayed such vertical applications as medical or legal reference retrieval systems, CD-ROM drives under the agreed-upon High Sierra format standards and even directories of CD resources. The few users attending the conference were scouting available products or testing customized implementations. But much of the discussions remained theoretical. "It's an industry in its larval state," said Richard Green, an analyst and technical consultant for Tec-Ed in Ann Arbor, Mich.

Several new retrieval interfaces paired with data bases were among the conference announcements. Microsoft also announced a new development vehicle. Microsoft Bookshelf is a CD-based collection of 10 reference works, including an almanac, thesaurus, *Bartlett's Familiar Quotations* and a postal zip code directory as well as a built-in retrieval system. The $295 package is scheduled to ship in June.

Lotus, which entered the CD-ROM market last year, with its One Source financial data analysis and update system, took another step by acquiring Computer Access Corp. in Belmont, Mass. Lotus will integrate that firm's Bluefish text search and retrieval technology into Lotus Manuscript word processing applications and other, unannounced products, according to Larry Moore, Lotus director of advanced applications. Lotus did not say when the products would be available.

Sun and Philips Subsystems and Peripherals, Inc., a CD-ROM drive leader, said they will jointly develop an authoring workstation for CD-interactive applications. Availability was not specified.

MIS seeks better Apple support, service

BY PEGGY WATT
CW STAFF

LOS ANGELES — Corporate customers last week said Apple Computer, Inc. has taken a big step in the right direction by releasing an expandable Macintosh that can read Microsoft Corp. MS-DOS data. However, they added that better services and support must soon follow in order for MIS to open its doors to the Macintosh.

Several hundred participants in Apple's National Accounts program, all Fortune 1,000 companies, heard Program Director Tom Strout, Sales and Marketing Vice-President William Campbell and other Apple executives call corporate business a priority this year.

But Apple stopped short of announcing new support or corporate sales programs. A corporate spokeswoman said Apple has focused on beefing up systems and is still developing its corporate services.

The National Accounts program consists of approximately 75 large corporations that Apple solicits for business use concerns and that may buy directly from Apple. The program is less than 1 year old, and its representatives were guests at a two-day Apple World forum last week, at which two models of the Macintosh were introduced. The more powerful of the models, the Macintosh II, boasts a faster processor, color and six expansion slots [CW, March 2].

Many of those corporate attendees said the Macintosh II is an Apple they can justify buying even in an IBM Personal Computer-dominated office.

"Certainly, the Macintosh II will do a lot to get Apple products into business," said Roger G. Stites, vice-president of Security Pacific Data Transmission Corp., an arm of Security Pacific National Bank in Glendale, Calif.

But Apple cannot get in alone, according to Al Holley, manager of Hughes Aircraft Co.'s computer-aided resources management, which already has some 700 Macintoshes in its engineering departments. "The real tools are the software, not the hardware," he said.

Apple has laid the right foundation by releasing more powerful machines and cultivating third-party developers, but it still needs to build a reputation as a serious business machine manufacturer to combat IBM office dominance, some managers said. "The new programs and technology help, but the problem is still changing management's view," an engineering specialist at a major aerospace corporation said. "When you can talk about Macintoshes working with IBM PCs and Digital Equipment Corp. Microvaxes — communicating with them and sharing data — that's what convinces them."

The Macintosh's new capacity to read MS-DOS files is a boon, according to corporate representatives. Several said they did not need the function, but its existence would answer concerns about compatibility with the rest of the systems.

"MS-DOS compatibility is a management caveat, whether it's really needed or not," said Paul E. Lucero, Hughes's consultant with microcomputer services.

Deskpro 286 to speed up

BY DOUGLAS BARNEY
CW STAFF

HOUSTON — Compaq Computer Corp. is set to announce today a speedier replacement for its 8-MHz Deskpro 286 microcomputer.

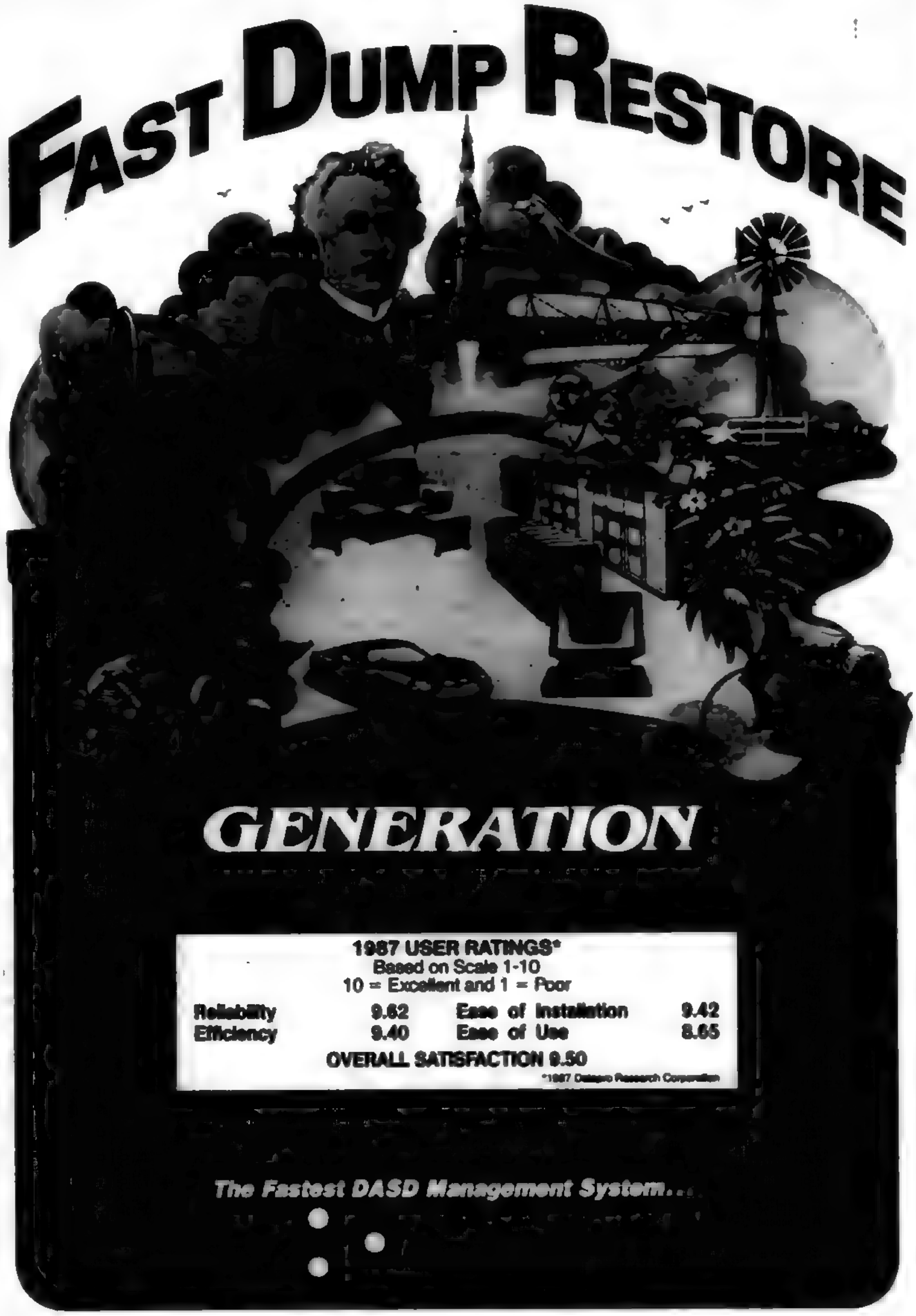
While selling for the same $2,999 in its base configuration, the new line of Deskpro 286 machines run at 12 MHz, and higher priced versions include a faster hard disk drive.

"A lot of the things we do involve heavy number crunching, and we find long periods of time where we wait, wait, wait," said Jon Seebach, director of the central microcomputer function for the certified public accounting firm of McGladrey Hendrickson & Pullen. He added, "12 MHz is much faster for number crunching, and it compiles languages much more quickly." In addition to using faster 286 machines, Seebach has brought in several Compaq Deskpro 386s to speed such processing.

Other machines, such as some versions of the PC's Limited 286 from PC's Limited, run at 12 MHz, but for Seebach, the wait for Compaq was worthwhile. "There are some benefits to going with IBM or Compaq. If you have clients or offices in small cities or scattered across the country, then support and maintenance is of key importance," Seebach said. "Yes, some machines are cheaper, but we may have difficulty getting parts, and dealers may not support the product."

For existing Deskpro 286 users, the upgrade path is simple: Buy a new machine. "It is physically possible to upgrade, but we are not offering a specific upgrade. You basically have to replace the entire insides of the new machine," said Michael Swavely, vice-president of marketing for Compaq.

In addition, Deskpro 286 now includes a 192W power supply.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*1987 Datapro Research Corporation

MIS plots micro purchase plan

LAN, Disoss, Unix/Xenix top purchase plans while PC clone use rises

BY DOUGLAS BARNEY
and ALAN RYAN
CW STAFF

FRAMINGHAM, Mass. — Local-area networks (LAN), use of the mainframe for virtual-disk storage of Microsoft Corp. MS-DOS files, IBM Distributed Office Support System (Disoss) file transfer and Unix/Microsoft Xenix operating systems top the list of MIS purchase plans for the coming year, according to a recent survey of 705 *Computerworld* readers. And although IBM's Personal Computer family continues to dominate microcomputer sales to large corporations, cheaper IBM clones are making headway in this market.

The vast majority of respondents to the survey currently have access to a mainframe, using their micro as a terminal. The subjects of the survey have an average of 240 personal computers installed per site.

Most of those PCs were selected by MIS/DP. Nearly 75% of the organizations polled cited MS/DP or an MIS/DP information center as controlling and specifying personal computers purchased for the organization.

Computerworld last week contacted readers to discover the motives behind the broad technological trends.

Unix takes hold

The most stunning revelation is an increase in the use of the oft-maligned Unix and Xenix operating systems. Only 10.8% of the firms queried currently support Unix, but 32.4% plan to support the operating system during the next year. For Xenix, 5.8% support it now, compared with a projected 14.3% by next year.

For Barry Hosking, systems analyst with the O-Cel-O Division of General Mills, Inc. in Tonawanda, N.Y., Unix and Xenix are important issues.

"With Microsoft stalling on their new operating system [a new version of MS-DOS that taps the potential of the Intel Corp. 80286 microprocessor], they may first develop a mix-based system for their 80286- and 80386-based machines which would allow an MS-DOS program to run as a session under a Unix shell," Hosking said in a phone interview last week. O-Cel-O, however, has yet to implement Unix or Xenix on PCs.

Micros reach out

MIS's current use of micro links and future plans.

	MIS Use	
Link	*Current*	*Planned*
IBM 3270 terminal emulation	76.0%	63.2%
Virtual disk storage of Microsoft Corp. MS-DOS files on the mainframe	26.6%	43.2%
Mainframe-based selection and extraction of the software	23.2%	31.2%
IBM Disoss file transfer	10.5%	21.4%
LU 6.2 protocol	7.1%	17.1%

CW CHART

The survey appears to indicate that the importance of IBM PC-DOS and MS-DOS, although they are clearly still the leaders among microcomputer operating systems, will wane over the next year as other operating systems gain steam. "[DOS] is running out of gas," said George DiNardo, executive vice-president of the Mellon Bank NA in Pittsburgh.

Mainframes store PC files

The increasing use of PCs is not entirely at the expense of host computers. Virtual-disk storage, already a large area, is poised for tremendous growth. Currently, 26.6% of those surveyed use the mainframe for storage of PC-DOS or MS-DOS files, but 43.2% report plans to use that technology during this year.

One reason for this trend is data security and control, as some hard disks provide a fragile medium for storing data. "It provides us with the capability to archive in a central site," said Dale Preston, director of MIS for Bristol-Myers Co. in Wallingford, Conn.

Others may trust the disks but do not trust the users. "PC users, in my opinion, are not as apt to properly save their files. The fact that they're on a mainframe allows DP departments to save files every day," said Richard Hanson, MIS manager for Braun, Inc. in Lynnfield, Mass.

Clone sales brisk

It will be a good year for vendors of IBM PC clones, according to the survey. While 83.7% of the respondents currently have IBM PCs, only 63.9% intend to purchase more IBM machines in the coming year. "It is usually possible to get the clone cheaper, and it does the same amount of work," said A.S. King, marketing systems development manager for J. C. Penney Co. in New York.

For James Zelle, agency data processing manager for the Connecticut Department of Mental Health in Hartford, clones are appealing because of their lower price. "We have many more clones than we have IBM. Don't forget, you're dealing with state government," he said.

But IBM is still leagues ahead of its closest competitor, Compaq Computer Corp., which will sell machines to 16.5% of the respondents. "The major problem I have with the clones is whether or not they'll be able to fit in with the networking strategies IBM has got on the boards for connectivity," Bristol-Myers' Preston said.

Apple ripe

Although only 9% — compared with 20.4% two years ago — of the respondents chose Apple Computer, Inc. as a PC vendor for the coming year, Apple's MIS fans are an important force.

"We are kind of hoping the Macintosh environment becomes more prevalent than IBM. That environment is so much easier to manage than the PC-DOS or MS-DOS environment," said Larry van Goetham, director of corporate systems for Sara Lee Corp. in Chicago. About one-fifth of the respondents currently have Apple machines installed.

Communications red hot

In communications, LANs, modems and micro-to-mainframe links will be the hot sellers. Each of these technologies is on the purchase lists of more than half the respondents.

According to the survey, many PCs will have several communications capabilities, with close to half acting as a node on a LAN within the next 12 months. Currently, only one-third of the installed PCs are reported to be part of a LAN.

Communications protocols are another area of growth. IBM's Advanced Program to Program Communications as well as LU6.2 use will more than double. But Disoss will lead the file-transfer charge with an increase from the current level, 10.5%, to use in 21.4% of surveyed organizations.

LANs are on the purchase lists of 56% of the respondents. "I am enamored with 3Com Corp. and others who provide a good way to link stand-alone PCs," Mellon's DiNardo said.

Bristol-Myers is heavily committed to LANs, with an IBM Token-Ring network and Rolm Corp. CBX already installed. "The next level of information that is going to need to be moved is images. The Token-Ring not only provides the highway, it provides the speed within the computing architecture we have established," Bristol-Myers' Preston said.

The buck stops here

Responsibility for control and specifying micros within corporations.

Department	*Percent*
MIS/DP	59.1
Information center (part of MIS/DP)	14.6
Top company management (non-MIS/DP)	8.4
Administration	6.7
Department using personal computers	5.2
Finance	2.7
Operations (non-MIS/DP)	2.0
Information center (not part of MIS/DP)	1.2
Other	3.0

CW CHART

Lining up micro vendors

Vendors being considered for future micro purchases

Company	*Percent*
IBM	63.9
Compaq Computer Corp.	16.5
Apple Computer, Inc.	9.2
AT&T	6.9
Zenith Data Systems Corp.	6.0
Hewlett-Packard Co.	3.9
Digital Equipment Corp.	3.2
Leading Edge Products, Inc.	3.2
Wang Laboratories, Inc.	2.8
Toshiba America, Inc.	2.8
Tandy Corp./Radio Shack Corp.	2.6
Epson America, Inc.	2.4
NCR Corp.	2.1
Other	21.9

CW CHART

IBM supports X.400, ties into OSI

BY AMIEL KORNEL
SPECIAL TO CW

PARIS — IBM last week announced here an X.400 message handling system as well as software connecting the firm's Distributed Office Support System (Disoss) to the Open Systems Interconnect (OSI) environment.

IBM also announced enhancements of previously released products that support OSI protocols.

OSI has been added to by the International Standards Organization since 1977 to permit the interconnection of heterogeneous computer systems. The X.400 application provides a common set of protocols for packaging and routing messages between IBM computers and other systems that support X.400. With the introduction of X.400 protocols for the uppermost levels of the OSI framework, IBM for the first time offers product support for the entire seven-layer model, the company said.

Rollout seen coming

The announcement of the IBM X.400 Message Transfer Facility Program Offering is not altogether unexpected. IBM participated last year in a demonstration of X.400 message handling, linking its equipment with systems from International Computers Ltd., Compagnie des Machines Bull, Siemens AG and Nixdorf Computer AG at the Cebit '86 trade show in Hannover, West Germany. Cebit '87 opened its doors last week.

Enhancements of the General Teleprocessing Monitor, Open Systems Transport and Session Service and Open Systems Network Support — all previously released OSI-related products — were also announced.

The two new products and the General Teleprocessing upgrade are to be available during the third quarter of 1988. Availability of Open Systems Transport, Open Systems Network Support and enhancements are scheduled for September.

IBM said that its OSI verification service at La Gaude, France, will support the new products as they become available. The service allows users to verify that their implementations of OSI protocols are compatible with IBM's implementation of the same protocols.

Kornel is a correspondent for CW Communications International News Service's European bureau.

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Iebcopy	67 min. 18 sec.	12 min. 27 sec.	103,486	$131.05
PDSFAST	3 min. 23 sec.	8 sec.	712	$4.22
12 cyl. PDS Copy				
Iebcopy	9 min. 14 sec.	1 min. 20 sec.	10,792	$18.47
PDSFAST	48 sec.	.7 sec.	122	$1.75
47 cyl. PDS Unload to Tape				
Iebcopy	58 min.	14 min. 52 sec.	97,253	$92.05
PDSFAST	4 min. 3 sec.	37 sec.	911	$5.74
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SOFTWARE ENGINEERING OF AMERICA SEA

IBM gives

FROM PAGE 1

Postscript," said Jeff Mason, general manager of IBM's new Publishing Systems independent business unit, in the keynote speech at the Corporate Electronic Publishing Systems conference held here.

Windows has already made its mark in the surging market for desktop publishing by serving as an interface for Aldus Corp.'s Pagemaker software. Last week's announcement, which fell short of an official IBM endorsement of Windows, is a needed lift for the Microsoft environment, which has received only modest support from users and the personal computer software development community.

Only about one in five copies of Windows sold is actually in use, according to figures supplied by Microsoft and the Cupertino, Calif.-based market research firm Infocorp. IBM has avoided committing to any IBM PC-based windowing standard other than its own Topview.

Microsoft Chairman William Gates last week said the IBM announcement is an important boost for Windows, although he cautioned against overinterpreting its impact. "This is just one more step [in Windows' acceptance], though it's a valuable step," he said. "This [IBM] business unit believes Windows is the standard, and I believe that statement will have significant effect on developers doing applications for desktop publishing.

"However, I caution anyone from reading more into this beyond desktop publishing," Gates added.

According to Jonathan Seybold, publisher of "The Seybold Report on Publishing Systems," Windows has clearly beaten out Topview for IBM's publishing products. "Windows is the IBM-sanctioned and preferred operating environment for publishing applications, not Topview," he said. "All of IBM's applications software for publishing will run under Microsoft Windows."

It was still unclear late last week whether Mason's statements meant that IBM will develop software specifically for Windows or simply use an existing product, such as Pagemaker, for its desktop publishing line.

Mason did not elaborate on the role Windows would play in the forthcoming IBM products, except to say that "Windows supports concurrent applications and the information exchange between them." Among those supported are cut-and-paste features that could be useful in a micro-to-mainframe strategy, which IBM has endorsed for its publishing products.

An IBM spokesman would not comment on the level of IBM's commitment to Windows.

IBM, however, did provide some details on its support of Postscript, which the company agreed to license last week from Adobe in Palo Alto, Calif., for future use in an IBM printer.

"We chose Adobe because of its strong customer and vendor acceptance and because of its superior output quality," Mason said. To date, the only way IBM Personal Computer users have been able to use Postscript has been to run a Postscript-compatible application, such as Microsoft Word, on their PCs and print out on a Postscript-compatible device, such as the Apple Computer, Inc. Laserwriter.

IBM is already at work to develop software that will link IBM's Advanced Function Printing Software (AFP) to PC-based Adobe software, Mason disclosed. "We want to be able to download AFP files to Postscript workstations and to upload workstation files to the IBM host for high-speed AFP printing," he said. AFP is used in conjunction with IBM's high-speed 3800 and 3820 laser printers.

All the IBM systems, Mason added, would be compatible with PC-DOS rather than Unix, which is the current platform for many of the most widely used publishing systems. "We're saying that we see PC-DOS as the solution for most of our customers, rather than Unix," he said. However, IBM's RT Personal Computer already runs the Unix-compatible Interleaf system from Interleaf, Inc. in Cambridge, Mass.

IBM's decision to support the PC-DOS, Postscript and Microsoft Windows standards should reassure users that IBM will catch up with the direction already taken at many large corporations, said David Henry Goodstein, president of Interconsult, Inc., a Cambridge, Mass.-based firm. "IBM has told the users to go ahead because they can assure them of future support," Goodstein said.

West Coast correspondent Peggy Watt contributed to this story.

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Vendors' desktop angles vary

BY JEAN S. BOZMAN
CW STAFF

IBM, Digital Equipment Corp. and Apple Computer, Inc. have each targeted desktop publishing as one of the industry's hottest growth areas. Yet they have taken very different approaches to developing products.

At stake is a market that IBM believes will produce at least $1 billion in sales this year and is expected to jump to $6 billion by 1990, according to Jeff Mason, general manager of IBM's new Publishing Systems independent business unit. Mason quoted industry estimates that corporations spend 6% to 10% of their budgets on publishing expenses.

IBM last week outlined a hierarchical approach to corporate publishing, one in which its mainframes will anchor enterprisewide publishing systems. "The host-based systems will interact with corporate data bases, which allows corporations to enforce corporate publishing standards," Mason said.

DEC has taken a different approach, using distributed processing for its publishing systems. The glue for the DEC scheme will be the networking software itself, as well as consistent user interfaces and the VMS operating system in each VAX. DEC announced a full series of hardware and software components, called VAX Integrated Publishing, at last week's Corporate Electronic Publishing Systems show. DEC's publishing scheme leverages its existing network architecture to link Vaxmate and Vaxstation II workstations to VAX host systems.

Apple, whose Macintosh is credited with kicking off the desktop publishing phenomenon, announced that it would support both the DEC and IBM corporate networking schemes for publishing. "We will provide communications into the VAX and IBM worlds," said John Scull, marketing manager for Apple's desktop publishing group.

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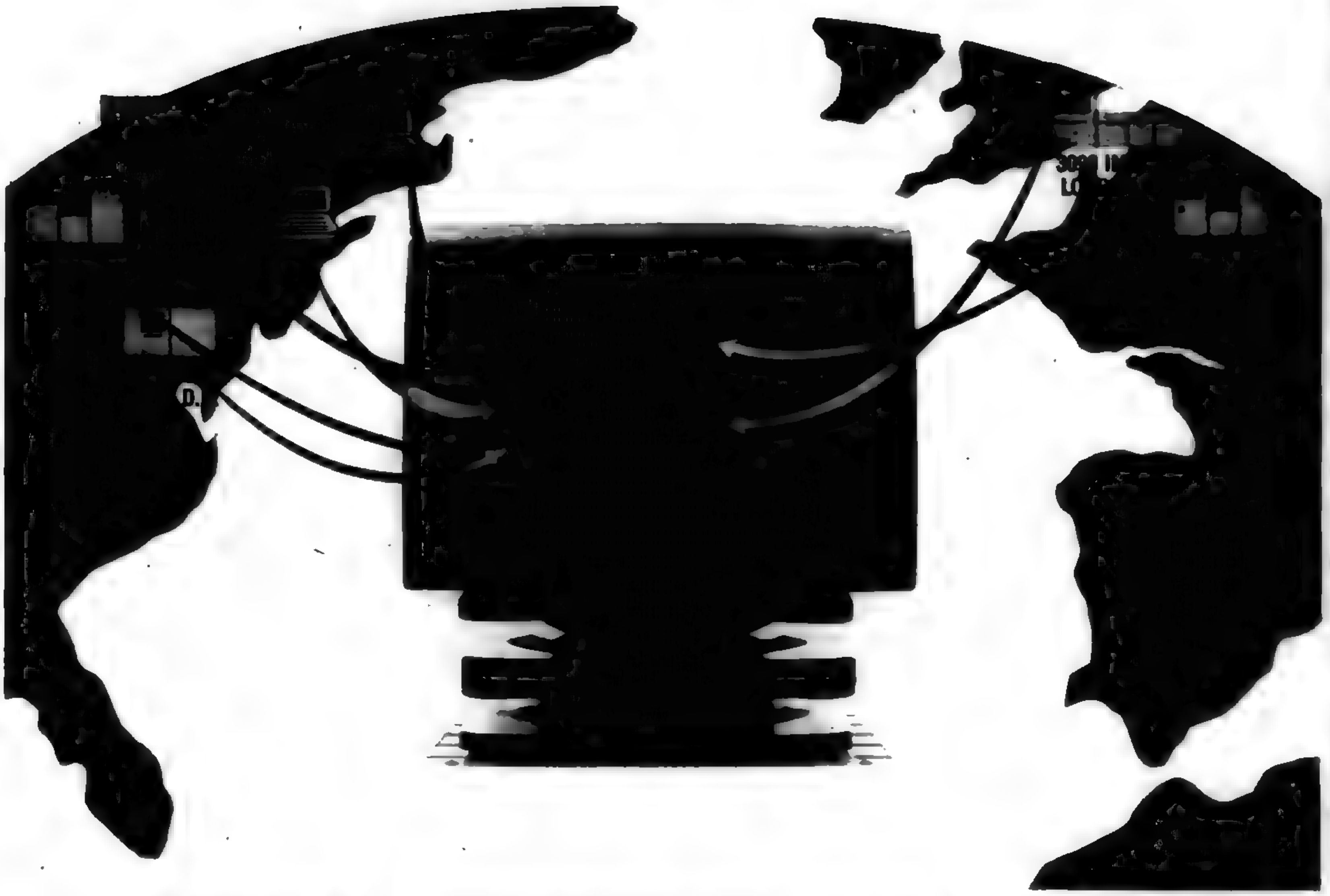

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Uccel cancels ADC2 support, ires users

BY JAMES A. MARTIN
CW STAFF

DALLAS — Two months after its acquisition of The Cambridge Systems Group, Inc., Uccel Corp. has informed users of Cambridge's mainframe scheduling package that it has discontinued marketing that product and will no longer support it after December 1988.

Uccel, in a recent letter mailed to users of Cambridge's Automated Data Center Job Scheduling and Production Control (ADC2), said that "effective immediately, Uccel will no longer offer ADC2 as a marketed product." Instead, the company said it would continue supporting its UCC-7, which competed with ADC2 before the acquisition, as its single production work load scheduling package.

Uccel's decision to drop Santa Clara, Calif.-based Cambridge's ADC2 has aroused the ire of some of its 130 users, at least one of whom is considering legal action. A systems director at a San Francisco-area financial consulting firm, who asked not to be identified, said he has contacted an attorney to review the perpetual license agreement and maintenance contract his company signed with Cambridge Systems Group in mid-1986.

The agreements state that Cambridge is bound to support ADC2 unless the company reorganizes under Chapter 11 bankruptcy laws or there is a breach of contract from either party. The systems director also said Cambridge misrepresented the stability of the company during their spring 1986 meetings. He expressed interest in pursuing a class-action suit against Uccel to block it from discontinuing ADC2 but added that it was too soon to determine the most appropriate legal recourse, if any.

"Our really big concern here is not so much the money but the time involved in retraining my staff on a new scheduling program," he said. It can take up to six months to get everyone over the initial learning curve and another six months until everyone is comfortable using the software, he added.

'Rotten thing to do'

"Simply, it was a rotten thing for Uccel to do," said Andrew Murawaki, operations analyst for Falk Corp., an equipment manufacturer in Milwaukee. "Just as we have implemented ADC2 in our data center and finished all the training, we're going to have to reverse the process and start all over again."

Several users said a January letter mailed by Cambridge to ADC2 users in an effort to soothe concerns after the merger now seems unpleasantly ironic. The letter informed users that Cambridge had been acquired by Uccel and added, "the Cambridge products you now have installed will continue to be supported from Santa Clara by the same support staff you have been working with previously."

Uccel realized it would anger some users with this announcement and is offering until April 30 a free conversion program designed to make the transition "as painless as possible," said Steve Lee, director of marketing services at Uccel's Dallas headquarters.

In the offering, Uccel is making available free to ADC2 users a UCC-7 basic license, data base conversion routine, videotape training and two seats at any regional UCC-7 training seminar. Uccel estimated the value of that offering at $52,360.

A license for the UCC-7 full-function scheduling package and training will cost ADC2 users $7,500, compared with the usual price of $71,360. UCC-7 is normally available for a one-time fee of $49,000 for the basic version and $68,000 for full-function UCC-7. ADC2, by comparison, costs $45,000. Both run under IBM's MVS and MVS/XA.

Several of ADC2's features will be incorporated into UCC-7 eventually, but those features have not been decided yet, said Craig Stull, director of marketing. In the meantime, Uccel has already discontinued marketing ADC2, and development efforts will cease this month as a new release, Version 2.30, is scheduled to ship. Support for Version 2.30 will continue until December 1988.

Following the merger, Uccel decided it would "be confusing and a duplication of effort to develop and support two products that were so similar," said Fred Meyers, UCC-7 product manager. "It makes more sense to take the best features from both and support and develop one product."

The company is not arbitrarily seeking to eliminate a competitive product in favor of its own, Lee said. After the acquisition, Uccel also found itself deciding between its UCC-3 and Cambridge's Automated Storage Management, both of which are mainframe disk management systems.

Although users agreed that Uccel's conversion offering was adequate, they cited lost productivity time and retraining demands as major concerns.

"I work with a small staff, so I have to stop, take the time to train my people all over again, and that's just after we've gotten all three shifts up on ADC2," said Rod Chatfield, specialist for production services at General Electric Co.'s Nuclear Energy Division in San Jose, Calif.

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3317-8710

Wang cutbacks hit top levels

BY ALAN J. RYAN
CW STAFF

LOWELL, Mass. — As part of Wang Laboratories, Inc.'s continuing efforts to pull itself back into the financial black, as many as 27 vice-presidents and 16 department directors are said to have left or been cut from the firm in recent weeks.

One former Wang employee claimed seven of the vice-presidents and 16 directors resigned or were asked to resign on the same day a month ago.

But a Wang spokesman denied the allegation that employees left on the same day, saying the company has been paring down its payroll roster since early this year. He refused to comment on the number of vice-presidents and directors who have left Wang this year.

"We announced back in January that there would be a consolidation of various departments within Wang," spokesman Paul Henning said. At the Jan. 6 announcement, Wang said it would attempt to cut $50 million from its budget by June 30 through a 6% pay reduction for all U.S. salaried employees and through a 1,000-man reduction in the company's work force. The reduction would be realized through attrition and consolidation, the company said.

Wang is saying its attrition and consolidation plan could take up to five months, but one source within the company said that the 1,000-man reduction goal has been met, with about 600 people opting to leave and 400 being laid off. The source added that the cuts are continuing, and that since January, 27 vice-presidents have had their names removed from Wang's employee roster.

Industry watchers contend that all of these vacated jobs prove that Wang had a serious job overlap problem. The source within Wang asserted that while overlap was a significant problem prior to this year, things are becoming more organized.

Sources within Wang and outside of the company claimed the reason the redundant positions were not terminated years ago was because founder An Wang had a strong sense of loyalty to his long-term employees. When his son, Fred, took the company's reigns last fall, he began eliminating the overlap, the sources explained.

A second former Wang employee stated that for the past three or four years, the company has been carrying some officials whose performance has not been up to snuff.

The source referred to problems within the company dating as far back as 1983 and said various vice-presidents were at fault.

'Harboring incompetent people'

Former Vice-President Samuel Gagliano scoffed at the charge that Wang held on to long-term employees who were not doing their jobs. He said Wang was not "harboring incompetent people."

Gagliano, 45, who left Wang last month, said that after spending 20 years at the firm, "I felt I was at a point where I wanted to take a lot of the things I had learned and apply them to general management." He added that he started work earlier this month as the general manager of a small start-up firm.

"My sense is that [Wang is] keeping much of this under wraps so they don't cause a commotion in the financial community" after the heavy financial loss the company suffered in its first fiscal quarter ended Sept. 30, 1986, a former employee said. For that period, Wang recorded a $30 million loss.

Among those who have reportedly left — according to current employees and outside sources — are Edward V. Garcia, vice-president of advanced maintenance development; Stephen Jonas, vice-president of finance and administration; Robert Kolk, vice-president of peripherals and small software development; and Joseph Klementovich, vice-president of manufacturing and customer engineering relations.

Other vice-presidents who have left Wang include Richard Connaughton, vice-president of voice product marketing, who resigned in mid-January; and Ralph Crusius, vice-president and assistant to Chairman An Wang, who retired on Jan. 30 [CW, Feb. 16].

Wang also declined to name directors who have recently terminated their employment with the company.

Daisy Systems puts 80386 to work in latest engineering workstations

MOUNTAIN VIEW, Calif. — Promoting a standard architecture as a key selling point, Daisy Systems Corp. last week announced two computer-aided engineering workstations based on Intel Corp.'s 80386 microprocessor.

The workstations — both based on IBM Personal Computer AT-compatible systems that Daisy purchases from Intel — come with Dnix, Daisy's proprietary version of Microsoft Corp.'s Xenix operating system. The lower end workstation runs Microsoft Corp. MS-DOS as an option, but the high-end system does not.

According to the company, the workstations support the full range of Daisy computer-aided engineering and design applications running under Dnix, such as analog and digital simulation, physical modeling and schematic capture. When configured with Daisy's Ethernet-based local-area network (LAN), the workstations can share a single distributed data base.

Prices begin at $20,000 for the Personal Logician 386 and at $50,000 for the Logician 386. The lower priced workstation includes 2.5M bytes of random-access memory (RAM), a 1.2M-byte floppy disk drive, a 44M-byte hard disk drive, an Intel 80287 math coprocessor and an IBM Enhanced Graphics Adapter.

The base Logician 386 includes 4M bytes of RAM, a floppy disk drive, an 85M-byte hard disk drive, a backup tape drive, a high-performance graphics accelerator and an Ethernet LAN.

DAVID BRIGHT

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NEC stutters, attacks in PC AT arena

BY DAVID BRIGHT
CW STAFF

BOXBORO, Mass. — After a false start last November, NEC Information Systems, Inc. said that it finally plans this week to expand its APC IV IBM Personal Computer AT-compatible system offerings.

The company is scheduled to announce three new systems: a small-footprint system, a more powerful version of the APC IV and a nine-user system running Santa Cruz Operation's version of the Xenix operating system.

NEC had been on the verge of introducing the multiuser version at Comdex/Fall '86 and the other two products shortly afterward, but the company delayed the announcement in order to offer the products together as a family, according to Frank Girard, vice-president of systems marketing.

Beginning in mid-1986, NEC shipped approximately 8,000 APC IV units, according to International Data Corp., a Framingham, Mass., market research firm.

All three new systems are powered by the Intel Corp. 80286 microprocessor and are said to be highly compatible with the PC AT.

Attractive alternative

Because of the Powermate 1's lower price and smaller footprint compared with the AT, NEC said it expects the 8-MHz system to become an attractive alternative to the AT.

The system's starting price of $1,995 includes 640K bytes of random-access memory (RAM), a 1.2M-byte floppy disk drive and a hard disk drive controller. PC AT prices begin at $3,395 for a system with 256K bytes of RAM and a 1.2M-byte floppy disk drive.

Powermate 1 options include a 3½-in. internal floppy disk drive for exchanging information with the company's Multispeed laptop system, two 40M-byte hard disk drives and a 40M-byte backup tape drive.

The Powermate 2 is housed in the same box as the APC IV. Improvements include an 8- or 10-MHz, switch-selectable microprocessor and an optional, 66M-byte hard disk drive. The unit can contain up to five storage devices, including a 3½-in. floppy disk drive and a backup tape drive.

Prices begin at $2,595 for a system with 640K bytes of RAM, one floppy disk drive and a hard-disk controller.

NEC claimed it is pitting the floor-standing, multiuser Businessmate system against NCR Corp.'s Tower system. The company said it hopes to sell the system to small and medium-size businesses, primarily through resellers. The system contains multiple intelligent I/O controllers for speeding the operation of connected terminals.

The price for a system with 640K bytes of RAM, one floppy disk drive, one 40M-byte hard disk drive and a monitor is about $6,000.

First-tier company

Now that NEC has a range of AT-compatible products, company officials claimed that the subsidiary of the $13 billion, Japan-based NEC Corp. will be able to make the difficult move from a second-tier vendor to a first-tier one.

"This is the beginning of a very large family of PC products," claimed Dick Miller, director of marketing support. "Until now, we haven't put the full weight of NEC behind our efforts."

Miller said that his company would be able to take advantage of the parent firm's economies of scale and ability to produce most of the parts on its own.

In line with its new aggressiveness, NEC this year plans to bolster its offerings with Intel 80386-based products, Miller added.

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Kodak stalks image systems mart

Aims KIMS at governmental, insurance firms requiring high degree of document storage

BY ALAN ALPER
CW STAFF

NEW YORK — Eastman Kodak Co. last week unveiled an information storage and retrieval system with the ability to access documents stored on microfilm and optical disk drives.

The Rochester, N.Y., firm's Image Management System (KIMS), based on Digital Equipment Corp. VAX processors, is aimed at insurance firms, government agencies and other concerns that require a high degree of storage and access to permanent documents.

Kodak first sketched out the KIMS concept in May 1985, showing an image management system based on an Apollo Computer, Inc. workstation.

Only three of those original systems were delivered, noted Paul Artlip, KIMS program manager with Kodak's Business Imaging Systems unit. "That's all we intended to ship," he said, citing preferred technology evolving from Kodak's joint arrangement with DEC.

Artlip said Kodak intends to ship approximately 80 of the systems to purchasing customers by the third quarter. He declined to provide customer names.

System specs

The entry-level KIMS 3000 is a base-level system using 12-in. optical disk drives. It is aimed at departmental users, small firms and government agencies.

The system features a file server running proprietary image management software, high-resolution workstations and up to two Hitachi Ltd. 12-in. optical drives storing up to 2.6G bytes of information on each side of the disk.

A single-user version of the system, priced at $150,000, will be available by mid-year, Kodak said.

The mid-range KIMS 4500 is an automated microfilm retreival system for users with large archival requirements, according to Kodak. The system is positioned to enable users of existing Kodak microfilm systems to migrate to automated microfilm handling systems, observers said.

Based on DEC's Microvax II with 16M bytes of main memory for indexing and controlling document retrieval, the system features two Kodak microimage terminals, a microfilmer and a robot arm for access and insertion of microfilm rolls into a reader. Two file servers with 456M-byte hard disk drives each also are offered with the system.

Base price of the KIMS 4500 is $150,000. It will also be available by mid-year, Kodak said.

The high-end KIMS 5000 can be used with either robotic microfilm or optical storage jukebox libraries. Any member of the VAX family can be used as the system's engine, the firm noted, though the Microvax II is being used in base-level configurations.

Documents can be digitized or created on the system and stored on optical disks or microfilm. Documents may also be accessed from IBM mainframes via Systems Network Architecture (SNA) gateways or from other systems through the use of protocol converters, Kodak said.

The optical storage jukebox, designed by Cygnet Technologies, Inc. in Sunnyvale; Calif., but manufactured by Kodak, handles up to 121 2.6G-byte 12-in. drives. A microfilm robotic library holds up to 372 rolls of microfilm, enough to store up to four million documents.

In a six-user configuration, including one storage module — optical or microfiche — a printer mode, file server and tape backup, the system lists for $700,000. Deliveries will begin in the third quarter, Kodak said.

Kodak's 6800 optical disk drive, which debuted at Comdex/Fall '86, will also be offered with the KIMS 5000, the firm noted. The 14-in. write-once system will not be available in volume until early 1988 and will be pitched at large accounts with image-intensive archival storage requirements, according to Kodak.

The drive comes with either a small computer systems interface or the IPI 3 interface for attachment to large systems. Kodak declined to provide pricing, noting that precise figures would be released later this year.

Ray Freeman, president of Santa Barabara, Calif., consulting agency Freeman Associates, Inc., said the Kodak write-once 14-in. optical drive is aimed at a small number of sophisticated users with enormous data base and storage requirements. The market for optical drives in excess of 3G bytes is expected to grow from a handful this year to 3,000 per year in 1991, he said.

So far, Kodak is the sole supplier of 14-in. optical disks, though the firm signed a preliminary second-source media manufacturing agreement with Philips and Du-Pont Optical Co. in Wilmington, Del., a joint venture of Philips N. V. in Holland and The DuPont Co.

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EDITORIAL

Awash in systems

In Samuel Coleridge's "The Rime of the Ancient Mariner," a marooned and dehydrated sailor is surrounded by the substance that gives life to billions of sea creatures. But he can't slake his incredible thirst, because the water around him is brackish.

The Executive Report on banking, which begins on page 65, points out that large elements of the banking industry are in a similar state. Banks are surrounded by computer technology in which they have invested heavily — some excessively — to compete more effectively and tap new markets

But most banks are struggling to turn this investment into a formidable competitive weapon. And, with the dynamic environment in which banks operate, time to do so is running out.

The problem does not seem to be, as some have suggested, that banks are afflicted with inherently conservative management, at least not any more than other established industries. On the contrary, banks were on the leading edge of acquiring and using large-scale computer systems throughout the 1960s and 1970s. The result of their automation was an effective and cost-saving overhaul of back-shop operations — basically the accounting functions.

The failure, however, has been in the banks' efforts to tie these back-shop systems to front-office analytical functions in some integrated fashion. Sure, the information systems at most big banks can deftly spit out commercial loan or credit-risk analyses. But how many can then link that information to data on overall market conditions, competing market conditions, global politics or risk of certain loans to exposure to any range of exogenous forces? Very few.

That is exactly what today's banks need from their information systems to compete (in addition to sound loan policies, of course).

BURNT ONCE BY SOFTWARE VENDORS peddling "totally integrated" software packages for banks, many banking MIS professionals are understandably wary of such solutions. As the report suggests, the most prudent course for MIS to set in evaluating such solutions is to first determine a reasonable level of expectations.

The most innovative, and therefore the most successful, information managers will be those who exploit the potential of personal computers. Selling this concept will be difficult in such a mainframe-dominated industry as banking.

However, the coming generations of micros will support sophisticated expert systems that can be formidable weapons in the modern bank's arsenal.

Great opportunities for MIS also lie in the exploitation of micros for use in home banking, money transfers, automatic checking and the like, which could unburden banks from handling many of the 45 billion checks that will be written in the U.S. this year.

There is just no excuse for being at sea with so much technology at hand.

Item: *Computer groups endorse transferring authority of data from the NSA to the NBS.*

LETTERS TO THE EDITOR

Paycheck envy

I have been an independent consultant and subcontractor for eight years. During that time, I have come across a few cases of "paycheck envy." So it is not surprising to find out that members of Congress have received letters from employees in favor of Section 1706 of the 1986 tax law [CW, Feb. 2].

I was surprised when one legislative assistant said that he received more letters from employees in favor of Section 1706 than from consultants writing against it.

Those people who wrote in favor of Section 1706 may actually be hurting themselves. If it turns out that all subcontractors must become employees, it is quite possible that many consultants will seek employment with client companies instead of consulting companies.

If this occurs, competition for the most desirable positions will become very tough since in most cases, but certainly not all, subcontractors are of above average competence.

This change in employment patterns has not happened yet, but it could, depending on how the Internal Revenue Service decides to interpret the law.

If Section 1706 remains on the books, the very employees in favor of it may find that in the future they will have one less career path to follow.

I do not expect employees to join the bandwagon against Section 1706, but they should realize that being in favor of it today may be a mistake tomorrow.

Ray Saperstein
President
Systech
Fairlawn, N.J.

Ethical imbeciles

Your pointed article, "Criminal past of IEEE officer went undisclosed" [CW, Feb. 16], about Stan Rifkin's undisclosed past when documenting his candidacy for a directorship in IEEE's Washington, D.C., local chapter contains a quote that deserves careful scrutiny.

In the article, IEEE member Stuart Katzke states, "People who make amends for their past mistakes deserve a second chance and shouldn't be hounded for the rest of their lives."

This statement may have little or no bearing on the case at hand, for no evidence, as far as can be determined, exists that Rifkin has made amends.

Indeed, his replies (or lack of replies) to investigatory questions suggest little more than an ex-convict attempting to hide from his past.

There is a vast difference between an ex-convict and a reformed person. Merely serving one's time does not expunge the record or automatically turn the criminal into a model citizen. Why bother with an ethics committee when it displays no concern about ethics?

IEEE Capitol-Area Executive Council Chairman Tom Doeppner's justification that he doesn't "feel it's incumbent upon me or anyone else in the IEEE to notify our people about anything either good or bad in someone's personal history" is little short of incredible.

Spitting on the floor or cheating on one's spouse may be no one else's business, but being released from prison only five years before for a felony is most certainly the business of those who are being called upon to vote for the man, especially when most of those voting will know nothing more about him than what is published in the candidate's biography.

If this is the best excuse the local chapter can come up with, perhaps those of us in technical fields deserve the criticism that we are ethical imbeciles and need to be overseen by nontechnical people who understand ethics and the consequences of our technical decisions.

Barbara R. Hunter
Manager
Office Automation
Hazeltine Corp.
Greenlawn, N.Y.

This week in history

March 7, 1977
The Internal Revenue Service continues to fight for congressional approval of its proposed — and controversial — Tax Administration System (TAS) in the face of objections by the Office of Technology Assessment, which claims TAS could violate individuals' constitutional rights.

March 8, 1982
J. Walter Thompson Co., the nation's second largest advertising agency, investigates why someone padded the agency's computer accounting system by $24.5 million. The figure is a combination of fictitious television commercial time and fictitious revenue from the sale of commercial time.

The CIO and the corporate perils of lunch

In the climb up the corporate ladder, let the new executive beware

JOHN L. KIRKLEY

It has become obligatory when writing computer trade publication columns or editorials to at least once a year urge MIS managers to give up their techie ways and become part of the top management team.

It's like planting tulip bulbs in November or noting the return of the buzzards to Hinckley, Ohio, in the spring: It's an annual ritual that grows more familiar and indispensable with the passage of time.

Publications like this one have been printing these little pep talks for years. And perhaps the repetition is justified. For a long time, MIS managers have been caricatured as introverted technologists who deliberately speak in incomprehensible jargon, carry great quantities of leaking ball point pens nestled in plastic nerd packs in the pockets of their shortsleeved shirts and, upon close inspection, are often found to be wearing white socks.

Joe Ferreira, a long-time industry analyst and sometime cynic, once observed, "The DP manager is like the tough Western sheriff that the town fathers bring in to clean up the place. They may have hired him, but they don't invite him to dinner."

In 1984, Ferreira and management consultant Philip Harris wrote, "If information professionals envision themselves as knowledge brokers, they are likely to remain more relevant and in tune with the profound transitions under way in society, in organizations and in roles and relations." They envisioned separate roles for information resource architects who would design the systems, consultants helping the users, synergizers bringing together the many parts of the information system and creating a whole and educators, professional teachers in the true sense of the word.

Since then, MIS has had to adopt all these roles. And now we have another corporate role being hyped — the Chief Information Officer, the path to the top, the Yellow Brick Road to Executive Row.

It appears that, after all these years of editorials — and more important, after the evolution of the information processing function from back-office accounting to providing sophisticated, integrated information networks — the MIS manager is poised on the threshold of acceptance into the top management team.

IN today's business world, a sudden shift in the marketplace might not just mean layoffs among the rank and file; top managers are even more replaceable.

What should the MIS manager feel at this juncture? Pride? Elation? Anticipation?

Fear might be more appropriate.

First of all, no matter how the DP function has changed of late, it is still a highly technical discipline. Those who practice it are drawn to the intricacies of information processing. Deep in their heart of hearts, they feel more comfortable with the certitude of technology than with the shifting sands of corporate politics.

Once they move from the computer rooms to mahogany suites, life will never be the same. The elevated MIS manager must abandon his comfortable world of intricate equipment and impenetrable jargon and learn a new, more subtle language. Executive conference rooms have their own argot, the esoteric language of corporate politics. He must learn the art of the memo, the subtlety of lunch, the delicate matter of choosing the proper person in power to hitch one's star to.

It is ironic that just now, as information processing is being widely recognized as a key competitive resource and that the people who control this resource belong in the top echelons of management, corporate America is undergoing a profound and disturbing change. An article, "Remaking the American CEO," in the business section of the Jan. 25 *New York Times* summarized it neatly. The introduction noted, "Many [CEOs] are adopting a new creed that puts corporate survival above all else. The result: a generation of ruthless management."

The impact of these new management concerns are manifested in daily newspaper reports — massive layoffs, forced early retirements, plant closings and relocations, mergers, bankruptcies and buyouts.

Given this emphasis on survival, short-term profits and crisis management, old concepts such as company loyalty, long-range planning and lifetime employment have become memories of a bygone, gentler era.

In today's business world, a sudden shift in the marketplace might not just mean layoffs among the rank and file; top managers are even more replaceable.

Given these conditions, the MIS manager, newly arrived in the rarefied air of the corporate suites, might have the uneasy feeling that the plush carpet beneath his feet conceals a trapdoor, and that, without his knowledge, someone has painted a bull's-eye on the back of his new three-piece suit.

And so, rather than using this column for the time-honored purpose of exhorting MIS managers to make the move up the corporate ladder, I instead urge caution. If you decide to make the climb, check each rung carefully before ascending. Look for saw marks before venturing on to top management turf. Be careful. There be dragons there.

Kirkley, a former editor of *Datamation* magazine, is an industry consultant currently acting as editorial adviser to Patricia Seybold's Office Systems Group.

In search of CIM: How to create computer-integrated people

JOEL ORR

The real problem with factory automation is people, not technology.

Unless the human obstacles to implementing technological progress are factored into the factory equation, there can be no computer-integrated manufacturing (CIM).

Long after the details of Manufacturing Automated Protocol are resolved, after Initial Graphics Exchange Specification and Product Data Engineering Specification work perfectly to allow information transfer from one computer-aided design and drafting environment to another, after a truly standard version of Unix (or something) permits fully transparent portability of programs and after there are a dozen "magic slots" that really work, enabling us to completely digitize and rectify engineering drawings in seconds, CIM will still have been achieved by only a few companies — and at an expense that will make everyone wonder if it was worth the effort.

In our race for competitiveness in the global market, we have set our eyes on a glorious vision: factories controlled through fully integrated computing schemes. From concept through design, on through manufacturing planning, production and quality assurance, packing and distribution and all the way to field service, a seamless fabric of information processing systems tracks each product, component, purchase, cost, service call and liability suit. (May the latter be few.)

Fresh information

Every detail can be instantly retrieved, reported, totaled, averaged, charted, displayed and assimilated by even the most casual of casual users, like the chief executive officer. The information is always fresh because everything happens through the system; the reporting structure is only incidental to the control structure.

However, the people who scurry about tending this system are viewed by most companies as drones, as interchangeable as the technology they serve. The structure of these organizations is a rigid pyramid.

The high plane of the CIM vision can no more support the weight of manufacturing's hopes than can the two-foot-thick blanket of snow that covers my yard as I write. The beautiful preachments of vendors and consultants would lead one to believe a new level has been attained through technology, and they need only step up on its pristine surface to reach new heights. The reward of those who take that adventurous step, however, is snow in their shoes, wet socks and even pneumonia.

While we are captivated by the artistry (not to say the artifice) of the CIM vision, we ignore the operation of the laws of physics. According to Newton's First Law, a body tends to remain at rest or in motion until an external force is applied to it. His third law says a body will exert a force equal in magnitude, but opposite in direction, to any force applied to it. Anyone who has tried to introduce automation into the factory can testify to the accuracy of these statements in describing manufacturing reality, especially in unionized plants.

But, after all, workers, managers and technocrats all want profits to increase. Perhaps we should simply let well enough alone then and allow change and improvement to take their own course. If we do, however, we run afoul of the second law of thermodynamics — entropy — that states the tendency of the universe is from order to disorder. In other words, chaos is on the increase; anything left to itself runs down.

Thus we are faced with a dilemma: We are compelled to interfere with the way things are if we are to survive; but we are guaranteed resistance if we try to create or maintain order.

The answer is CIP: computer-integrated people. In the current form of organization, it is almost impossible to maintain teamwork; the hierarchical pyramid stifles, perforce, the full functioning and recognition of the individual that are necessary for organic growth and prosperity.

Individual uniqueness

What is needed is organismic management, a view of the company modeled after a dandelion puff or a family cluster, rather than a pyramid. A pyramid, after all, is a place where things are buried. The organismic dandelion or family model is alive and flexible and takes into account the uniqueness of individuals.

In the dandelion, all the seeds are directly connected to the center. In organizations of this type, all workers, on a more or less equal basis, can access the highest level of authority germane to their activities. They feel they are part of a family, rather than a pre-formed niche like a block in a pyramid.

The dandelion-structured suborganization goes through several stages of development: Childhood, in which the central authority tells all the "seeds" what to do; Adolescence, in which the children reason with the central authority and take part in decisions; and Maturity, in which authority is delegated to the children, the dandelion puff breaks up and the seeds blow away to their destiny — the formation of new dandelions. This is the secret of the so-called "excellent" organizations, like IBM and Hewlett-Packard Co.

Planning for CIM offers an excellent opportunity for examining and changing the way the people parts of organizations work. The solutions to the problems of the technological obstacles to CIM are in sight, but they will never be implemented unless we change the organizational framework to truly accommodate people as individuals. The organismic nature of organization must emerge.

Orr is an industrial-automation consultant based in Great Falls, Va. He is writing a book on restructuring the organization for automation, titled *Organismic Management*.

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Steven Pfrenzinger

Clarifying integration

Integrated productivity tools are critical to the successful development of IMS, CICS and DB2 applications. They can be used to reduce training and development costs, minimize risk, improve quality and cut schedules.

However, determining the level of integration of these tools, especially during the evaluation process, can be a major challenge.

It is becoming apparent that the word "integration" has joined the list of data processing terms that require additional clarification.

The definition of integrated software in a popular computer dictionary is "groups of programs that perform different tasks but which share data and often the same presentational format."

With this in mind, let's look at integration as it relates to IMS, CICS and DB2 productivity tools.

Figure 1 (page 24) provides a high-level view of archi-

Continued on page 24

Users applaud prototyping tool

BY ALAN ALPER
CW STAFF

PEARL RIVER, N.Y — Users of The Application Builder (TAB), a microcomputer development environment for Cullinet Software, Inc.'s IDMS/R, have found it to be a powerful prototyping tool and a convenient way of executing mainframe applications on micros.

Users, however, are still waiting for TAB's developer, Online/Database Software, Inc., to deliver promised IDMS/R-compatible facilities that would allow users to begin full-scale application development.

Released one year ago, the $4,000 product was touted as a microcomputer version of Cullinet's ADS/Online applications development environment for mainframes. TAB was envisioned as a method of relieving contention for mainframe resources by shifting programming work to IBM Personal Computer XTs and ATs.

Bruce Resser, manager of data base support at Prucapital, Inc.'s data processing center in Roseland, N.J., said his firm is using TAB for prototyping only after purchasing 25 copies. TAB does not yet fully support all Cullinet IDMS/R facilities, such as ADS/Application (ADS/A) for application-structure definition, Logical Record Facility for system-defined sets and Pageable Maps for reaching maps without scrolling, he pointed out.

"Once we get the three missing components, we'll begin to market it internally as an alternative to developing on a mainframe," Resser said.

Bruce Loeffel, marketing vice-president at Online/Database Software, said ADS/A support was recently made available, although Logical Record Facility and Pageable Maps will be part of Release 2.0. The latter were promised earlier, he said, but were put on the back burner when few customers asked for them.

Resser said TAB was "a fairly immature product" when it was released last year. "It's come a long way, but it's not there yet," he added. Since TAB's debut, eight interim releases have been issued to fix minor bugs and provide needed enhancements, Loeffel said.

Resser and other early users have observed that TAB is slow when performing dialogue generation. They cite performance bottlenecks attributed to Microsoft Corp. MS-DOS's current inability to access the protected mode of Intel Corp. 80286 microprocessors.

"Since you can't access memory addresses beyond 640K bytes, it slows down dialogue generation," Resser said.

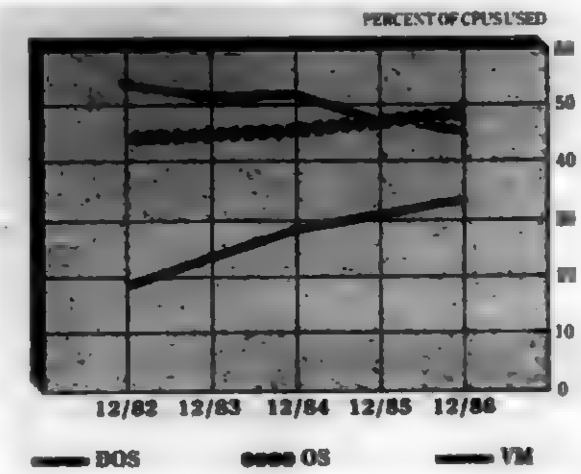
Dialogue generation tends to

Continued on page 24

Data View

IBM operating system history

Older DOS-oriented CPUs, such as the 360 and 370, are decreasing as they are replaced by OS-oriented CPUs, such as OS/VS1, MVS and MVS/XA.



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE CORP

Cullinet plans two DBMSs

BY CHARLES BABCOCK
CW STAFF

WESTWOOD, Mass. — Officials at Cullinet Software, Inc. can envision the day when they will be offering two data base management systems — one networked and one relational — for at least the low end of IBM's 370 mainframes.

But they do not like to hear the phrase "dual data base strategy" mentioned in connection with their approach.

Cullinet is preparing for a fall launch of IDMS/D, a relational product that will appear first on the Digital Equipment Corp. VAX. Cullinet officials acknowledge that a relational product based on a similar architecture will follow at some point for IBM's low-end mainframe, the 9370. IDMS/D is being developed from the relational DBMS acquired from Esvel Co. in San

Continued on page 23

Inside

- Answer Systems' micro-to-mainframe software supports DB2, Page 22.
- Computer Associates updates IBM CICS application development tool, Page 23.
- [illegible] software brings integrated computer-assisted retrieval ability to IBM 4300 series users, Page 26.

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Answer micro-mainframe link supports DB2

BY ROSEMARY HAMILTON
CW STAFF

CANOGA PARK, Calif. — Answer Systems, Inc., a division of Sterling Software, Inc., announced recently that its micro-to-mainframe link software now supports IBM's relational data base management system, DB2.

The current version of Answer/DB, which supports IBM's IMS data base management system, is marketed by IBM. Asked if IBM plans to market the new version of Answer/DB, David Saykally, Answer System's president, said he is "not in a position yet to make that kind of an announcement."

The vendor also announced last week that it has begun delivery of Mark IV, its mainframe application development package, with DB2 support.

Answer/DB is designed to provide personal computer users with data from mainframe data bases. In addition to the IBM data bases, the product also includes support for the Cullinet Software, Inc. IDMS and Adabas from Software AG of North America, Inc. Data can be incorporated into the Lotus Development Corp. 1-2-3 or Symphony applications as well as into Ashton-Tate Dbase II, Dbase III or Framework applications.

The package with DB2 support is available this month and will range in price from $45,000 to $200,000, depending on the operating system and configuration. A $45,000 package, for instance, is designed for an IBM MVS-based system supporting 10 personal computers, Saykally said. The software also runs under the IBM DOS and OS operating systems.

The personal-computer module of Answer/DB costs $550. It communicates with the mainframe data bases via 3270 terminal emulation.

MSA The Software Company

February 20, 1987

Management Science America, Inc.

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The undersigned acted as financial advisor to Management Science America, Inc.
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Focus goes to RT PC

BY ALAN J. RYAN
CW STAFF

NEW YORK — Information Builders, Inc. has added IBM's RT Personal Computer to the growing arsenal of computers that runs its Focus fourth-generation language.

Focus, a fourth-generation language that is widely used in information centers, also runs on IBM mainframes, Digital Equipment Corp. VAXs, Wang Laboratories, Inc. VS and the AT&T 3B family of computers. The company claimed that applications that are developed on the RT PC can be transported between the machines.

Information Builders said the fourth-generation language software incorporates application development, data base management, reporting and decision-support tools into one environment.

While noting that the RT PC is not a big seller, "we are really committed to putting Focus in all major operating environments," the spokesman added.

He said his firm will be porting Focus to other Unix machines this year, and that "one of the more notable will be the Pyramid Technology Corp. machine."

"Focus for Unix on the IBM RT enables users to design multitasking, multiuser technical applications in engineering, science and CAD/CAM at the departmental level," said Martin Horowitz, Focus for Unix product manager.

Focus offers sort, calculation and format capabilities, as well as program error correction, Help and a user-defined vocabulary. Decision-support tools include graphics, statistical functions, financial reporting and an integrated spreadsheet.

Information Builders' Talk technology includes a series of pop-up windows that guides users through the creation of file descriptions and report requests, the vendor said.

Focus for the RT PC is priced at $7,900 for a one-time license fee and $316 for a monthly license.

System/38 gains SSA data module

CHICAGO — System Software Associates, Inc. (SSA) is offering a performance measurement module for the IBM System/38 that automatically collects data from SSA distribution and manufacturing modules.

Called the Business Planning and Control System (BPCS), it permits management to review performance in distribution and manufacturing against established business plans and pinpoint areas of lag in their early stages, said Robert E. Covey, president of SSA.

The BPCS module can provide percentage increase or decrease, variance from target ranges and out-of-range conditions. It can track inventory accuracy, schedule performance, bill-of-material accuracy, vendor performance and shipments.

BPCS Performance Measurement is available for $6,000.

CICS application product updated

GARDEN CITY, N.Y. — Computer Associates International, Inc. is offering an updated release of its IBM CICS application development product, CA-Flexiscreen.

Release 2.0 includes full arithmetic capabilities, reducing the need to exit from an application under development, a map conversion program to convert Flexiscreen maps into transportable IBM Basic Mapping Support maps and a data verification feature for data entry, Computer Associates spokesmen said.

CA-Flexiscreen is used in IBM's MVS and VSE environments for developing CICS applications. It is priced at $23,000 for MVS and $17,500 for VSE.

Release 2.0 allows users to create and modify forms interactively, directly from the terminal, Computer Associates representatives claimed. In addition, users may access files not defined to CICS through an off-line file table, permitting quick access to new files without disrupting CICS operations, spokesmen said.

Integrated security features control the unauthorized use of files on the applications generated with the product, the spokesmen added.

Cullinet

CONTINUED FROM PAGE 23

Jose, Calif., which in turn was developed in a mainframe VM environment. Since the 9370 will be a VM-based member of the 370 family, it will not be difficult to move IDMS/D onto that machine, according to Jeffrey P. Papows, vice-president of marketing.

At the same time, Cullinet is currently beta-testing a vanilla copy of its flagship product, IDMS/R, on the 9370 at selected customer sites.

Since the one represents a well-established, networked DBMS and the other represents a relational product, they are engaged in what Sharon Weinberg, president of Codd & Date Consulting Group, calls "a dual data base strategy," a phrase that stings when applied to Cullinet. Cullinet officials have frequently criticized IBM's dual data base strategy in promoting DB2.

"IBM has put itself out on a limb," said John Cullinane, chairman of Cullinet, when asked about IBM's dual data base strategy last fall. "They've put DB2 in a lot of places that already use IMS. They've created a tremendous amount of confusion."

Now Cullinet officials worry that some of that confusion may come back to haunt them. "We're going to be very hassled if people conclude IDMS/R is anything less than appropriate for the 9370," Papows said.

When a 9370 is serving as a mainframe at a site, "IDMS/R represents the best possible choice," he said.

When the 9370 is serving as a departmental processor, operating in "unattended" mode, IDMS/D "would be a terrific product offering," he added. "We want to see the physical evidence. We're in a position technically where we can react fast enough to match the DBMS product to the processor use."

MCBA releases Cobol packages for DEC VAX

BY ALAN J. RYAN
CW STAFF

GLENDALE, Calif. — MCBA, Inc. has announced three new packages in its planned 18-module line of accounting, manufacturing and distribution applications for Digital Equipment Corp.'s VAX line of minicomputers.

Written in Cobol, the packages include General Ledger, Accounts Payable and Purchase Order and Receiving. Previously released software includes Inventory Management, Accounts Receivable, Bill of Material Processor and Fixed Assets and Depreciation.

The final product in the VAX Cobol accounting and distribution system, Customer Order Processing, is due for release soon.

"Unlike many other suppliers of business application software, MCBA regularly supplies source code to its licensees," President Stina Hans said. "Consistent naming conventions, modular design, comprehensive documentation and structured coding techniques result in reduced programming efforts in maintaining and modifying the software," Hans said. All MCBA packages reportedly have a multilevel security system that limits access to both data selections and menu selections.

"MCBA's VAX Cobol packages have been designed to be independent of any particular VAX/VMS configuration," said Ken Schilling, the company's DEC product line manager. "They work equally well on single VAXs, VAX clusters or networks, with no additional installation or setup expense."

Suggested retail prices for source code licenses of the VAX Cobol packages range from $3,000 to $6,000 per module for use on the first computer, depending on the specific model in use. Cost does not include installation or training.

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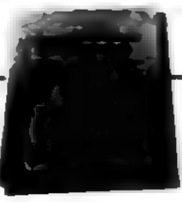

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Users applaud

CONTINUED FROM PAGE 19

be slow even on 386-based machines, Resser continued. "While it took our AT 17 minutes to run dialogues, it still took a Compaq Computer Corp. 386 seven minutes. That's still much longer than it takes on a mainframe," he said.

Loeffel claimed Release 2.0 of TAB will resolve 80% of the software and hardware problems associated with slow dialogue generation. He said the new release will speed dialogue generation through more efficient swapping of data in and out of the 640K-byte address space.

Ludwig Slusky, a professor at California State University in Los Angeles, has used TAB since last fall to teach data base design.

"TAB is an excellent example of a prototyping CASE tool," Slusky said.

Slusky's students are using TAB in conjunction with Excelerator, a computer-aided software engineering (CASE) tool from Index Technology Corp. used to do conceptual modeling. Students manually transfer their designs from Excelerator to TAB for prototyping purposes.

"The problem we've had is finding a way to integrate the two," Slusky said. "So far, we haven't found a commercial interface."

Slusky said he would like to see a way for data definitions developed in the concept modeling phase to mesh with the data dictionary created on TAB.

"TAB's response time, flexibility and ease of use is good," he stressed. "The one drawback is that it is assumed by Online/Database Software that the user of TAB is familiar with IDMS and has a rack of IDMS manuals, which is not the case."

Dick Reeser, data base administrator for Holland American Lines Westours, Inc. in Seattle, said his firm has used TAB since last May. Originally, the firm was going to use TAB to "stub up" or build skeletons of systems on PCs and finish development on its mainframe. That plan was scrubbed when the transportation firm did not purchase as many PCs as planned.

Development work at the firm is now being done on a mainframe, Reeser said, although the firm is using TAB to download programs to PCs for training purposes. "We don't want to have our reservation people training with production data," he explained.

Online/Database Software has shipped about 260 copies of TAB, Loeffel said.

In the future, TAB will support multiuser PCs and networked workstations, Loeffel said, adding that the local-area network environment, expected for release early next year, will support IBM's Token-Ring and PC Network. The firm also plans to port the C-based program to Digital Equipment Corp. VAX minicomputers by year's end, Loeffel said.

Clarifying

CONTINUED FROM PAGE 19

tectural integration. Different development tasks related to screens, reports, data and process logic would be considered minimally integrated from an architectural standpoint if their descriptions were stored in a nonredundant fashion on a central repository and used during both the definition and generation processes. Additional architectural integration and ease of use would be achieved if entry panels during the definition phase had consistently structured dialogues with the same presentational format.

Complete architectural integration would also include the substantial advantages of a central respository shared in both the design and development processes, automatic generation of application documentation and verification of the generated code. This verification would automatically guarantee the correctness of the generated code, reduce required testing and identify costly errors earlier in the development life cycle.

Integration of development tasks requires various specification layers to address the variety of application requirements. Figure 2 (page 25) shows these layers as they relate to simple through more difficult requirements.

The higher layers exist to allow simple application requirements to be accomplished using graphics and nonprocedural, fill-in-the-blank features. Entry

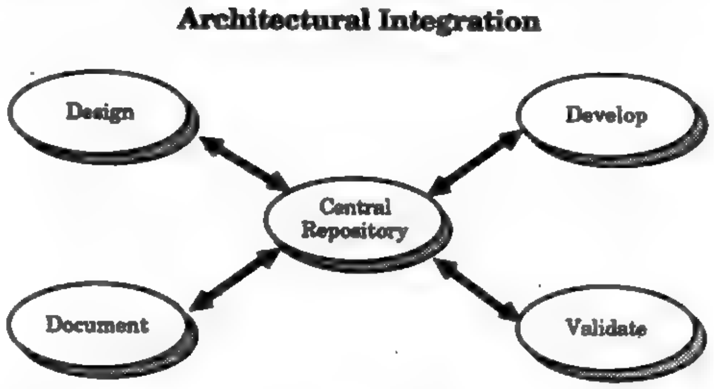

Figure 1

CW CHART

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panels with these features are often called painters. Examples of these include screen, data, report, application (system level) and program painters.

The more difficult application requirements use the lower layer, which includes access to a productivity-oriented procedural language, which would include basic IF-THEN-ELSE, PROCESS and DO-WHILE constructs, as well as powerful macro commands. A macro brings productivity and additional syntax to this procedural layer by expanding into multiple statements during a precompile process. A true macro facility brings major productivity improvements by supporting conditional code generation and customized execution routines based on key word values.

The procedural layer allows unique logic to be specified and added at various points defined at the higher layers in the skeletal program. It also allows access to zero-defect common routines in reusable code or macro libraries, which maximize previously written and tested code.

All of this adds up to substantial productivity gains; for example, a traditionally developed IMS application that would normally require that four out of five developers be experienced in IMS could use these specifications layers to cut that number to as few as one out of five.

Specification Layers

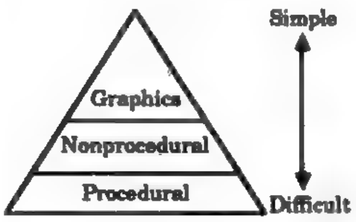

Figure 2

CW CHART

Integration with the software development life cycle means that a family of tools would provide automated machine handoffs between design, development and maintenance phases. Integration requires that these phases share data on the central respository shown in Figure 1 with the advantage of no throwaway work.

The greatest productivity and quality benefits will come when complete integration supports automated program code generation directly from the design specifications (referred to as fifth-generation tools).

Multiple productivity tools from different vendors sharing different data do not adequately satisfy this requirement and may increase the learning curve and lessen overall effectiveness. This is because the handoff between tools is usually manual, prone to errors and often results in redundancy of effort while using dissimilar tools.

Even though different vendors automate the handoff by passing files from one to another, this would be better described as an "interface" and certainly not deserving of the term "integration."

Sometimes a development tool can double as a design tool because early prototyping capabilities allow the developers and users to develop a full-function working model of the ultimate system, which can gradually be expanded and then be refined.

But the formal design and analysis processes often needed for larger, more sophisticated IMS, CICS and DB2 applications require more than prototyping.

These systems are good candidates for the numerous PC-based systems analysis tools that use a graphics facility and central repository to create, maintain and validate architectural models, data flow diagrams, data model diagrams and structure charts.

Certain vendors have already moved their mainframe development tools to the PC and plan to integrate them with their own graphics-based design tools. This will provide a fully integrated design and development environment and lay the groundwork for automatic code generation, with its obvious benefits. The APS/PC Workstation from Sage Software, Inc. is an example of one of these integrated tools.

Being integrated with IBM's strategic software direction would involve the commitment to and coordination with the most recent releases of IBM's strategic software products, including MVS, MVS/XA, IMS DB/DC, CICS, DB2 and VSAM. This would help secure an investment in existing hardware and software and provide future growth paths with evolving technology. This category of integration means that the vendor has chosen to piggyback on IBM's strategic directions, rather than compete with IBM.

Investigation into the meaning of integration regarding productivity tools reveals a wide range of definitions: everything from "Rube Goldberg type" interfaces to automated machine handoffs between life cycle phases to automated code generation from design specifications.

The benefits of using fully integrated productivity tools are obvious: reduced costs, shorter schedules, minimized risk and higher quality.

So the next time a salesman uses the term "integrated" to describe an IMS, CICS or DB2 productivity tool, ask for a more complete definition.

Pfrenzinger is president of IMS Consulting, Inc., an Encino, Calif.-based firm specializing in IBM's IMS DB/DC and CICS/DL/1.

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Hess concludes: "When we consider the flexible, but powerful, tools we have to work with and the support we've received under Walker's Warranty Maintenance Service, we feel we made the right decision in going with Walker."

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NEW PRODUCTS

Systems software

Eastman Kodak Co. has announced the **Kodak KAR mainframe system**, software said to bring integrated computer-assisted retrieval capabilities to IBM 4300 series and 3000 series users.

The KAR mainframe system is a generic computer-assisted retrieval package. According to the vendor, users need only add microfilmers, such as the Kodak Reliant intelligent microfilmer 2000, and retrieval terminals, such as the Kodak IMT-150, 250 or 350 microimage terminals, to integrate a full computer-assisted retrieval network.

The software allows integration of such retrieval with the user's present applications.

The KAR mainframe system costs $30,000 for the initial license, with an annual renewal fee of $4,500.

Kodak, 343 State St., Rochester, N.Y. 14650.

Applications packages

Lexadica Software, Inc. has announced **Version 1.0** of its **Nucleus Menu System.**

The menu system is said to enable a Digital Equipment Corp. VAX/VMS system user to build end-user menus. The tool can be used to provide a complete captive environment for the end user.

According to the vendor, the open architecture of the utility allows the integration of applications desired for word processing, spreadsheets and electronic mail.

Other features include screen utility functions, control of user access, session control, directory control, personal files and a pop-up calculator.

Nucleus costs from $715 on the Microvax II to $7,245 on the VAX 8800.

Lexadica Software, P.O. Box 22822, Lexington, Ky. 40522.

Mitrol, Inc. has announced **Mitrol-MSS**, a management summary system designed as a supplement to Mitrol's Manufacturing Resource Planning II package, Mitrol-MFG. The firm also unveiled **Mitrol-ACC**, accounting software for financial management.

Mitrol-MSS is a manufacturing planning and control software package, which uses Mitrol's fourth-generation development language called Mitrol. It provides reports and graphs designed to support proactive management decision making, according to the vendor. The software runs on IBM mainframes. Prices begin at $10,000.

Mitrol-ACC is said to encompass general ledger, accounts payable and receivable, sales orders, cash management, invoicing and fixed assets. It is written in Mitrol and offers an external interface to applications written in other languages. It runs on IBM operating systems under VM or MVS and is priced from $50,000.

Mitrol, 800 Cummings Park, Woburn, Mass. 01801.

Utilities

Software Research, Inc. has announced the **PL/I G-subset Touch Test Suite**, designed to assess the quality and capacity of a PL/I compiler.

The software consists of 86 programs based on a comprehensive feature matrix that has 270 G-subset features organized in strict hierarchical form. Overall, the suite contains 7,649 lines of PL/I text. Both positive and negative tests are included and are designed to illustrate end-to-end operation of the compiler.

The PL/I G-subset Touch Test Suite costs $3,500 for a source license.

Software Research, 625 Third St., San Francisco, Calif. 94107.

X-Tended Computing, Inc. has announced **X-2ools**, a series of productivity tools and aids for IBM DB2 data base users in the IBM TSO/ISPF environment.

Three tools are included in the series.

A Structured Query Language (SQL) source generator allows the user to view DB2 object relationships.

The Data Dumper tool allows the user to create a physical, sequential data set containing the results of any valid SQL Select statement.

Security Cloner enables the user to create the SQL Grant or Revoke statements that are necessary to replicate user security, the vendor said.

X-2ools is priced at $3,500. The price includes maintenance and enhancements for the first year.

Annual renewal licenses for the product will cost the user $525.

X-Tended Computing, No. 202, 1642 S. Parker Road, Denver, Colo. 80231.

Training software

Innovative Software Solutions, Inc. has added a module to its **Teachme/3000** series of computer-based training modules for the Hewlett-Packard Co. HP 3000.

The "Using Vplus Intrinsics" module is intended for HP 3000 users who have need to use HP's Vplus/V screen formatting software.

The module is priced at $750 and is accompanied by the Teachme driver program and an on-line tutorial module.

Innovative Software Solutions, 10705 Colton St., Fairfax, Va. 22032.

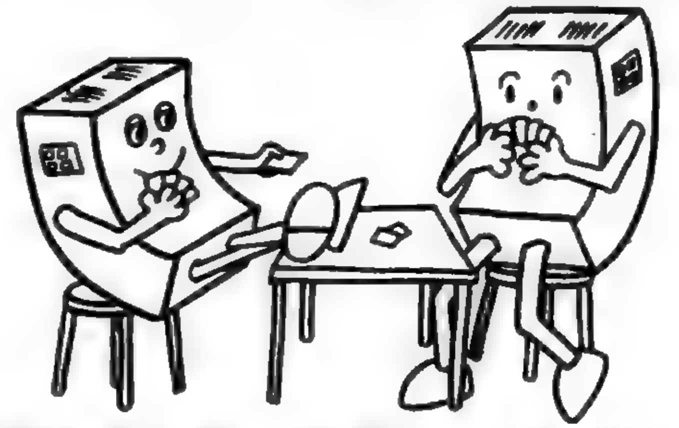
Development tools

Tominy, Inc. has ported its **Mach 1** applications system generation facility to the IBM 9370 computer system running VM with CICS.

Mach 1 includes a full-function logical data base management system, screen-definition facilities and print-definition facilities along with an SQL-based query and report writer.

Mach 1 costs $52,000.

Tominy, Mach 1 Division, 4221 Malsbary Road, Cincinnati, Ohio 45242.



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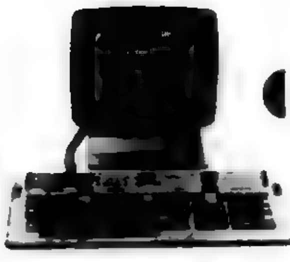

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MICROCOMPUTING

SMALL TALK

William Zachmann

Mindwrite outlines text

One of the most exciting aspects of personal computers is their potential to function as mind enhancers, supplementing and augmenting human thought processes. Outline processing software provides an extremely useful instance of this and, in effect, makes it possible to manipulate and rearrange ideas.

But packages developed as outline processors have, in the past, offered bare-bones word processing capabilities. The ability to handle text paragraphs under outline headings is also quite limited.

Alternately, somewhat limited facilities for developing outlines have been added to some word processing software packages. In these instances, the flexibility and ease of use in creating, organizing and rearranging outlines has typically been more limited than what the outline processors have had to offer.

Mindwrite, a $125 software tool for the Apple Computer, Inc. Macintosh from Carmel,

Continued on page 35

1-2-3: A dangerous language

BY JOHN J. XENAKIS
SPECIAL TO CW

As much as I love Lotus Development Corp.'s 1-2-3, I hate the way it throws out three decades of research on what a good computer programming language should be. Templates written for 1-2-3 are typically uncommented, unstructured spaghetti code.

This is far from a trivial issue, for while few managers like to think of themselves as computer programmers, the fact is that spreadsheet programs like Visicalc 1-2-3 are indeed computer programming languages, especially when you get into things like macros.

"Just as dial telephones turned us all into telephone operators," says Dan Bricklin, the designer of Visicalc, the first spreadsheet program, "Visicalc turned businessmen into computer programmers. It's a historic development."

Even a Lotus official admits 1-2-3's programming shortcomings. "Anyone who regularly uses spreadsheets knows that it's hard work to build a complex worksheet, even harder to debug it, difficult to explain it to other people once it's complete and dangerous to modify it later," writes S. Jerrold Kaplan, principal techoologist at Lotus, in *Lotus* magazine.

How can it be dangerous? Here are a couple of lines from a 1-2-3 template that appear in a popular book:

```
G71: + E69*E65 + F68*F65 +
G67*G65...H126:@IF
(H124<0,@ABS(H124),
@IF(G127>H124,-G127),0));
```

This particular template includes hundreds of lines like these. Maybe one of the Hs should be a K, or maybe a plus sign should be a minus sign. Who knows?

This language is so error-prone that you are literally 50 to 100 times as likely to make a programming error in 1-2-3 as in a well-structured programming language. And that factor goes up exponentially when you try to

Continued on page 34

OA package offers choice

BY CHARLES BABCOCK
CW STAFF

Cullinet Software, Inc. said it will incorporate PFS: Professional Write from Software Publishing Corp. into the next release of its integrated microcomputer product, Goldengate.

As a result, Release 1.3 of Goldengate, expected in September, is expected to have two word processing programs on its menu. Some may choose to use Professional Write because it is easier to learn than Goldengate's own Edit word processing, acknowledged Cullinet's

Continued on page 35

Data View

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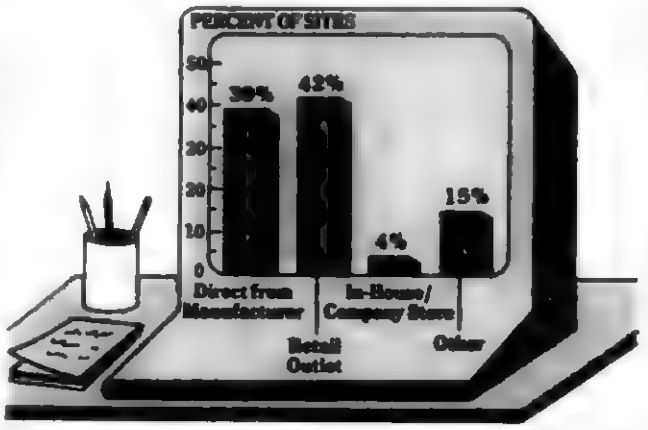

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CW CHART SUSAN ALDAM

Apple opens gates for developers

BY PEGGY WATT
CW STAFF

LOS ANGELES — When Apple Computer, Inc. opened its Macintosh system architecture last week by introducing two expandable models, it also opened the floodgates for third-party products that build on the Macintosh line's new capabilities.

"The big news is not what Apple did but what the third-party developers are going to do," said John Sculley, Apple's president. He said the architecture opens the door for innovation in software and add-on hardware design.

The long-awaited connectivity to the Microsoft Corp. MS-DOS operating system was finally unveiled, but it appeared that Apple preferred to let a third party release the products. Although Apple announced add-on cards to let its Macintosh read MS-DOS format data, Apple stopped short of producing a Macintosh that runs MS-DOS.

Continued on page 39

Inside

- Kaypro enters desktop publishing mart. Page 34.
- Televideo Systems upgrades Telecat-286. Page 40.
- Streamline Software offers software package for laptop computer users. Page 40.

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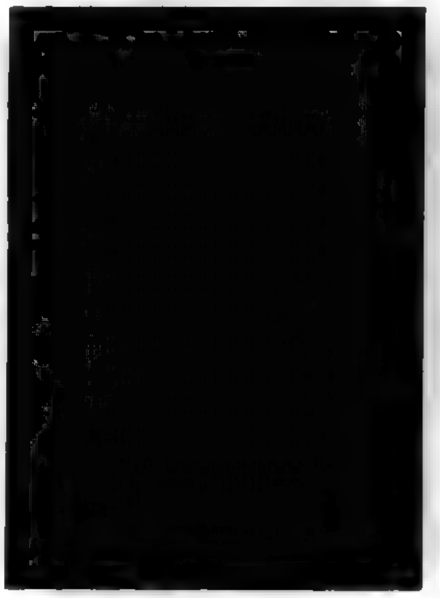

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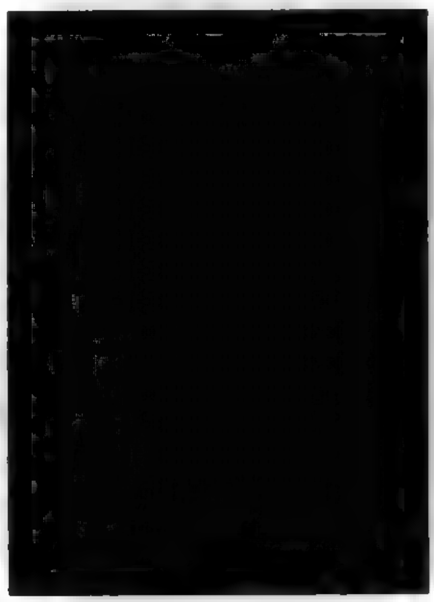

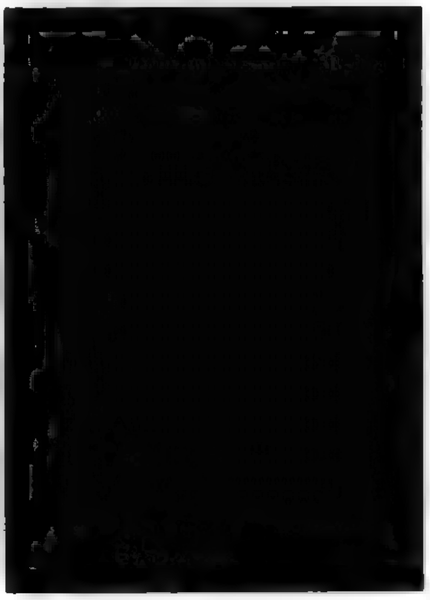

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Kaypro endures fray of 386 clones

BY PEGGY WATT
CW STAFF

Kaypro Corp. joined the early battles of the Intel Corp. 80386 microprocessor-based PC clone wars, but its Kaypro 386 line is still shipping in numbers too small to draw more than curiosity.

The company is also pushing on another increasingly crowded front, with the recent introduction of an Intel 80286-based turnkey desktop publishing system with software and peripherals.

Called Extra Extra, the desktop publishing package is built around the IBM Personal Computer AT-compatible Kaypro 286i. The computer has 640K bytes of random-access memory (RAM), a 30M-byte hard disk drive, an IBM Enhanced graphics adapter-compatible graphics card and monochrome monitor. Extra Extra comes with the 300 dot/in. Kaypro Page Printer II, which uses Hewlett-Packard Co. Laserjet fonts; an applications selection of Ventura Software, Inc.'s Desktop Publishing software; Micropro International Corp.'s Wordstar 4.0, Mailmerge and Correctstar; and Microsoft Corp.'s MS-DOS 3.2.

The complete system is priced at $8,495 and is scheduled to be available April 1. Kaypro said a digital scanner will be available as an option.

Kaypro expects sales of its three 80386-based systems to increase as manufacturing ramps up, according to Frank Valcarcel, network products marketing director.

"We're all working with the same building blocks," Valcarcel said of the growing army of clones that started with Compaq Computer Corp.'s Deskpro 386 last fall. "Sales will be an issue of support, training and the manufacturer's integrity."

At the top of Kaypro's 386 line is the Model N, designed as a network file server and available with hard disk drives in varying capacities. The Model N has a single 1.2M-byte floppy disk drive and 2.5M bytes of RAM.

The Model A, priced at $4,995, is an entry-level unit with a single floppy drive and a hard-disk controller board. The Model E, priced at $6,295, adds a 40M-byte hard disk drive and 2.5M bytes of RAM.

The 386-based systems have drawn some interest for desktop publishing applications, said Dave Post, sales representative with Computer and Terminals Services, Inc. in Sedona, Ariz. Kaypro also offers professional seminars on desktop publishing applications to promote its new system.

Three Keys to Successful TDM or Statistical Multiplexing

Three keys! They're all you need to configure Universal Data Systems' new multiport V.33 modem/multiplexer combination. Separate versions offer either six-channel TDM or eight-channel statistical multiplexing capability.

In either configuration, the device is trellis coded at its basic 14.4 kbps operating speed and has alternate data rates of 12 or 9.6 kbps. If your system utilizes TDM, you may also choose between asynchronous and synchronous operation and you can have V.29 operation at 9.6 kbps.

The three-pushbutton/LCD control panel allows configuration choices (with different data rates for each channel if you desire), "soft strap" settings and easy review of both multiplexer and modem status.

The entire set-up and review process is menu-driven; the user need only answer a series of questions by pressing the appropriate YES or NO switch. When the process is complete, a push on the HOME switch returns the device to the communications mode.

Diagnostics on both versions of the V.33 multiplexer/modem include local and remote digital loopback on each channel as well as local and remote analog loopback. All test features are compatible with CCITT V.52 and V.54 recommendations.

YES, you can now have TDM or stat mux capability in a single package with a 14.4 kbps trellis coded modem.

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HOME of the new V.33 multiplexer/modem is Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/721-8000; Telex 752602 UDS HTV. Ask for detailed specs and quantity prices.

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Created by Daymer/Hall, Inc., Winter Park, Florida

1-2-3

CONTINUED FROM PAGE 31

modify the program later, when you are probably thousands of times more likely to make an error. That's why Kaplan says modifying a 1-2-3 template is dangerous.

Then what should you use, if not 1-2-3? I just don't know. Javelin, a spreadsheet program from Javelin Software Corp. in Cambridge, Mass., specifically addresses the language problem by providing the same functionality as 1-2-3, with a well-structured language. Still, people complain that it's not a standard like 1-2-3, and they are right.

Dbase III Plus from Ashton-Tate is a standard, well-structured language. It's a data base language, not a spreadsheet language, but many large spreadsheets are really data base applications anyway. To see what the difference is, consider the following program segment in Dbase III:

```
   CUST□TOTAL = 0
   USE LEDGER
   GOTO TOP
   DO WHILE .NOT. EOF()
   IF LEDGER->TYPE = "CUSTOM-
ER"
   CUST TOTAL = CUST□TOTAL +
LEDGER->AMOUNT
   ENDIF
   SKIP
   ENDDO
```

A person who understands Dbase III would find this program segment much easier to understand, write, modify and debug than the one shown before in 1-2-3 macros. What makes this programming language much less error-prone than 1-2-3 are the mnemonic variable names — like CUST□TOTAL, which obviously means "customer total" — the clear key words — like USE, which specifies which data base to use — and the indenting, which indicates how the program is structured into loops and conditionals. The problem with Dbase III is that most people find it much harder to get started than with 1-2-3.

The solution has to come from Lotus itself. If Javelin and Ashton-Tate can design good languages, so can Lotus. And I know Lotus engineers that would love to take on this project.

For now, be careful. If you can solve your problem in a spreadsheet that fills up only one or possibly two screens, then you are probably all right.

Xenakis is software editor of *Computer Update Magazine*, published by the Boston Computer Society, and president of Xenakis Consulting Services, Inc.

Mindwrite

CONTINUED FROM PAGE 31

Calif.-based Mindwork Software, is unique in the way that it combines a powerful outline processor, a word processor and the ease of use of the Macintosh.

The result is a package that is flexible and powerful yet remarkably easy to use. When you start up the program, Mindwrite appears as a word processor. Mindwrite compares favorably with other word processors for the Mac.

The program has all the basics that come with word processing on the Macintosh: multiple fonts and type styles, the ability to include pictures from graphics applications like Apple's Macpaint and Macdraw, the Clipboard to cut and paste between files and similar capabilities are included.

Mindwrite includes a number of features typically found in more sophisticated word processing packages. Although the software does not provide all the features of more advanced word processing packages — like mail merge, spell checking and thesaurus look-up — it goes well beyond those of a basic package like Macwrite.

Where Mindwrite really stands out, however, is in the embedded outline processing capabilities. Included in the design from the start, these capabilities are competitive with what the best of the outline processing packages have to offer.

An ARRANGE item on the main menu bar makes it easy to move back and forth between outline and word processing modes. An entire document can be created within the context of an outline.

Alternatively, however, outlines or outline segments can be embedded in a document. Hiding and displaying portions of the outline, moving parts of it around, sorting entries and raising or lowering outline levels are simply done.

Outlines can be automatically converted to a section numbering format if desired. Individual segments of the document can be easily moved back and forth between paragraph and outline formats. One very handy feature is the ability to convert a set of outline entries at the lowest levels into a bulleted or numbered list within a paragraph.

Versatile formatting options give the user a great deal of flexibility in arranging the outline format as well as the appearance of the text. Header and footer options make it easy to control the appearance of the final document. Pictures and graphs can be easily included.

A Search menu contains a wide range of search or search-and-replace options, including an assortment of wild-card capabilities. Text can be marked based upon when it was last changed. Automatic table of contents creation is provided. A minor but extremely useful twist is the ability to get a count of words, characters and paragraphs along with an average word length.

Multiple windows in the same document are possible up to the memory limits of the Macintosh. Alternately, windows may be opened for multiple documents. Quickly formatted tiled windowing options are handy alternatives to standard Macintosh window manipulation, which is also supported by Mindwrite. Another useful feature is a simple yet sophisticated Preferences option on the file menu.

Mindwrite is not copy protected, making installation on a hard-disk system a simple matter of dragging the disk to a folder on the hard disk. The package comes on a single-application disk.

All things considered, Mindwrite is an excellent value. It is useful for the Macintosh user who frequently has occasion to be creating and writing documents of some degree of complexity and sophistication, as well as those who want to write casual documents or maintain outlines.

OA package

CONTINUED FROM PAGE 31

Stephen B. Sayre, director of end-user and information-center product marketing.

"Frankly, Edit is a more complex program with in-depth editing features," Sayre noted. Goldengate will continue to include Edit, since many users are accustomed to it, he said.

Goldengate is Cullinet's desktop office automation package that includes spreadsheets, graphics, data base management and an IBM terminal emulator. The Software Publishing PFS series, which now includes the Professional Series, has sold about two million copies. The Professional Series includes word processing, file management and a spreadsheet package. Although the firm does not have any immediate plans to include other programs from the PFS line, it has not ruled out that possibility, Sayre said.

The fall release of Goldengate will also include a personal computer-based report writer, Sayre said. The addition of the report writer will boost Goldengate's memory requirements from 384K to 512K bytes, he added. The addition of Professional Write reportedly does not affect random-access memory requirements because most of the Goldengate applications sit on a disk, with the user selecting the one that he wants to be loaded into RAM.

Sayre said Cullinet will also include Infolink, a $200 micro-to-mainframe link that previously sold separately, in Goldengate. Cullinet is planning to drop the price this fall, according to Sayre. In addition, Goldengate upgrade customers will be able to receive the product at a price that will be less than the cost of Professional Write alone, which is $195, he said.

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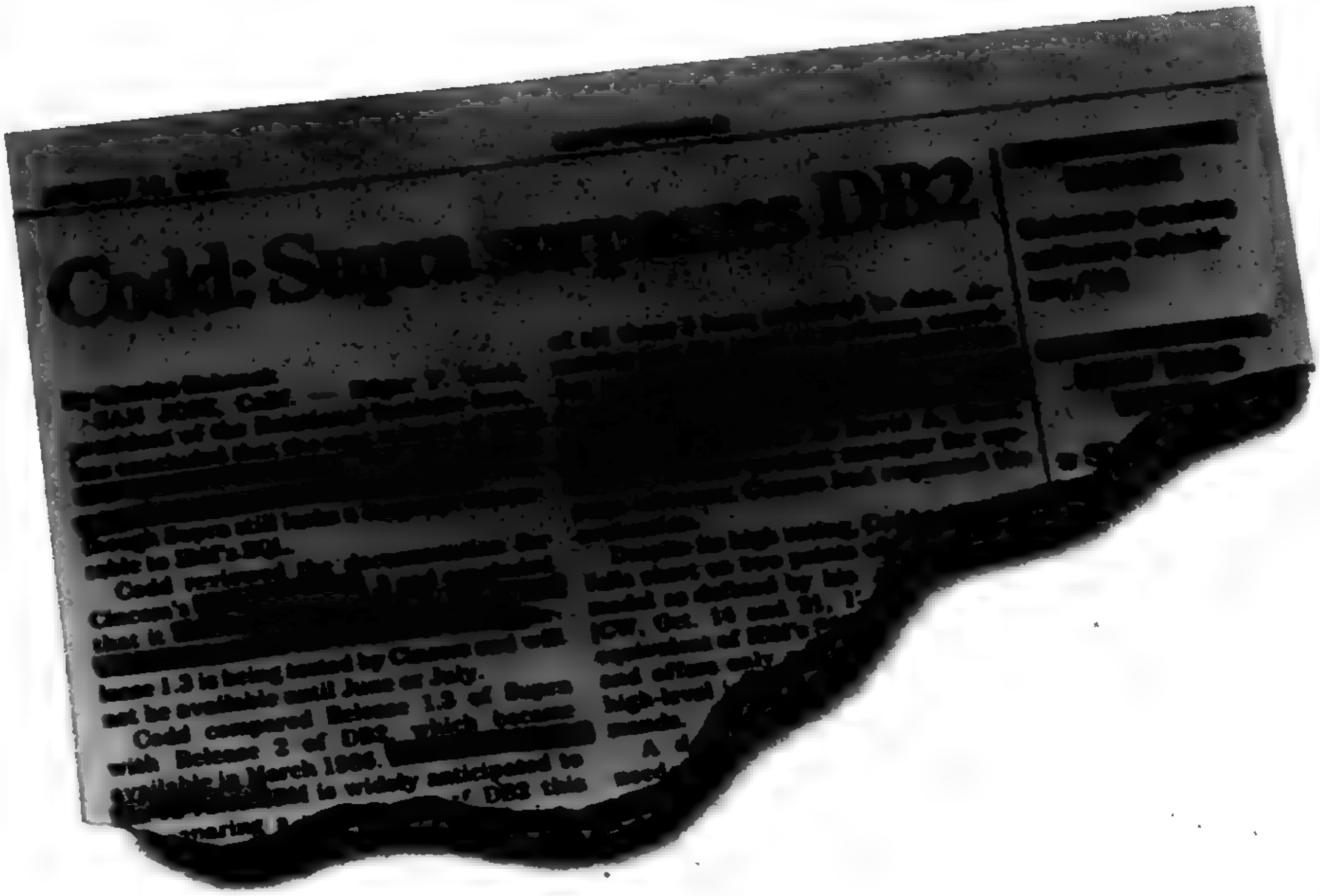

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The seminar series, "The Business Value Of Relational Technology," offers you a comparative look at SUPRA and DB2. You'll see how relational database technology can substantially reduce costs of development and maintenance, plus you'll learn the importance of the "three integrities" (referential, entity and user-defined) to relational implementation.

Sharon B. Weinberg, President of Codd & Date Consulting Group and a former relational database consultant with IBM® responsible for releases of DB2, will review Dr. Codd's point-by-point comparison of SUPRA Release 1.3 and Release 2 of DB2. She'll demonstrate why Dr. Codd concluded that SUPRA adheres to 10 of his 12 basic rules for the relational model, versus DB2's 7 of 12, and explain why he stated, "SUPRA's rating is the highest achieved of all those I have reviewed to date."

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Apple opens

CONTINUED FROM PAGE 31

Apple left that to AST Research, Inc. in Irvine, Calif., which announced five expansion boards. Two of the boards enable the models to run MS-DOS applications while the other three enhance the performance of the new Macintosh.

For the Macintosh II, the $1,499 Mac286 board provides IBM Personal Computer AT compatibility with an Intel Corp. 80286 coprocessor and connection to a 1.2M-byte AT-style floppy disk drive. The $599 Mac86 from AST provides similar compatibility to an 8086-based MS-DOS system for the Macintosh SE.

According to AST, the 80286 will allow Macintosh II users to take advantage of Microsoft Corp.'s unreleased operating system, dubbed 286 DOS, that allows 80286-based machines to access up to 16M bytes of random-access memory (RAM).

One area in which incompatibilities may arise is with applications such as Autocad, from Autodesk, Inc., that require particular hardware devices to run or generate output.

The aim of the AST boards, however, is to provide applications-level connectivity, rather than simply the ability to run MS-DOS software. For example, a user of Microsoft's Excel integrated package for the Macintosh could load and view a work sheet from Lotus Development Corp.'s 1-2-3 and then transfer that work sheet to Excel.

Other system enhancement products are the $949 AST-ICP Intelligent Communications Processor to speed the Macintosh II with a Motorola, Inc. 68000 coprocessor, 512K bytes of RAM and four serial ports; the AST-RM4, an $899 memory-expansion unit that adds 4M bytes of memory and can be used as a RAM disk; and the AST-Pak for the Macintosh SE, a family of multilevel expansion products, ranging from memory to coprocessor boards, which begin at $499.

AST said its products for the Macintosh SE are scheduled to be available within a month, and the Macintosh II products will ship in May, when the machine is scheduled for release.

In the communications area, a product that connects the Macintosh SE to IBM mainframes was announced by Avatar Technologies, Inc. in Hopkinton, Mass. The $795 Macmainframe consists of a card that fits inside the SE and software that provides IBM 3278 terminal emulation and file-transfer capability.

A slew of high-resolution monitors were announced by Radius, Inc., Supermac Technology, Sigma Designs, Inc. and Micrographic Images. Supermac also introduced color video boards.

Software was another active area. Borland International announced a $195 Macintosh version of Eureka: The Solver, an engineering calculator. National Instruments, Inc. announced faster versions of its engineering software series, Labview. Microsoft, Living Videotex, Inc. and Cricket Software, Inc. were among those who announced color implementations of their applications.

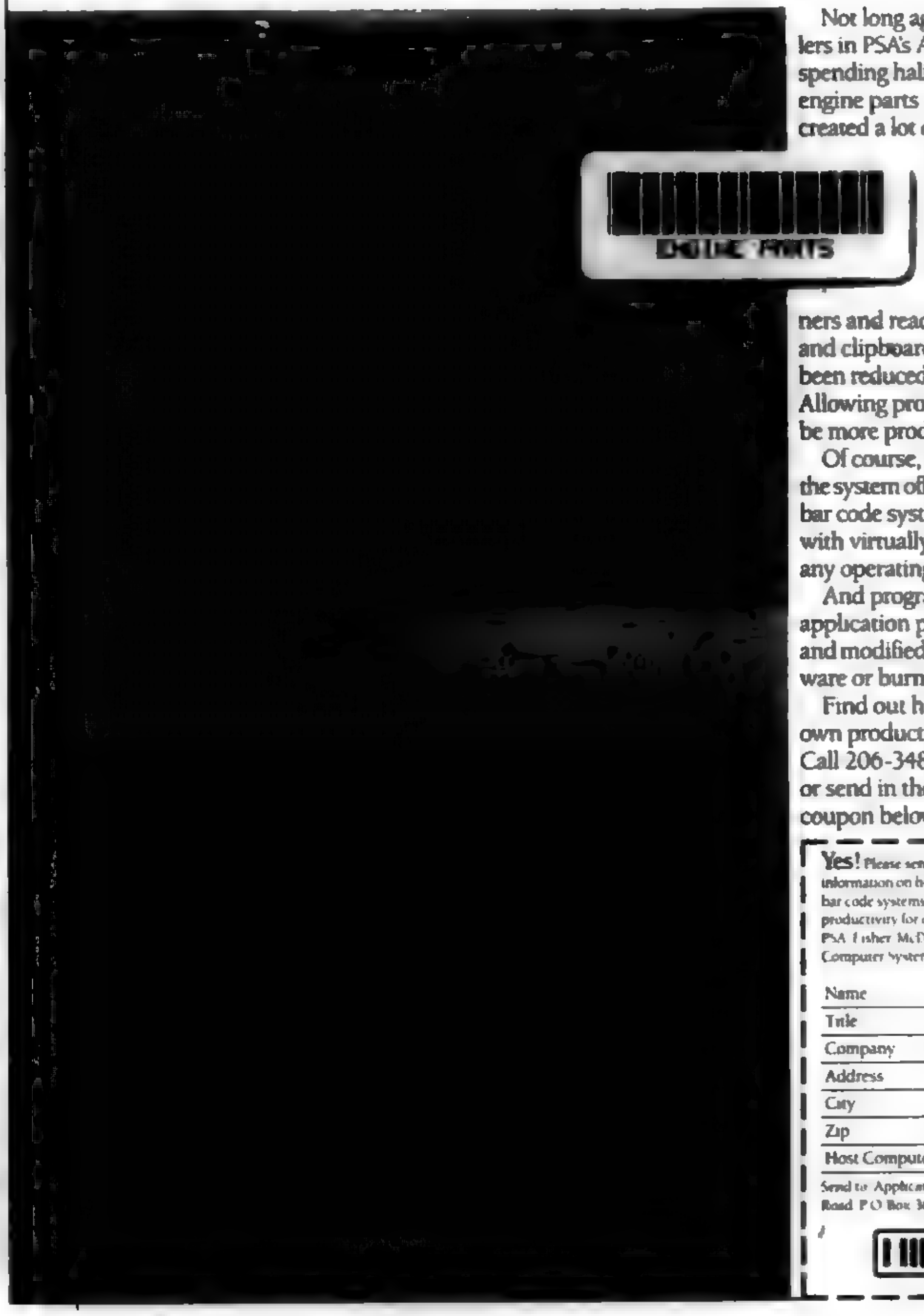
Another speedup board comes from General Computer Co. in Cambridge, Mass., with the Hypercharger 020 for the Macintosh SE. It has the 16-MHz 68020 microprocessor used in the Macintosh II, plus 1M byte of memory, upgradable to 4M bytes for $1,499.

Other 68000-based expansion boards, designed to give the Macintosh SE some of the power of the Macintosh II, were announced by Levco in San Diego and Peak Systems, Inc.

Another hardware enhancement, a redesigned keyboard with function keys including "cut" and "paste" for the Macintosh, was introduced by Datadesk International in Van Nuys, Calif., and is priced at $169.95. A hardware-software combination system introduced by Lightspeed, Inc. in Boston includes a color scanner, Seiko Instruments U.S.A., Inc. color printer and color page layout system for the Macintosh II and costs $3,500, which includes the Macintosh.

Senior Editor Douglas Barney contributed to this report.

Once again, we've made shop floor productivity take off.



Not long ago, production controllers in PSA's Airmotive Division were spending half their day tracking the engine parts they serviced. Which created a lot of paperwork. And little productivity.

Thanks to a bar code system from INTERMEC, things are now looking up.

With bar code scanners and readers replacing pencils and clipboards, parts-tracking has been reduced from hours to minutes. Allowing production controllers to be more productive with their time.

Of course, it didn't take long to get the system off the ground. INTERMEC bar code systems are designed to talk with virtually any mainframe under any operating system.

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CW 3 9

NEW PRODUCTS

Systems

Televideo Systems, Inc. has announced the **Telecat-286 EGA**, a package said to upgrade its Telecat-286 IBM Personal Computer AT-compatible system from monochrome.

The upgrade includes an IBM Enhanced Graphics Adapter (EGA)-compatible, 14-in. high-resolution monitor on a tilt-and-swivel base and an EGA adapter card. The Telecat-286 features an Intel Corp. 80286 CPU, a hard-disk controller, graphics controller, keyboard, 1.2M-byte floppy disk drives, 512K bytes of random-access memory, a 20M-byte hard drive, an RS-232C serial port, a parallel port, a clock/calendar and five I/O expansion slots.

The Telecat-286 EGA upgrade package is priced at $995.

Televideo, P.O. Box 3568, 1170 Morse Ave., Sunnyvale, Calif. 94088.

International Instrumentation, Inc. has announced its **Blue Max Atlas** IBM-compatible personal computer.

The Atlas is said to operate at a 13 MHz clock speed. It features 1M byte of 120-nsec memory, expandable to 16 MHz; eight expansion slots; a 1.2M-byte floppy- and hard-disk controller; a 1.2M-byte floppy drive; and a built-in clock calendar.

Optional features include hard disks to 140M bytes, tape backup subsystems to 240M bytes, digitizer, mouse, printers or plotters and an Intel Corp. 80287 math coprocessor.

The Blue Max Atlas is priced from $1,500.

International Instrumentation, Box 3751, Thousand Oaks, Calif. 91359.

Software applications packages

Streamline Software Systems has introduced **Sales Repeater Executive**, a software package designed for users with laptop computers.

The software is said to allow field sales representatives to update customer and prospect files and enter follow-up information during or after a sales call. Reports to home-office management can be transmitted instantly via the laptop's modem.

The product includes a customer and prospect data base, a tickler file, a follow-up file, a weekly sales report, a customer-contact report and a planned sales contacts report.

Sales Repeater Executive costs $495 in either 3½-in. or 5¼-in. formats.

Streamline Software Systems, Suite 1406, 14 Perimeter Center E., Atlanta, Ga. 30346.

Venturcom, Inc. has announced the **Prelude Word Processor**, a module for its Prelude Information Management System for personal computers running AT&T's Unix System V.

The word processor is a menu-driven, function key-oriented program. It offers features such as insert/overwrite mode, Help messages, global/interactive search and replace and options for directories, cursor movement and format and character control on a what-you-see-is-what-you-get screen. The program allows word processing in foreign languages.

The module is said to be integrated with other Prelude modules and can also be used as a stand-alone tool.

The Prelude Word Processor costs $450 for a two-user configuration on IBM or compatible systems.

Venturcom, 215 First St., Cambridge, Mass. 02142.

Software utilities

Core Technology Corp. has ported its **CTC Bridge** products to the Apple Computer, Inc. Macintosh computer.

The CTC Bridge package is said to include Unisys Corp. terminal emulation and file transfer. The terminals emulated are the TD830, MT983 and ET1100 from the former Burroughs Corp. Features include support of multiple-terminal addresses, background-printer address, on-line Help and implementation of the Burroughs Poll/Select protocol.

Line speeds from 300 to 19.2K bit/sec. are supported. The Macintosh may be connected to the Burroughs mainframe via phone lines or Burroughs TDI Direct Connect Interface.

The CTC Bridge package costs $395.

Core Technology, 7201 W. Saginaw, Lansing, Mich. 48917.

Secad has introduced the **Pro-Cad Architectural Menu System** for Autodesk, Inc.'s Autocad Versions 2.18 and 2.5.

The menu system is said to feature door- and window-insertion routines, automatic cleanup and a perimeter walk that automatically generates walls from user-defined length, angle and type.

A plotting utility allows users to view the placement of the drawing before actual plotting, assemble multiscale drawings onto one page for plotting and keep track of text size for the different scales used.

Pro-Cad is priced at $195.

Secad, 4707 S. W. 72 Ave., Miami, Fla. 33155.

Software enhancements

Softway, Inc. has announced **High Screen Version 3.4**, an enhanced version of its user interface development tool.

High Screen is said to offer features such as screen generation, automatic field checking and Help and window management as well as pull-down menu management. Version 3.4 is said to allow the programmer to choose between two modes for each individual data entry screen or window: field-by-field or full-screen mode.

Another new feature is the ability to use vertical scrolling within a zone.

According to the vendor, High Screen can be used with most programming languages, including Basic, Pascal, Cobol, C, Fortran, Dbase and assembler.

High Screen Version 3.4 is priced at $129. Registered owners of previous versions can upgrade for $20.

Softway, Suite 222, 500 Sutter St., San Francisco, Calif. 94102.

Vantex Data Systems has introduced **Version 2.0** of its word processor, **Vantex Word.**

Vantex Word Version 2.0 is said to feature a built-in 90,000-word spelling checker, split-screen capability, macros and unlimited document size. Other features include 30 user-specified defaults, such as automatic backup and time save, eight sorted directory-list formats and diamond cursor movement.

Vantex Word users can move and copy text with repetition or across split screen, move, delete and fill columns and search and replace backward or forward.

Vantex Word runs on IBM Personal Computers and compatibles. It costs $119.99.

Vantex Data Systems, P.O. Box 507, Chatham, N.J. 07928.

Data storage

DMI has announced the **SMI Base Expansion Systems**, products designed to support the Digital Equipment Corp. Vaxmate and PRO lines.

The SMI Base Expansion System consists of an integrated external cabinet with hard-disk controller, power subsystem, cooling system, connecting cable assemblies and documentation.

An additional hard disk, tape backup unit or floppy disk drive can be added to the Base Expansion System.

Four models are available: the DM320A, featuring 60 cycles with 20M-byte hard disk, for $1,595; the DM320B, featuring 50 cycles with 20M-byte hard disk, for $1,845; the DM340A, featuring 60 cycles with 40M-byte hard disk, for $2,295; and the DM340B, featuring 50 cycles with 40M-byte hard disk, for $2,695.

DMI, Suite H, 27635 Forbes Road, Laguna Niguel, Calif. 92677.

Seagate Technology has announced six **3½-in. hard disk drives.**

The drives feature sputtered thin-film media from Seagate Magnetics and open-loop rotary-stepper actuators providing an access time of less than 30 msec.

Featuring an embedded small computer systems interface controller, the ST138N and ST157N provide 30M and 45M bytes of formatted capacity. The ST138R and ST157R also offer 30M and 45M bytes. The ST125 and ST138 feature 20M and 30M bytes of formatted capacities using the ST412/MFM interface.

Prices for the disks range from $495 to $695 in quantities of 500.

Seagate Technology, 920 Disc Drive, Scotts Valley, Calif. 95066.

Tecex has announced the **TEC-OAS/2 Optical Archiving Subsystem** for the IBM Personal Computer, PC XT, PC AT and compatibles.

The TEC-OAS/2 is a 12-in. write once/read many times optical peripheral subsystem. It reportedly provides access of up to 4G bytes of on-line archived data. It can be configured for single-user or multiuser networked system environments.

Subsystem pricing starts at $13,900. Additional double-sided 2G-byte platters cost $475.

Tecex, P.O. Box 6086C, Anaheim, Calif. 92806.

Gil Roeder and his team teach a whole staff C for less than one Seminar fee

C Language Made Easy To Learn

Programmers call it the most comprehensive C course ever, and first video package they like enough to finish

"It's incredible" says a software manager at a Silicon Valley instruments company. "I've never seen programmers get up to speed in C so fast. They get totally drawn in, and they *remember everything.*"

Gil Roeder of Hands On Learning, who developed this remarkable workshop, says customers like C for its power and portability, but hit snags getting staff up to speed. "C can be tricky at first. On the job training is too slow and distracts senior staff. Seminars (and travel) are too costly, and often disappointing".

The Solution: Now, the *All Hands On C Video Workshop* gets staff up to speed faster and better than ever before, at far lower cost. The workshop contains six professionally produced video modules that teach the full features and capabilities of the C language from operators and expressions through pointers and structures.

Students review lesson content with workbook exercises, and each module builds practical programming experience with sample programs provided on the C Video Workdisk. The package includes the acclaimed text "Learning to Program in C" by Dr. Thomas Plum, international authority on C and technical advisor to Hands On Learning.

The Secret: Roeder and his company have helped thousands to master computers and software. The secret of their system is its focus on people: using human experience to teach technical concepts. "It's like learning by osmosis" says one student. "I had no idea I was getting so much. When the tapes ended, I just started programming."

The All Hands On C Video Workshop is available in VHS or Beta at $995, and other formats at additional charge. We are sure you will find it an exceptional value. However, if you are not fully satisfied, return it for a full refund for up to 30 days. To order, or for more information, please call us or send this coupon with your business card or letterhead. Thank you.

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NETWORKING

DATA STREAM

Patricia Keefe

Can MHS set a standard?

Last October, Novell, Inc. revealed plans to develop Netware Message Handling Service (MHS), software the firm said would provide message transfer and routing services between local-area networks (LAN) based on Microsoft Corp.'s MS-DOS and minicomputer- or mainframe-based document distribution systems such as Digital Equipment Corp.'s All-in-1 and IBM's Professional Office System (Profs).

With MHS, Novell is proposing to make IBM Personal Computer LANs — and its own Netware in particular — the lynchpin of a corporatewide document distribution system. But it's questionable whether Novell, admittedly a leader in the PC LAN market, can successfully pit its product against the emerging electronic mail standard, X.400.

The success of MHS will depend both on how many companies want to use a PC LAN to tie together disparate systems and how quickly Novell can

Continued on page 42

MIS exerts network control

BY DONNA RAIMONDI
and ELISABETH HORWITT
CW STAFF

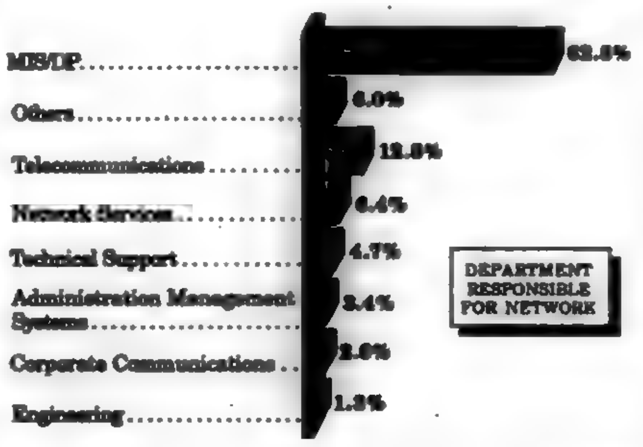
MARLBORO, Mass. — Network management installations are growing and increasingly coming under the jurisdiction of MIS departments at Fortune 1,200 corporations, a recent survey reports.

Of the 269 Fortune 1,200 company sites interviewed by the Market Information Center, Inc., 62.8% said their MIS/DP departments are responsible for managing the corporate communications network (see chart). In contrast, 12.8% of the survey respondents said that their telecommunications departments are in charge of networking operations, and 11% said either network services or technical support departments have

Continued on page 44

Network management

At more and more companies, the buck stops at MIS



INFORMATION PROVIDED BY THE MARKET INFORMATION CENTER, INC.
CW CHART

More ISDN offerings on the way

NEC America, Northern Telecom follow AT&T's lead

BY ELISABETH HORWITT
CW STAFF

RESEARCH TRIANGLE PARK, N.C. — Hard on the heels of AT&T's announcement of Integrated Services Digital Network (ISDN) terminals and ISDN Primary Rate support for the firm's System 85, competitors NEC America, Inc. and Northern Telecom, Inc. have revealed ISDN plans of their own.

Northern Telecom research and development subsidiary Bell Northern Research announced the development of Call Manager, an IBM Personal Computer software package that enables the PC and a Northern Telecom telephone to share an ISDN Basic Rate Interface, the company said.

The product provides basic ISDN connectivity for terminals and telephones, forming the basis for future applications that will make use of the ISDN D channel for sending information from one user station to another, said Tony Yuen, Bell Northern Research assistant vice-president of network development. An initial application Bell Northern Research is currently working on is an ISDN-based voice encryption capability, he added.

Northern Telecom has announced no commercial release date for the product. Call Manager is being tested at the Mountain Bell ISDN trial in Phoenix.

Continued on page 44

CPE offers DACS, T1 switching

BY ELISABETH HORWITT
CW STAFF

Two companies have announced customer premise T1 switching systems that are based on AT&T's Digital Access and Cross-Connect System (DACS) and offer high-level compatibility with AT&T's DACS-based networking services, the vendors claimed.

Last week, Integrated Telecom Corp. in Richardson, Texas, unveiled the Accudacs 400, a digital multiplexer that can switch 64K bit/sec. DS0 channels among up to four T1 network trunks. The system targets users who want to combine private T1 networking with interfaces to carrier services.

The Accudacs 400, like other Integrated Telecom products, is fully compatible with a wide range of telecommunications protocols used by AT&T and other network service vendors,

Continued on page 46

Inside

- X/Open demonstrates Unix standardization initiative. Page 42.
- Cabletron Systems offers [illegible] hardware. Page 47.
- Fibronics International unveils full-duplex optical system. Page 48.

MAINFRAME

```
printf("Hello, world\n");
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The mainframe compiler uses standard IBM linkage conventions. Assembler programs, MAIN routines in other high-level languages, and packages such as IBM's ISPF and GDDM can be invoked directly from C. And you can use C, instead of assembler, to develop small and fast subroutines called from other languages.

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X/Open offers portability ease

Unix standardization initiative showing mixed results

BY JENNY DE MONTAIGNE
SPECIAL TO CW

LUXEMBOURG — X/Open, the industry group promoting the definition of a standard applications environment for Unix, has demonstrated the portability of software to computer systems supporting the group's standards. Source code from an applications package, Access Technology, Inc.'s 20/20 spreadsheet, was ported to equipment from 10 manufacturers.

At a meeting held here last week for the international press under the auspices of the European Community, X/Open members sought to underscore the achievements of their initiative.

Started two years ago by six major European vendors, X/Open has since been joined by Digital Equipment Corp., Hewlett-Packard Co. and Unisys Corp. Even Unix developer AT&T joined X/Open's ranks recently.

Most X/Open members now offer a Unix version that supports the common applications environment defined by the group. DEC and HP have indicated they will launch products sometime this year.

X/Open also confirmed that its proposed specifications are to be compatible with the Portable Operating System Interface X being defined by the Institute of Electrical and Electronics Engineers.

In January, X/Open published its second Portability Guide, which includes data management, high-level languages such as Fortran, Pascal and Cobol, the integration of applications and internationalization of characters. Other X/Open projects, though, seem to be treading water. A portability center that X/Open intended to set up last year near London is now scheduled to open sometime this year.

Montaigne is a contributor to the CW Communications International News Service.

MHS standard

CONTINUED FROM PAGE 41

generate application support.

The first piece of Novell's MHS strategy was delivered two weeks ago with the release of a developer's kit. Applications utilizing MHS, expected to begin appearing by the end of March, will allow users to put messages, charts — whatever — into an "electronic envelope" for delivery to a stand-alone MHS server on a DOS-based LAN. The server, a PC running MHS software, converts and routes the message to its destination.

MHS's proposed open architecture has the potential for filling a void in the message transfer arena by providing a much needed standard for the transfer of data between unlike systems. However, X.400 also has that potential. Just last week at Cebit '87 in West Germany, 14 European and U.S. computer vendors demonstrated interoperability of their X.400 products.

MHS has generated excitement in the industry, largely because of some very ambitious promises made by Novell. Users on a DOS LAN will be able to send and receive mail to and from Profs, All-In-1 or the Wang Office from Wang Laboratories, Inc., without regard for the recipients' applications, protocols or location, Novell claims.

To enable this message transfer, Novell is building support into MHS for standard message protocols like X.400 and standard connection protocols like asynchronous communications, IBM's Systems Network Architecture and X.25. In addition, Novell has promised format translation for Profs and All-In-1 to a common DOS format — all by year's end.

That's a monumental undertaking by any definition. Novell detractors have harshly criticized the marketing-oriented firm in the past for announcing products well in advance of delivery dates. Critics point to Novell's diskless workstation and two announcements regarding plans to port the Netware network software to the Macintosh environment. That project has been stalled twice, and "Macnetware" remains vaporware.

Completion date questionable

With all the work that lies ahead, it seems unlikely that a completed MHS product would be available by year's end, especially since it appears Novell is intent upon doing all the work itself.

Also, MHS is located on a PC LAN and will be written to handle traffic between a LAN and specific office systems. It is not intended to facilitate direct message transfer between Profs and All-In-1, for example.

As for X.400, it's unclear whether MHS will wind up facing off against this standard. Novell claims MHS is not only compatible with X.400 as it stands today, but goes beyond it in functionality. X.400 and MHS are not comparable, according to Novell.

Whatever the outcome of these issues, Novell seems to have gone a step or two further in resolving message transfer problems than its competition has. At the very least, the MHS concept is a step in the right direction. Whether Novell can bring that concept to market remains to be seen.

Keefe is a *Computerworld* senior editor, communications.

"INFOURMATION"
ASCII Printing Within The 3270 Environment Made Possible By 4G Data Systems.

From a leader in micro-to-mainframe link communications, two new products designed to introduce the efficiency and flexibility of ASCII printing to the power of the 3270 environment.

The INFOURMER – our Printer Adapter with a dual personality. One, it interfaces any popular, low-cost ASCII printer to your IBM 3274 controller; and two, it emulates IBM's 3287 printer for mainframe applications.

Now you can tie the same fast ASCII printer into an IBM host, an ASCII host and an IBM PC. All at the same time. Easily and economically.

The ***INFOURMER*** also expands printing output with bar codes, graphics, international languages, and of course, ASCII character sets. Menus in plain English facilitate simple operation.

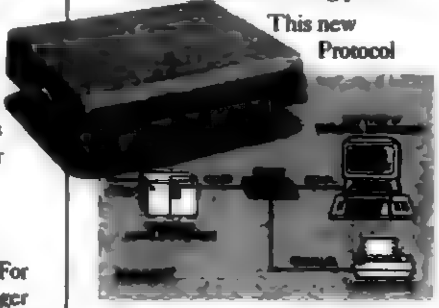
Because it offers increased performance at a lower cost, this printer adapter from 4G is well worth introducing to your 3270 environment.

The IMAGE – our Protocol Converter for local screen printouts. For the first time, you no longer require an expensive IBM 3287 printer to screen dump from your 3270 terminal.

Instead, you can perform this function on any low-cost, industry-standard ASCII printer. All it takes is our ***IMAGE*** hooked up between the 3274 controller and your PC's coax cable.

Hard copy of relational information can be printed from mainframe files without heavy CPU time-sharing costs. Also, you can produce immediate screen printouts without interacting with the controller. Up to 10 screens of memory can be stored in a 20K buffer, permitting you to work with the host while the stored screens are being printed.

This new Protocol



Converter from 4G represents an inexpensive, viable local ASCII screen print solution for IBM 3270 users.

Again, 4G has the answers to your data communications needs. These two products are a natural extension of the technological support we offer to corporate clients. Not only do they bring ASCII printing to the 3270 environment, but they have a positive bottom-line impact as well. And that's an answer that everyone likes to hear.

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MIS controls

CONTINUED FROM PAGE 41

this responsibility.

A study conducted by the Market Information Center approximately one year ago found that 50.7% of respondents said MIS was responsible for network operations. Four to five years ago, the research firm's estimated figure was 30%, according to Barry Gilbert, executive vice-president. He predicts that by the end of the decade, MIS will manage networks for two out of three large corporations.

"Either telecommunications is becoming a subfunction of MIS — with the telecommunications VP reporting to the director of MIS — or you have MIS and telecommunications departments as autonomous entities with independent budgets, with the VPs of each group reporting to a senior executive, such as the VP of finance," Gilbert notes. In the latter instance, telecommunications and MIS departments tend to "communicate on a daily basis" about network operations and planning, he adds.

Approximately half of the respondents with networks say they use a network management system; 8.1% are in the process of evaluating such a system; and 43.4% say they are not using or investigating a management scheme.

"The kind of network management we are talking about here is centralized management facilities for companies networked through various locations," Gilbert explains. "It has only been around for two or three years, and it's growing."

Research results show that the average site surveyed spent $4.1 million in the last fiscal year on communications expenditures — 61% of which was for voice. Typical sites employed 26 people in the communications department, with approximately 5.6% of those people directly involved in network management.

About 70% of the sample had data networks: 46.2% had a voice/data network, and slightly more than a quarter of the respondents said they had a data-only network in place.

"We wanted to look at network importance by industry sector, and we found that the network is most critically important to banking, insurance and finance types and a little less critical to point-of-sale or some retail industries that still send batch information," Gilbert says.

Seven vendors accounted for more than 70% of the total number of network management systems. IBM led the group with 18%, followed by Codex Corp., 15.6%; and Racal-Milgo, 10.2%. General Datacomm Industries, Inc. (9.4%), AT&T Information Systems (7.8%), Paradyne Corp. (6.3%) and Atlantic Research Corp. (4.7%) followed, and Infotron Systems Corp., Digilog, Inc., Digital Communications Associates, Inc. and Infinet, Inc. accounted for less than 3%.

Respondents rated network management systems according to six criteria: ease of use, report generation, overall reliability, restoral capability, traffic rerouting and vendor support. Atlantic Research was at the top in each category and ranked 4.3 out of a possible 5 points overall. General Datacomm followed with a 3.7 rating, Codex with 3.4 and Racal-Milgo with 3.3. The giants, AT&T and IBM, each scored 3.2, and Paradyne bottomed the list with a 2.7 score.

Third-party management

About 20% of large organizations use third-party management services, Gilbert says. "That sector could grow considerably in the next couple of years. Third-party services are being used by large companies with lots of remote locations because they can be cost-justified against the cost of personnel, network management hardware and software, overhead costs and the availability of sophisticated equipment the organization might not want to own," he adds.

Eighty percent of the network management system users said they have remote diagnostic capabilities, while 74% noted that they have service restoral from a central facility. More than half (57.5%) have some backup or redundancy features.

While just less than 9% of the communications budget is allocated for network management, half of the respondents said not enough money is being spent on network management functions. Only 27.7% felt it was adequate, and 22.9% were not sure. The study draws the conclusion that network management costs will be rising for the next three to five years. Respondents cited 50 areas in which they would like to have increased control in their networks. Those areas include error detection, remote-node reporting, problem determination, circuit routing and diagnostics, Gilbert says.

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ISDN offerings

CONTINUED FROM PAGE 41

NEC America told *Computerworld* that it is equipped with technical and production capabilities to ship commercial ISDN terminals in the fourth quarter of this year, with volume shipments targeted for 1988. The firm is currently testing ISDN terminals in the Illinois Bell ISDN field trial at McDonald's Corp. headquarters. The trial began in December.

NEC also said that it was in the final stages of development of an ISDN-compatible module for the NEAX2400 IMS private branch exchange (PBX) system, which could then be used in conjunction with NEC's ISDN terminals. The PBX ISDN interface should be available for shipment this year, NEC said.

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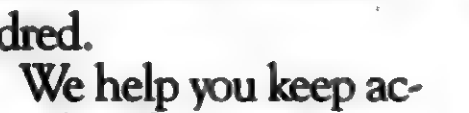

New 8-Channel Codex 6003 Multiplexer

codex

MOTOROLA

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CPE offers

FROM PAGE 41

according to product manager Thomas Crawford. Compatibility with D4 framing protocols at the 64K bit/sec. DS0 level enables the system to interface with AT&T Accunet T1.5 services and also provides 64K bit/sec. connectivity with AT&T's Customer Controlled Reconfiguration, Megacom, Software Defined Network and M24 services and digital private branch exchanges.

Customers can then route 64K bit/sec. channels through a carrier central office out to company sites that cannot cost-justify a dedicated T1 link, Crawford explained.

The Accudacs 400 also complies with Subrate Digital Multiplexing (SDM) protocols that determine how customer premise equipment and telecommunications services route subchannels down to the 2.4K bit/sec. level, either separately or bundled together into a 64K bit/sec. channel.

AT&T reportedly will announce by the second quarter of this year an SDM service that allows customers to route individual subchannels to different destinations and AT&T services.

Compression capability

Compliance with Advanced Digital Pulse Code Modulation (ADPCM) protocols permits the Accudacs to compress 64K bit/sec. voice channels down to 32K bit/sec. and send both over one 64K bit/sec. band, which can then be transmitted to a carrier's central office-based services, Crawford noted.

Multiple T1 lines can share the ADPCM compression feature on the multiplexer, saving users the necessity to provide an ADPCM module for each T1 link, he added.

The Accudacs uses the Extended Super-Frame (ESF) format so that it can exchange diagnostics and error checking with ESF-compliant telecommunications services such as Customer Controlled Reconfiguration. The system can store up to eight routing tables that can be user-activated to bypass trouble spots on the network, the vendor said.

An entry-level Accudacs 400 configuration with a two-T1 port board costs $8,100. The system can be expanded modularly with X.25 packet assembly-diassembly, voice compression and additional T1 trunks.

Tellabs, Inc. in Lisle, Ill., recently introduced Crossnet, a DACS-compatible nodal processor that routes 64K bit/sec. channels among up to 16 1.5M bit/sec. T1 links. Developed with technical support from AT&T Data Systems Division, Crossnet will be remarketed by AT&T as a customer premise T1 switch called Acculink 740, a Tellabs spokesman stated. AT&T would neither confirm nor deny this statement.

Crossnet provides intelligent switching and dynamic reallocation of 64K bit/sec. channels, DACS-compatible multiplexing, voice compression and packet-switching, the company claimed. The system will accept input from up to 128 voice, data or video channels. The system supports ESF and ADPCM protocols, according to a company spokesman.

Pricing ranges from $13,000 for just the DACS-compatible multiplexer to up to $60,000 for multiple T1 networking. Volume shipping is scheduled for May.

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NEW PRODUCTS

Local-area network hardware

Black Box Corp. has introduced the **Black Box 232 Line Booster** and the **Centronics Line Booster.**

The 232 Line Booster is said to actively receive and retransmit the 12 most commonly used signals of the RS-232C interface, doubling the signal transmission distance beyond the RS-232 specification of 50 ft.

The Centronics Line Booster accommodates the Centronics Data Computer Corp.-compatible printer interface. The 16 most common signal lines of this interface are supported, and the device enables doubling of the cable length typically permitted in a transistor-to-transistor-logic-driven application.

Each device costs $99 and is installed at the center of the RS-232 or Centronics cable.

Black Box, P.O. Box 12800, Pittsburgh, Pa. 15241.

Cabletron Systems, Inc. has announced its **MR-9000C Multiport Repeater** and its **LR-2000 Local Repeater** for use with Ethernet/IEEE 802.3 network hardware.

The MR-9000C port connects up to eight full-length Ethernet segments. The AUI transceiver port is used to connect backbone coaxial or fiber cabling.

The LR-2000 allows expansion of an Ethernet network — up to an overall length of approximately 1.5 miles — by connecting up to five coaxial cable segments.

Both products incorporate the vendor's Lanview built-in diagnostic system. Both offer repeater functions, such as transmission of retimed data packets.

The MR-9000C costs $2,795, and the LR-2000 costs $1,365.

Cabletron Systems, P.O. Box 6257, Cabletron Industrial Park, 10 Main St., E. Rochester, N.H. 03867.

Local-area network software

Dynamic Communications, Inc. has introduced the **Telemark System**, a turnkey software package said to allow the IBM System/38 to directly interface with digital telephone equipment from vendors such as Rolm Corp.

The Telemark System is said to provide information about trunk traffic and extension activity. It also provides cost accounting information. Other features include output report and on-line review capabilities.

Telemark includes 54 display, menu and inquiry screens and 37 reports, all supported by on-line Help, run books and user guides.

The Telemark System is priced from $7,000 to $9,000.

Dynamic Communications, Suite 700, 711 Leyden St., Denver, Colo. 80220.

Network services

Telcomm Marketing, Inc. has introduced a measured-time, long-distance phone and data service called **Z-Tel-II**.

The service is said to provide unlimited, uninterrupted telephone or data transmission service anywhere in the U.S.

Subscribers receive a personal identification number and an access code to activate the service.

Z-Tel-II is priced, on a monthly basis, at $120 for the first 400 minutes and $20 for each subsequent 90-minute segment, no matter how many long-distance calls or transmissions are made, the vendor said.

Telcomm Marketing, Suite 109, The Wharf, Lake Saint Louis, Mo. 63367.

XEROX

"Xerox has a range of Electronic Printing Systems that produce 10 originals per minute to 120 per minute. And they thought I was prolific."

Leonardo da Vinci

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As a result, Xerox has developed more than just one of the broadest ranges of electronic printing systems—it's one of the most unique. For instance, Xerox 4045 Laser CPs are desktop printers that are also copiers. The two new models have expanded memory capabilities—the Model 20 for IBM 3270 data processing systems, and the Model 50 for desktop publishing and other applications where full-page graphics are needed.

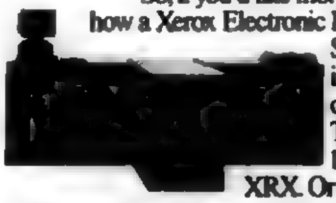
Work groups and small corporate departments have special problems when it comes to electronic printing. Problems the Xerox 2700 and 3700 can solve. Both laser printers are designed for remote printing. The 2700 can produce 12 originals per minute. And the 3700 can produce up to 24 pages per minute on paper sizes up to 11" x 17".

Xerox has electronic printing systems for more intricate needs. The 4060

computer printing system can turn out 60 pages per minute. Its ion-deposition print engine is extremely reliable and an economical way to produce documents with a lot of text. The Xerox 4050 is a laser printer that creates laser-sharp text and graphics at 50 pages per minute.

The Xerox 8700 and 9700 set the standard for high-volume electronic printing. And now, the new 8790 and 9790 take that standard to a new level. These high-volume electronic printing systems give corporate data centers and service bureaus imaging tools that are unsurpassed by anything else on the market. The 9790 can produce up to 120 pages a minute. And can handle both text and graphics, which is critical for so many high-speed applications.

So, if you'd like more input on how a Xerox Electronic Printing



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Customer premise equipment

Isoetec Communications, Inc. has introduced the **Isoetec/Ivie**, a digital voice-mail system designed as an integrated option for the company's computerized System 96, 120 and digital System 228 phone systems.

The product uses disk technology to provide storage, retrieval and forwarding of digitized voice information from an outside caller. Features include automatic call distribution, voice/data switching capabilities, message waiting indication, phone forwarding to voice mail, direct dialing into voice mail, password protection and direct outside access.

The Model 1, priced at $8,800, offers two ports and two-hour voice storage. The Model 2, priced at $11,900, offers two ports and four-hour voice storage.

Isoetec, 6 Thorndal Circle, Darien, Conn. 06820.

Fibronics International, Inc. has announced its **Digital Air Link**, a full-duplex optical system said to transmit data on an infrared light beam.

Data can be transmitted through the point-to-point range of 250 meters, as long as there is a clear line of sight. The optical beam is said to be safe, secure and immune from electromagnetic interference. The Air Link was designed for fiber-optic I/O as an added feature for the Fibronics Unimux 832 network system. It consists of two transceiver units.

The Fibronics Digital Air Links are priced at $12,500 per pair.

Fibronics, Communications Way, Independence Park, Hyannis, Mass. 02601.

Links

Tymnet, Inc. has announced **Expresstym**, a service said to allow users utilizing Tymnet's Systems Network Architecture (SNA) Service for IBM mainframes to connect remote personal computers to the mainframes.

Expresstym is software based. It features a customized network gateway allowing access to multiple IBM applications and SNA domains as well as other network services via the Tymnet network. Expresstym also includes an IBM software package providing 3270 keyboard emulation, 10 user-definable soft keys, Help screens and 3287 printer emulation. It also provides Tymnet's protocol conversion and end-to-end, error-free communication via the X.PC protocol.

Expresstym typically costs $8 to $10 per hour, and the PC software costs $175.

Tymnet, 2710 Orchard Pkwy., San Jose, Calif. 95134.

Protocol converters

Palantir Software has announced **Intalk Version 2.11**, a version of its software for modem communications.

Version 2.11 features the Yterm Binary File Transfer protocol for sending and receiving files in the Apple Computer, Inc. Macintosh format to and from IBM mainframes and Digital Equipment Corp. VAX systems. Also included is improved support for Microstuf, Inc. Crosstalk Version 3.6 file transfer protocol.

Intalk is said to run on both Macintosh computers and Microsoft Corp. MS-DOS-based computers under Microsoft Windows.

Intalk is priced at $145.

Palantir Software, Suite 100, 12777 Jones Road, Houston, Texas 77070.

File servers

AST Research, Inc. has announced support for the Appleshare file server software from Apple Computer, Inc. for the **AST-4000** hard-disk subsystem.

According to the vendor, with the incorporation of an AST-4000 or other hierarchical file system-compatible hard disk, the Appleshare software turns an Apple Macintosh into a dedicated file server in an Appletalk network.

The AST-4000 costs from $6,995.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

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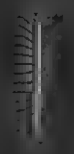

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This COMPAQ PORTABLE III is so busy in the office, it doesn't get out much.

HARD TALK

James Connolly

Cray fends off IBM

For a market in which all the players once had niches pretty much to themselves, the supercomputer business is becoming very, very crowded.

Established powerhouses, including IBM, are elbowing for position as start-ups try to sneak in from below. The latest maneuver was carried out by one of those established vendors, Cray Research, Inc., which is looking to drive from its dominant position at the top of the market down to meet the challenge of those that are fighting their way upward.

Cray's recent announcements are meant to fend off the advances of companies such as IBM and Amdahl Corp., which are trying to move from their commercial mainframe bases into the higher end of the scientific and engineering markets.

IBM, which is touting its vector-processing facility for the firm's 3090 mainframe, cannot steal the ultra-high-performance customer who is looking for more and more power from Cray's $17 million Cray-2 supercomputer. But it appears that Cray recognizes the damage companies like IBM and Amdahl can do Cray's X-MP product line — by persuading customers to delay a move to a full-fledged supercomputer if a 3090 and vector processor can meet the user's short-term needs.

Meanwhile, Cray was facing competition from other vendors, including long-time foe ETA Systems, Inc., which is reportedly ready to announce its ETA-10 this month. Some of the others, many of which are still in start-up mode, want to move into the growing supercomputer market by packaging dozens, or even hundreds, of processors in parallel configurations.

Most of those vendors have fallen far short of beating out big Cray systems like the X-MP/416 and the Cray-2. But those vendors offer at least the-

Continued on page 60

IBM 3090 may endure into '90s

BY STANLEY GIBSON
CW STAFF

Recent statements by industry sources indicate the 3090 mainframe will live through 1990, and the 3090's successor, the Summit processor, will not diverge greatly from the 3090 in technology when it does arrive.

George DiNardo, executive vice-president of Mellon Bank, N.A. in Pittsburgh, attended IBM's recent conference for major customers in Orlando, Fla., and said he thinks the 3090 will survive "well into the 1990s."

He also said that IBM would not exceed six processors, even in the Summit machine. "I also gathered that a six-way machine is the maximum they're going. I don't believe they are working on any more software than for a six-way machine."

DiNardo, speaking at a recent Yankee Group conference, said he believes the quadratic processors he has now are insufficiently utilized. "I conclude six-way is the maximum because I'm having difficulty working under four-way. It works like hell under IBM's TSO."

Thomas Henkel, an industry analyst with the Boston-based Yankee Group, predicted Summit will be announced in 1989 and delivered in 1990. In contrast to DiNardo, Henkel said IBM will have an eight-way, 96 millions of instructions per second 3090E model in 1988. In addition, he said, the Summit line will include machines with eight and more processors.

For the remainder of the 3090's life span, all enhancements will be made only to E models, according to Henkel. He added that the next upgrade for the 3090 will include the 4M-bit memory chip IBM recently fabricated.

DiNardo and Henkel agreed that enhanced thermal-conduction modules will be a key to Summit. DiNardo said the thermal-conduction modules will at least double in speed, thanks in part to the use of X-ray lithography in the design of microcircuits. The use of X-rays permits much thinner circuits than does the laser technology now in use

However, a long 3090 life span raises the question of whether or not IBM will be able to generate sufficient revenue from the 3090 product line to meet its financial goals

"IBM is at a significant crossroads The year 1987 will be as bad as 1986 was for IBM." predicted Howard Anderson, managing director of the Yankee Group. He said mainframe sales will never grow as they did in the early 1970s, and said a "real recovery" for IBM is some 36 months away.

According to Brian Jeffery, an industry analyst with International Technology Group in Los Altos, Calif., IBM cannot expect to attain high revenue and profit levels with the 3090 and will, for financial reasons, speed up introduction of the Summit. "Recently, every time the financial people at IBM have said 'jump,' the mainframe people have asked, 'How high?'," Jeffery said when asked about IBM's plans.

"There's no way they can last it out for three years, particularly if it means sitting on the 4M-bit chip that's ready to go," he said. He said he anticipates the Summit announcement to take place in 1988.

IBM mainframe power to grow in 1988

Future enhancements to IBM's E models will deliver up to 96 million instructions per second

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E models	-	10.3	18	32	45	54	75	-
E + models	9	11	20	35	50	60	83	96

[illegible]

Lab tests T200 for R&D use

BY ALAN J. RYAN
[illegible]

LOS ALAMOS, N.M. — The Los Alamos National Laboratory (LANL) here recently installed Floating Point Systems, Inc.'s T200 supercomputer for use in the development of parallel processing

The computer, manufactured by the Beaverton, Ore., firm has a theoretical peak performance of approximately 1.5 billion floating-point operations per second (GFLOPS), the vendor claimed. LANL officials said Floating Point ran a preshipment test of the unit at the factory

"This $6 million system represents the largest T Series configuration installed to date (by

Continued on page 60

Inside

- Start-up develops commercial application for Josephson junction technology Page 59
- IPL announces 4M-byte memory card for System/38 mini. Page 59.
- Matrox color graphics board for Multibus I out. Page 61.

TI develops LISP chip

Federal contract allows commercial production

BY JAMES CONNOLLY
CW STAFF

DALLAS — Texas Instruments, Inc. has announced development of a 32-bit microprocessor designed to support LISP processing while integrating more than 60% of the circuitry of TI's existing two-board Explorer CPU.

The chip was developed under a federal government contract calling for TI to deliver a shoe box-size LISP machine to the Defense Advanced Research Projects Agency (DARPA) in June. However, the DARPA contract allows TI to develop a production version of the microprocessor for the commercial market served by the Explorer.

TI officials said the chip is one centimeter square and contains 553,687 transistors. It was designed to run off chip microcode and execute microinstructions and simple macroinstructions.

In addition to six random-access memories totaling 114K bits, the chip contains a 16K-bit read-only memory. TI said the chip was designed to be memory intensive to provide broad manipulation and branching capabilities to support LISP.

TI said the microprocessor is five times more powerful than the Explorer CPU.

Floyd Hollister, director of TI's Computer Science Center, said the LISP chip will make it easier to package artificial intelligence systems for applications.

"There are lots of places where people want to put expert systems, but the environment is too hostile for current machines, or they are inappropriate. This type of machine should be able to fit in those places," Hollister said.

HP says A400 mini delivers more power at lower price

BY STANLEY GIBSON
CW STAFF

PALO ALTO, Calif — Hewlett-Packard Co. has introduced the Model A400, an entry-level single-board minicomputer in its HP1000 line of real-time computers

According to HP, the Model A400 delivers more real-time computing power than its predecessor, the HP A600, at about 70% of the price

The machine consists of an HP A400 processor chip, 512K bytes of random-access memory, an on-board I/O processor and four serial ports

According to HP, the machine is aimed primarily at manufacturing applications, especially in the aerospace and telecommunications industries

"The HP A400 is ideal for the manufacturing environment because it is a single-board minicomputer capable of controlling multiple devices and instruments," said James M. Burns general manager of HP's data systems division. "At the same time, it is small enough to fit into intelligent equipment and tough enough to survive in harsh environments," he added

The vendor claimed the A400 minicomputer can be used as a network data manager to monitor networks and diagnose and predict network problems in real-time It can also take steps to maintain the system's health and integrity and can serve as a message router

The HP A400 can be purchased as a board computer for $2,500; as a box computer in a Micro 14 six-slot package for $4,800, or as a Micro 24 14-slot package for $6,900

The TeleVideo 955. Seeing is believing.

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Optional Graphics model	Yes	No
Dynamically allocated non-volatile function key memory	512	128
Maximum non-volatile bytes per function key	256	4
High contrast super dark Matsushita screen	Yes	No
List price	$549	$499

Sure, most $600 terminals can scrunch 132 columns onto a 14" screen. But you need a magnifying glass to read them.

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For more information about the TeleVideo 955, call the nearest TeleVideo regional office listed below, and we'll give you the name of your nearest distributor.

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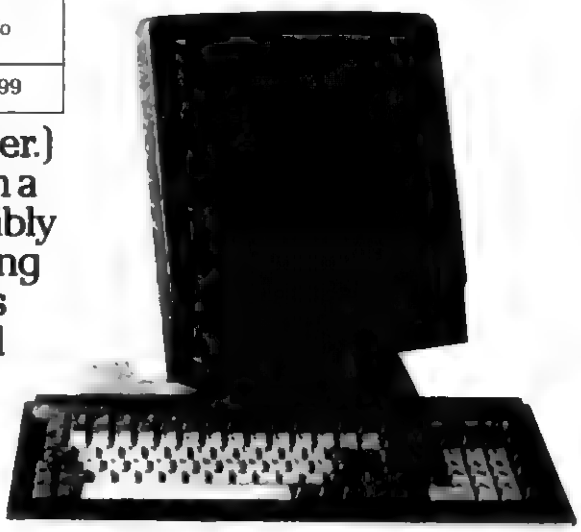

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Supercool chip revs up processor

ELMSFORD, N.Y. — A start-up company has developed what it claims to be the first commercial application for a processor based on Josephson junction technology, in which a chip is supercooled to 273 degrees below zero Celsius.

Hypres, Inc. recently demonstrated its PSP-1000 Picosecond Signal Processor, which the company said uses a liquid helium cooling scheme to support picosecond processing.

Hypres officials claimed that while the PSP-1000 is a test and measurement device, the Josephson junction technology has the potential to be used later in supercomputing, ultrahigh resolution radar and communications systems operating at frequencies in the 50-GHz to 1000-GHz range.

Hypres said the superconducting devices dissipate less power and generate less heat than conventional semiconducting devices, allowing chips to be packaged extremely densely.

Supercomputing vet

Hypres Chief Executive Officer Sadeg M. Faris worked on a Josephson junction research team at IBM before that project was dropped in 1983 and said such superconducting technology could lead to computers with cycle times of 500 picoseconds.

Hypres said its PSP-1000 Picosecond Signal Processor will be available in June at a cost of $120,000.

Necessary input modules, which range in price from $20,000 to $45,000, will also be available for purchase with the PSP-1000.

IPL offers System/38 memory card

WALTHAM, Mass. — IPL Systems, Inc. has introduced a 4M-byte memory card for use in the IBM System/38 Model 700 minicomputer.

The product provides twice the storage capacity of IPL's previous add-in memory for the System/38.

IPL, which also manufactures mid-range systems compatible with the IBM 4300 family, claimed a price advantage of 50% in comparison with IBM memory products. The 4M-byte IPL board costs $10,000. Two boards are necessary to carry out the 8M-byte minimum logical upgrade in a Model 700, an IPL official noted. The Model 700 was introduced as a high-end System/38 last year.

The company said several of the 4M-byte boards have been delivered to customers.

Optical archiving subsystem claims increased throughput, data integrity

BY ALAN J. RYAN
CW STAFF

PLACENTIA, Calif. — Tecex Corp. recently announced that it has upgraded its optical archiving subsystem to include direct-read-during-write (DRDW) technology.

The TEC-OAS/1 Subsystem, first shipped in October 1985, originally performed through direct-read-after-write (DRAW) technology, according to Mike Johnson, manager of Tecex's optical systems division.

The TEC-OAS/1 provides up to 7G bytes of on-line archived data, the vendor said, and works with the Digital Equipment Corp. VAX series of architectures, from the Q-bus Microvax II to the VAX 8650 processors.

The enhancement is integrated through a single-board Q-bus or Unibus host adapter without patches or changes to the existing DEC-based software device drivers or utility packages, the vendor said.

Because the DRDW technology involves a new drive, users of the subsystem with DRAW technology are unable to upgrade without purchasing the entire unit. "The trade-offs are negligible," Johnson said.

For new customers of the subsystem, which costs $21,000 for the Unibus version and $20,600 for the Q-bus version, the DRDW technology will reportedly help revolutionize error correction to provide 100% data integrity during real-time write operations, Johnson said.

Implementing DRDW reportedly increases throughput and eliminates unnecessary drive latencies during the write-and-verify process without making a rotation. Increased throughput performance during a sustained write operation is up to four times faster than previous product releases, according to the vendor.

Another reason the company has switched drives, Johnson said, is to help it migrate toward 5¼-in. optical-disk products. He said that Tecex will probably ship a 5¼-in. product early next year.

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Lab tests

CONTINUED FROM PAGE 57

Floating Point]," according to John Marte, the company's vice-president of marketing.

"What it was acquired for was to provide some research and development into the area of parallel processing," according to Bill Spack, associate leader of the computing and communications division at LANL."This computing division, as well as the Defense Advanced Research Projects Agency and the Department of Defense, have interest in parallel processing," Spack added.

Once delivered to LANL, the unit "came on very rapidly," Spack said. The only problem, he added, had to do with the amount of primary power in-house at LANL. "We still have the power limitation and have to increase the power to the building." Currently, "the whole thing is at the capacity of the power supply," and the users are only operating one part of the system at a time, according to Spack.

Norman Morse, division leader of the LANL Computing and Communications Division, said the Floating Point machine "is primarily a research vehicle for us. We probably will not run any production on it any time soon.

"Our expectation is that the T series of machines may be powerful enough to actually put at least a representative of a production code on the machine and get better experience with multitasking in a 128-processor environment," Morse added.

The T200 is the largest massively parallel supercomputer to be installed at LANL, Floating Point claimed, with 128 nodes — each with a peak performance of approximately 12 million floating-point operations per second (MFLOPS).

Recent benchmarks on the T200 achieved 1.16 GFLOPS on a two-dimensional convolution, with 2.6 billion operations performed; and 1.13 GFLOPS on a matrix multiply-and-add with 4.3 billion operations performed, with 64-bit precision, the vendor claimed. The benchmark performance was nearly five times the theoretical peak speed of a Cray Research, Inc. X-MP-1, according to Floating Point.

Morse said LANL will use the Floating Point operating system with the machine.

LANL is a multiprogram facility that develops, among other things, nuclear warheads. LANL also works in advanced nuclear reactor designs, environmental and safety areas, biomedical research and fusion and thermal energy. The laboratory is operated by the University of California for the Department of Energy.

The $6 million price tag includes the mainframe, its software, maintenance for one year, two on-site analysts and one engineer, Spack added.

Cray fends

CONTINUED FROM PAGE 57

oretical alternatives and challenges that Cray must answer.

Cray brought the price of its entry-level X-MP down to $2.5 million with a tuned-down X-MP that allows a customer to get into supercomputing for half the price of the earlier X-MPs. Cray did this while enhancing other parts of its product line, including the Cray-2. The X-MP/14SE appears to serve in a rear-guard capacity. In a market in which the user base is measured in quantities of 10 — market leader Cray can count on about 30 sales a year — convincing even a couple of customers to move into X-MPs rather than keep scientific applications on mainframes can be a major factor.

However, there is still one more challenge for Cray and ETA. They must deal with customers who want to do scientific computing on something faster than an IBM 4381 or Digital Equipment Corp. VAX without spending millions of dollars. Those customers are looking toward $100,000 near-supercomputers.

Cray and ETA may not want to move down into that price range, but the emergence of near-supercomputers raises the possibility those customers will move upward. That is when Cray and ETA must be ready with yet another solution.

Connolly is *Computerworld*'s senior editor, systems & peripherals.

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NEW PRODUCTS

Processors

Microbar Systems, Inc. has announced a Multibus II Central Services Module called the **CSM-B**.

According to the vendor, each system must be equipped with a Central Services Module, which assigns logical addresses to each physical device on the bus during system start-up. The CSM-B is said to provide this function as well as others required of the Central Service Modules, as stated in the latest IEEE-P1296 specification.

The CSM-B is priced at $315 in quantity orders.

Microbar Systems, 785 Lucerne Drive, Sunnyvale, Calif. 94086.

Matrox Electronic Systems Ltd. has announced the **MG-1280** single-slot, color graphics processor board for the Multibus I architecture.

The board is said to enable the creation of 1,280- by 1,024-pixel graphics images at up to 35,000 vector/sec. The board can display 256 colors simultaneously from a palette of more than 16 million.

Other features include on-board, pipelined processors; a 16-bit direct memory access port; two RS-232 ports; and 2M bytes of on-board video random-access memory.

The MG-1280 is priced from $4,995.

Matrox Electronic Systems, 1055 St. Regis Blvd., Dorval, Quebec, Canada H9P 2T4.

Comtal/3M has announced the **Visionlab II-T**, a digital-image processing system.

The system is said to utilize a dual-bus design to deliver enhanced real-time image processing performance. The IBM Personal Computer AT-compatible bus controls interprocess communication, and the video bus provides direct memory access operations between the system's image processing boards. The image-transfer rate is up to 36 million pixel/sec.

Real-time processing commands include contrast enhancement, continuous zoom, minify and roam. Other commands include image edit, filtration and image analysis

Features include data compression, variable windowing, aspect-ration correction and input lookup tables for gamma or contrast correction.

The system is priced from $15,000.

Comtal/3M, 1111 S. Arroyo Pkwy., Pasadena, Calif. 91105.

Data storage

Sigma Information Systems has announced its Digital Equipment Corp. LSI-11-compatible **SA-H123S** peripheral mounting enclosure.

The enclosure is said to provide mounting and power for two 8-in. Fujitsu Ltd. Winchester disk drives. Each drive has its own 175W power supply, rear on/off switch and fan. Two additional fans provide cooling with side exhaust.

The SA-H123S is priced at $1,392.

Sigma Information Systems, 3401 E. La Palma Ave., Anaheim, Calif. 92806.

Terminals

Graphon Corp. has announced the **GO-400 series** of color-composite terminals.

The GO-400 terminals are said to use the Texas Instruments, Inc. TMS34010 graphics systems processor. They support various industry-standard interfaces, including Tektronix, Inc. 4100/4200 series and Digital Equipment Corp. VT220 graphics.

The GO-405 offers 16 pages of local alpha storage, a 4,096-color palette, one parallel and three serial ports and up to 52 lines of text on the screen. It costs $2,995.

Both the GO-407 and the GO-411 offer 22 pages of local alpha storage, up to 52 lines of text, 256 colors from a palette of 16 million, raster operators and local storage for two full 16-color graphics images. The GO-407 costs $3,795, and the GO-411 costs $5,995.

Graphon, 1901 S. Bascom Ave., Campbell, Calif. 95008.

Barco Industries, Inc. has introduced the **CDCT 6000 series** of 19-in. graphics display monitors.

The line includes four monitors with resolution up to 1,280 by 1,024 addressable pixels. The monitors have a red-green-blue bandwidth of up to 120 MHz and a range of horizontal scanning rates between 15 and 75 KHz.

Options for the CDCT 6000 monitors include rack mounting, an antireflective coating and a tilt-and-swivel mount.

Prices range from $3,100 to $4,900.

Barco Industries, Suite 212, 170 Knowles Drive, Los Gatos, Calif. 95030

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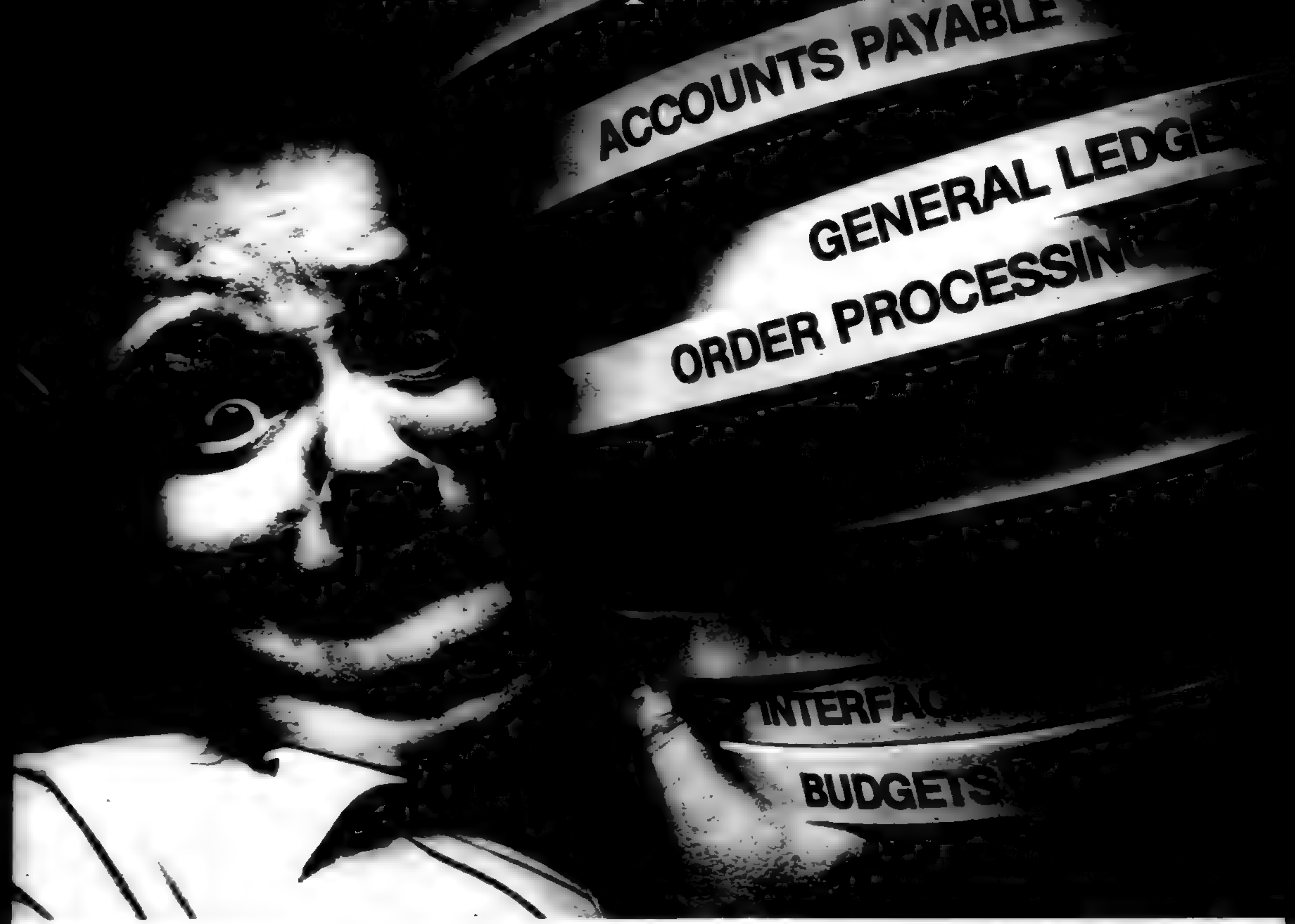

Some large software companies aggressively sell the single vendor idea. Unfortunately, the benefits of using this approach can be far outweighed by inconsistent quality and poor integration across a multi-application product line. Opting for one vendor may force a user to settle for some second-class products that ride on the coattails of good ones.

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Printers/Plotters

I-O Corp. has introduced the **I-O 8210 Procard**, a conversion kit for IBM Proprinters said to allow 80- and 132-col. printers to be used with IBM's System/34, 36 and 38.

The single personal computer card installs in the Proprinter. It emulates a 4214 printer on the System/36 and 38 and a 5224 or 5225 printer on the System/34. According to the vendor, the conversion kit allows for printing bar codes and graphics via IBM's advanced printer function.

The I/O 8210 Procard costs $795.

I-O, 2256 S. 3600 West, Salt Lake City, Utah 84119.

Power supplies

Sutton Designs, Inc. has introduced the **MM-Series** and **F-Series** uninterruptible power supply systems.

The MM-Series is offered in 250W to 1,000W sizes. The F-Series consists of continuous, on-line sine-wave systems and is offered in 3-kVA to 15-kVA sizes. Both series feature built-in extended range surge, spike and noise protection circuitry.

The F-Series systems include computerized, self-diagnostic monitoring and control package for monitoring all system modes, alarm conditions and 12 power parameters. It also creates an outage log.

The MM-Series is priced from $399 to $1,399. The F-Series is priced from $5,995 to $14,995.

Sutton Designs, 300 N. Tioga, Ithaca, N.Y. 14850.

Nova Electric, Inc. has announced a **three-phase 30-kVA**, on-line uninterruptible power system.

The 30-kVA system is said to employ transistor technology in a six-step wave-form design. It includes a static transfer switch and maintenance bypass switch. It also comes with a complete diagnostics package and battery backup. The power system was designed for data processing applications on systems such as IBM's System/38 and Digital Equipment Corp.'s VAX.

The 30-kVA power system is priced at $29,700.

Nova Electric, 263 Hillside Ave., Nutley, N.J. 07110.

Auxiliary equipment

Empire Data Protection, a division of Empire Safe Co., has introduced the **EMC-100** safe, one of the EMC series of safes.

The EMC-100 is said to provide protection against destruction and alteration of information stored on computer media resulting from fire, humidity, water, dust, magnetic disturbances and theft or espionage.

The EMC-100 is priced at $575.

Empire Data Protection, 433 Canal St., New York, N.Y. 10013.

Electro Standards Laboratory, Inc. has unveiled its **Model 8024-D Twin-Axial A, B Switch** for use at the twin-axial interface of the IBM System/34, 36 and 38; 5120, 5150 and 5520 systems; and others.

The product reportedly allows the user to switch any twin-axial port to either of two peripherals or to switch a terminal to either of two ports. The Model 8024-D costs $119.

Electro Standards, P.O. Box 9144, Providence, R.I. 02940.

Maintenance equipment

Micromax Corp. has announced the **Model 100**, a hand-held test set designed for off-line testing of both serial devices and parallel printers.

The Model 100 is said to feature a microprocessor that is controlled by an erasable programmable read-only memory-based program.

It costs $349.

Micromax, P.O. Box 438, Berlin, N.J. 08009.

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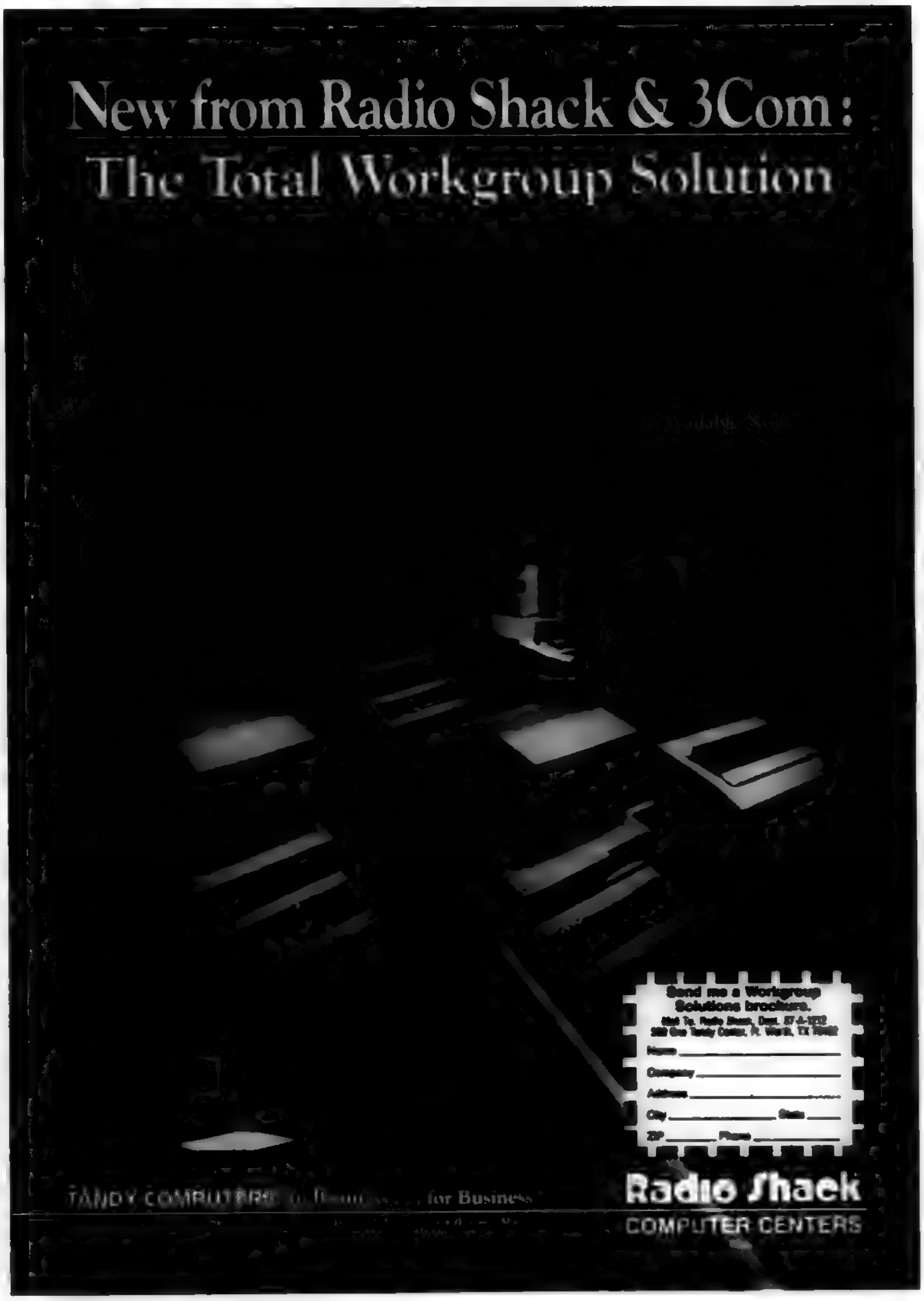

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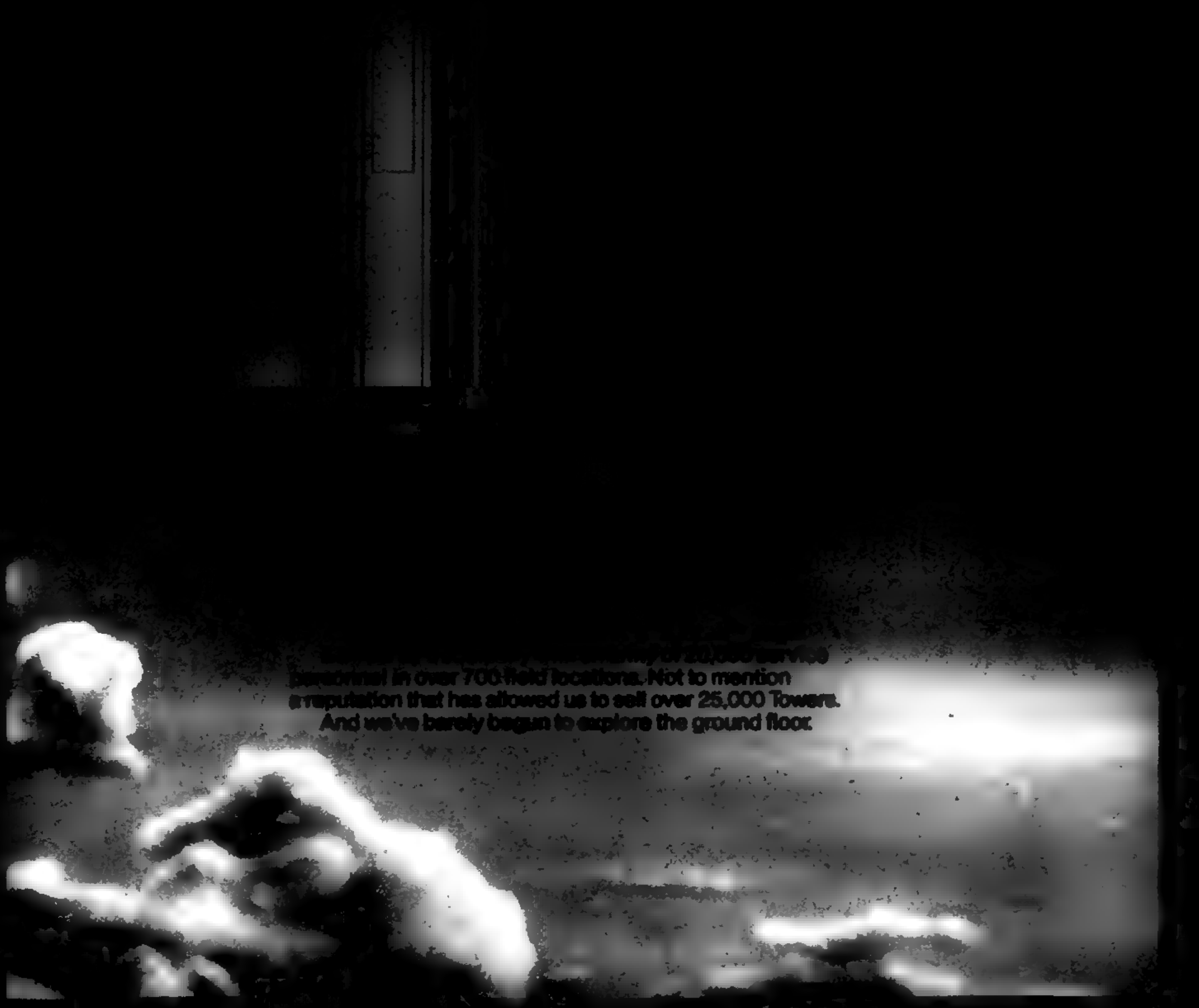

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68020
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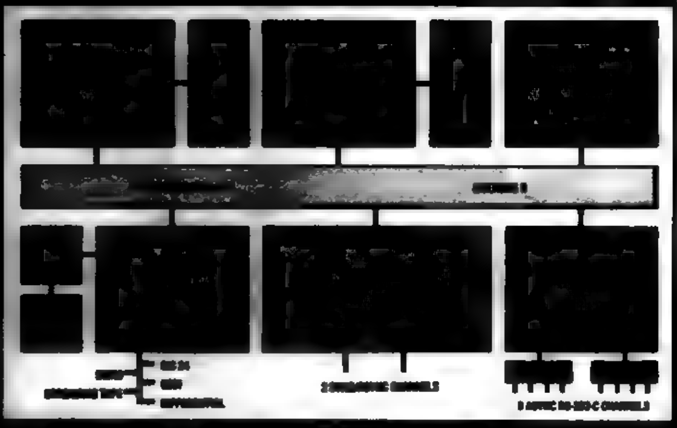
[illegible] POWER TO ADD PROCESSORS. [illegible] AND WHERE YOU NEED THEM.

At the heart of the NCR Tower 32/800 is an architectural [illegible]through of colossal proportions. A loosely-coupled, [illegible] processor architecture that lives up to the [illegible] multi-tasking powers of our distributed UNIX. [illegible] based on an ingeniously logical idea. [illegible] depending on one central processor to do more [illegible] of work by itself, the Tower 32/800 off-loads [illegible] distributes processing to intelligent 680XX-series [illegible] dedicated to their own specific tasks. [illegible] provides disk cache, and manages [illegible] to disk traffic. The terminal processor [illegible] (32-128) terminals you hook up. The [illegible] processor provides control for [illegible] and others. And the Ethernet LAN [illegible] area network traffic.



Which frees the applications processor to do its job: run applications and coordinate the workload among the other processors.

All of them work independently and in parallel. Communicating over Multibus II sending [illegible] at a 40 mega- [illegible] transfer [illegible] an [illegible] computer. [illegible]

[illegible]ULAR DESIGN [illegible]S BUS[illegible]SS SENSE.

[illegible] simple to [illegible]

[illegible]ped VLS[illegible] broad technology [illegible]ved us to [illegible] functionality into [illegible]ght, compact, [illegible] cabinet.

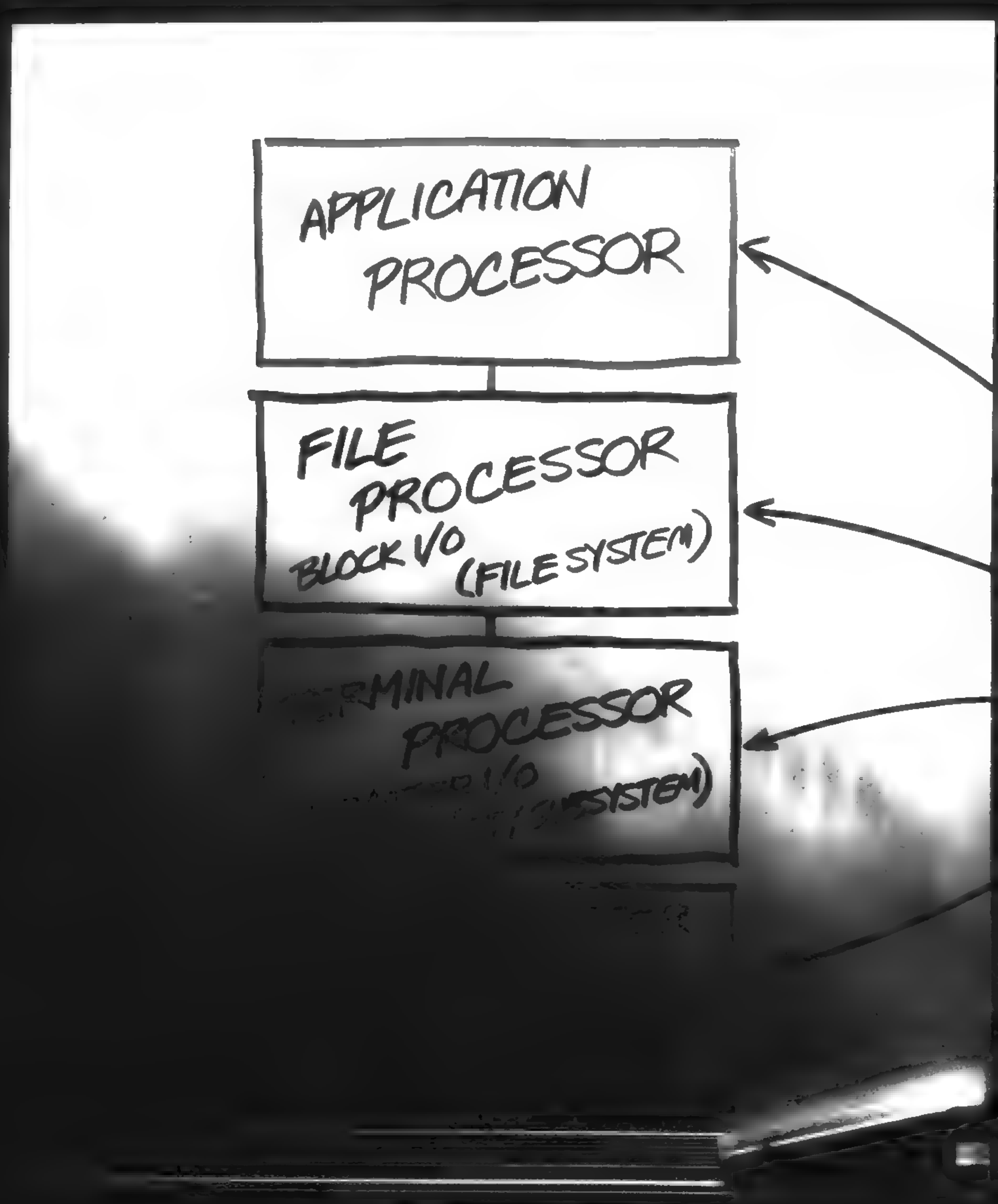
We [illegible] the [illegible] drives into removable cassette m[illegible] change, or service them, just pull them out [illegible].

We've eliminated the[illegible] carrying [illegible] internal communication[illegible]es.

All external cables mount directly to [illegible], so there are no separate bulkheads.

It co[illegible], and you ca[illegible] the rear doors fro[illegible]de, or remov[illegible] for easy [illegible]

[illegible]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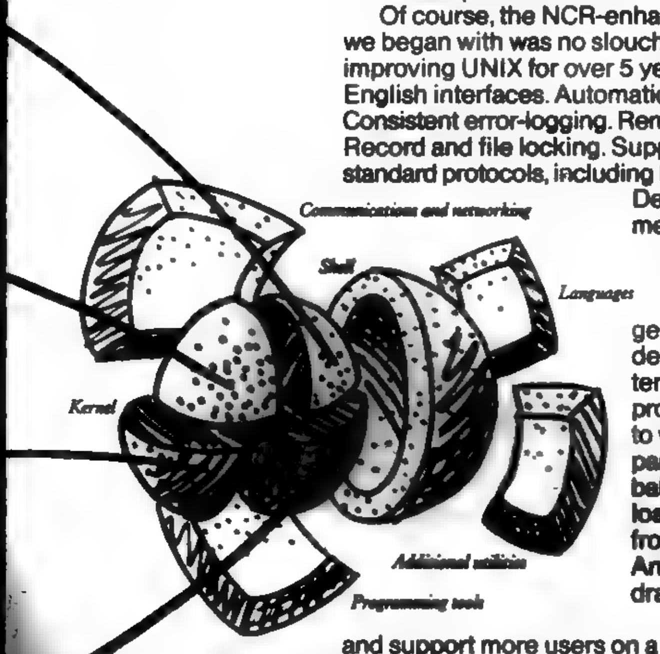

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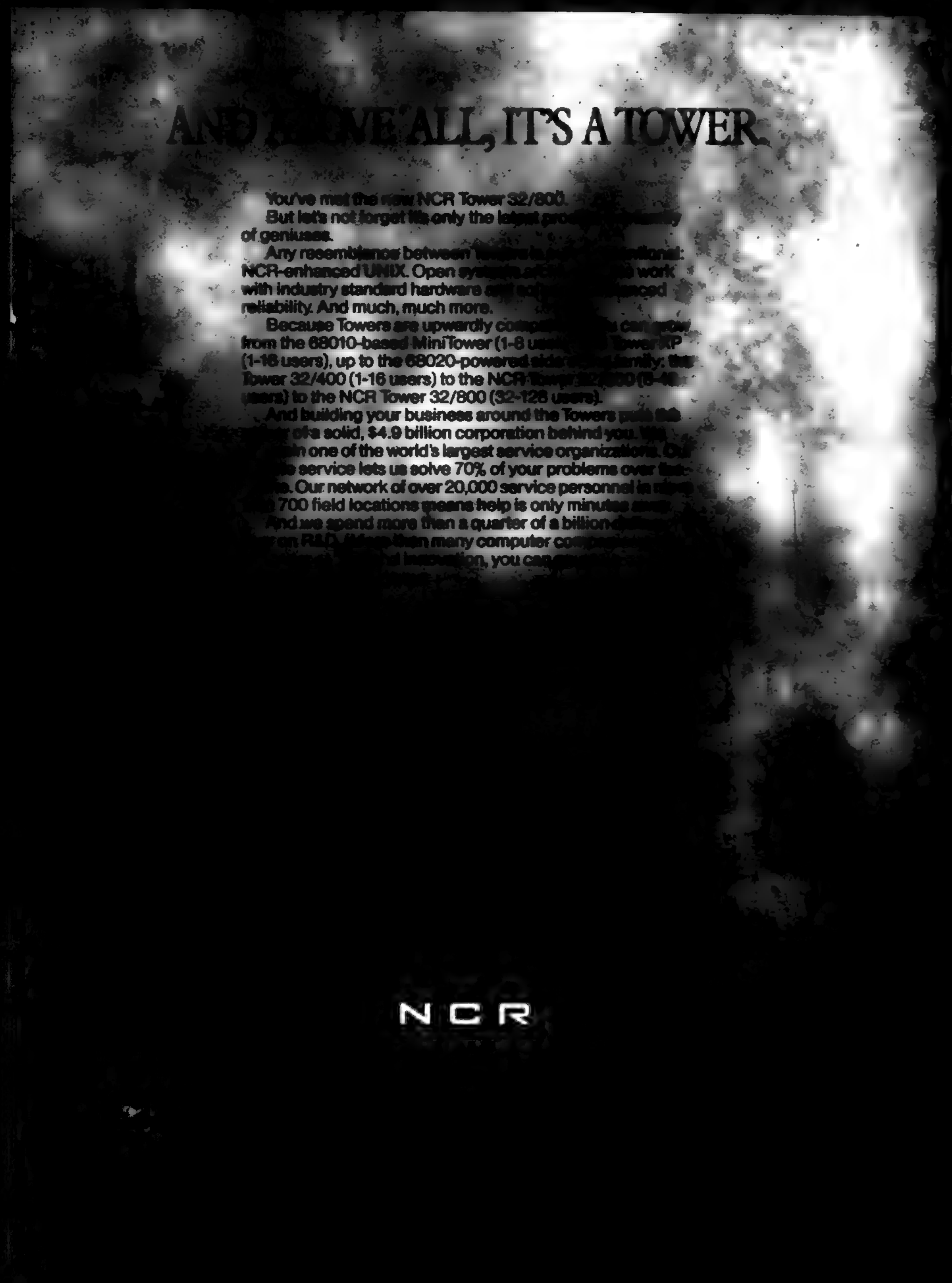
The Tower 32/800's Visual System Administrator program gives the less experienced user plain English menus to work with. While the experienced UNIX guru can enter commands at his or her own blistering pace.

The expandable Tower 32/800 with distributed UNIX. The whole is greater than the sum of its parts.



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Communication	(1) 68010 (1) 8085	1MB RAM*	4
Local Area Network	(1) 68010 (1) 80186	1MB RAM*	1

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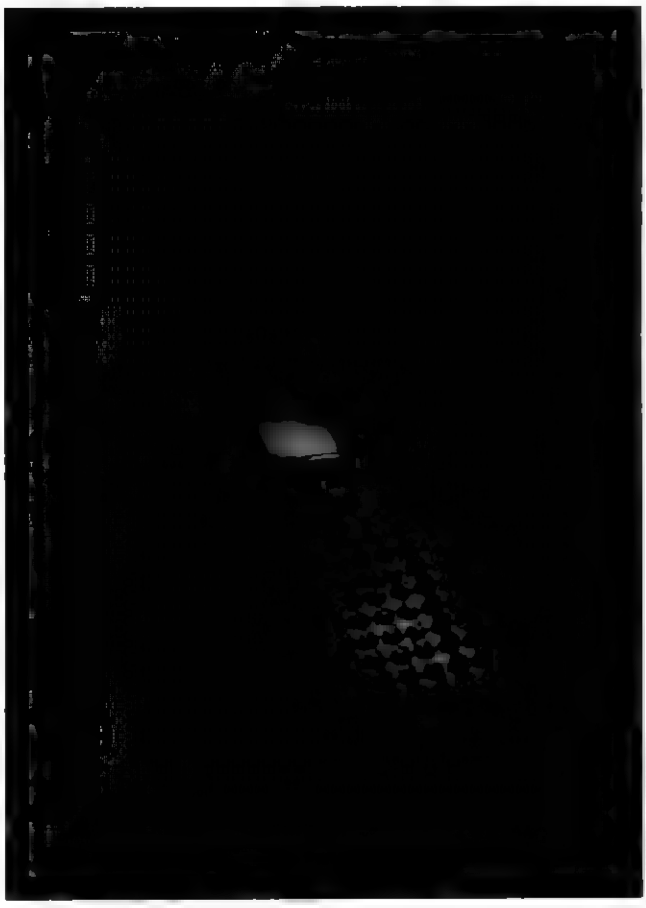
EXECUTIVE REPORT

TECHNOLOGY IN BANKING

Technology in banking: Who is cashing in?

BY GLENN RIFKIN



P. CHARLES LAINDUCFUR

INSIDE

High tech aids a troubled Bankamerica PAGE 66

Interview: Banc One exec on change PAGE 69

Are banks on track with expert systems? PAGE 72

Branch automation fuels technology fire PAGE 76

"For 30 years, bankers lived by the three-four-three rule," consultant David Gilbert says. "Borrow at 3%, loan at 4% and go home at three o'clock: But now banking has been redefined, and the walls are coming down."

As the banking industry awakens to the competitive realities of deregulation, the idea of banker's hours has radically changed: It means 24 hours per day following the sun — as it shines on the world's financial markets. The key to competing in this new environment, according to Gilbert, president of Banking Decisions Systems, Inc., a Waltham, Mass., consulting firm, is the effective and timely implementation of technology. And right now, Gilbert insists, except for a few organizations, banks are missing the technology boat.

"The transition from an environment of regulation and stability to one of deregulation and instability has shown that information systems put in place before deregulation are simply not able to handle the change," Gilbert says. "It's shocking how much banks don't know."

Although the top-tier banks such as Citibank, N.A., Bankamerica Corp., Chase Manhattan Bank, N.A., Mellon Bank, Banker's Trust Co. and Banc One Corp. have poured resources into leading-edge banking systems, bankers and consultants agree that the vast majority of the country's banks are not technically prepared for today's marketplace.

Major concerns include the following:

- Banks that invested heavily in "back-shop" automation are not able to use those automated accounting systems to provide the management information needed to gain a competitive advantage.
- Integrated software application packages designed to provide "a bank in a box" have not fulfilled their early promise and have left MIS executives wary and cautious about this solution.
- Electronic transaction systems for applications such as direct deposit are seeing only limited use, and banks, content with an inexpensive checking system, are not pushing this technology.
- As regional and interstate barriers come tumbling down, banks must find better methods for data communications by consolidating individual networks to improve branch banking beyond the automated teller machine and platform teller applications.
- Deregulation means greater decentralization for banks and puts an emphasis on smaller distributed systems and networks that provide for more effective branch banking.
- Global banking is now infringing on markets long held by U.S banks, thus challenging the banking industry with potential problems similar to those that have struck manufacturing
- MIS executives in banks must continuously push senior management to understand the use of information systems as a strategic weapon.
- With deregulation and technology combining forces, the big banks grow larger and more menacing while the country's second-tier banks struggle to survive in a newly competitive marketplace.

The verdict please

And the results are already coming in. Mergers and acquisitions abound as the superregionals and giant national banks swallow the smaller banks. International banking and financial firms are making inroads into the U.S. market and taking market share from regional and local banks.

According to William Synnott, director of information systems and services at Bank of Boston Corp., complete deregulation of interstate banking in the next five to seven years will cause the number of banks in the U.S. to shrink from the current 15,000 to just a few thousand in the 1990s. "As we are able to cross state boundaries, the facilitator is going to be electronic banking, not bricks and mortar," Synnott says.

Meanwhile, the promise of the bank of tomorrow remains unfulfilled. The banking industry pioneered the use of mainframe computing for number-crunching in the 1950s and invested heavily in accounting systems throughout the '60s and '70s. The emphasis, however, was squarely on the labor-intensive, productivity-enhancing capabilities that reduced costs

This automation of the back shop, ironically, is partly to blame for today's shortcomings.

According to Phil Giaquinto, senior vice-president for global

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Rifkin is a senior editor for *Computerworld*

Cashing in

FROM PREVIOUS PAGE

electronic banking at Chase Manhattan Bank, the early commitment to commercial DP equipment allowed banks to be leapfrogged by a generation of technology. "Banks installed automated accounting systems so early, before such things as data base management systems existed, that it has not been an easy task to take advantage of new hardware and new software," he says. "By being a pioneer into technology, banking lost a chance to easily implement new systems."

Although many top-tier banks have made the transition to modern technology, there are a lot of banks still using 10- to 15-year-old systems, and the evolution for them will be more difficult.

"It's only in recent years that we've begun to look at technology as a revenue generator rather than as a cost-cutter," Synnott adds. "And there are still a lot of managers who have the old view and just haven't gotten the vision of how systems can be used competitively."

Futurists who, in the 1960s, predicted a checkless and cashless society have been proven dramatically wrong. And more recent predictions have also come up short: According to Osman Eralp, senior technical analyst with Hambrecht & Quist in New York, the deregulation fever of the early 1980s was flush with visions of full-service banks with sophisticated products ready for eager customers. Customers could expect discount brokerage services, travel services, financial planning and such innovations as home banking, point-of-sale services at stores and other offerings not usually associated with banks.

Unfortunately, the hype was not met with much enthusiasm or support. "Consumers got smart," Eralp explains. "That's not what you go to a bank for. You go to a bank to borrow money or to keep your money safe."

"There is a point where you can't push customer acceptance anymore," adds Arthur Gillis, a banking consultant based in New Orleans.

The role of MIS

If banks and their customers are, in fact, not getting as much from today's technology as they could or should be, the obvious question is: Who is to blame? Does the responsibility fall on MIS?

Gilbert says he believes that technology is a partnership issue. "It is far too easy to blame MIS," he states. "MIS needs the input and direction of executive management. Management must effectively communicate the needs the bank is going to have both strategically and tactically."

In this marketing-oriented environment dictated by flourishing customer service needs, MIS needs not only to implement systems but to be able to visualize market opportunity. Senior management needs to work with MIS to understand the technical possibilities.

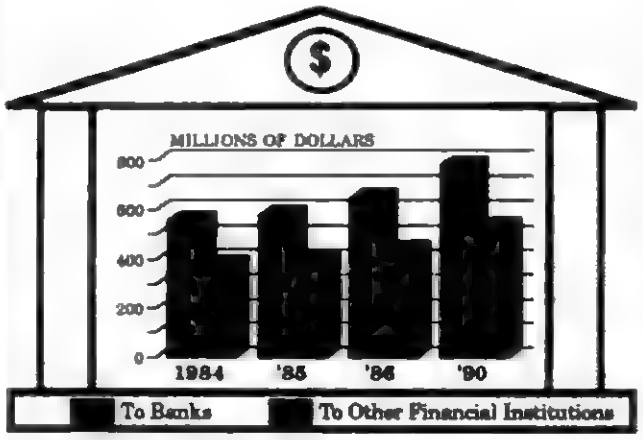
At Texas Commerce Bank-Houston, N.A., the fourth largest bank in Texas, Ben Kuenemann, executive vice-president and group manager for technology marketing, insists that it is MIS's job to sell the benefits of information systems to management. "Management is not aware of the potential of automation," he says. "It's difficult for management to accept the old 'trust-me' approach from MIS. MIS can't hide behind the mystery of our business — that causes executives not to trust us. If we can't talk to them in language they can understand, then we're not doing our jobs."

MIS executives and banking consultants agree that education

Continued on next page

Shipments of large-scale processors to financial services institutions

As banks turn toward distributed processing, the need for large-scale systems will grow slowly



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Troubled Bankamerica looks to technology for financial relief

Nation's second largest bank stocks its arsenal with information systems

Bankamerica Corp., the troubled San Franciso-based banking giant, is fighting an uphill battle to regain its lost luster.

Saddled with billions of dollars' worth of bad loans and problem assets, the nation's second largest bank lost more than $800 million in 1985 and 1986 combined. As if that wasn't enough, Bankamerica just emerged from a trying takeover struggle with First Interstate Bancorp of Los Angeles — a skirmish that for now, at least, has left Bankamerica independent but vulnerable.

Despite its woes, the bank does have a strategic weapon left in its arsenal: information technology. During its rise to prominence, Bankamerica quickly recognized the importance of information systems and spent billions on equipment and research and development in the early 1980s.

> "TECHNOLOGY per se does not impact the bank in the same way as managing its loan portfolio. The major business of a bank is borrowing and lending money, and losses get a bank in trouble. No bank has gone broke by spending too much on technology."
>
> BOB JAMES
> SRI INTERNATIONAL, INC.

Although it pulled back dramatically in some technology areas during its recent troubles and saw info systems whiz Max Hopper leave in late 1985 to return to American Airlines, Bankamerica has a solid technology foundation in place.

According to Bob James, a financial services industry expert and a senior consultant at Menlo Park, Calif.-based SRI International, Inc.'s Center for Information Technology, Bankamerica continues to enjoy a reputation of being on the leading edge in the adoption of technology. In fact, he points out that the bank has more technology in place than it can effectively use.

"Even before Max Hopper joined them, the bank was spending heavily on technology," James says. "And though they've scaled back, the infrastructure is a very prime asset of the bank; in a sense, it is an undervalued asset. It makes Bankamerica strong in terms of future capabilities, if they can turn the loan portfolio situation around."

James points out that the technology base at Bankamerica is stronger and more sound than at most other banks in the country. Although Hopper took a few key employees with him when he left and though personnel cuts cost MIS as well as other areas of the bank, the MIS staff retains high-quality professionals, James says.

In addition, the very size of Bankamerica — a bank with more than $100 billion in assets — affords it an economy of scale in per-unit cost that most banks cannot match when it comes to transaction-level systems.

In retail and consumer banking, the bulk of technology is devoted to automated teller machines, platform teller systems and other large transaction systems.

Since these require "large iron and massive communications," the larger banks enjoy a greater economy of scale than second-tier banks, James says. He says he does not, however, believe the technology base will be a major factor in Bankamerica's turnaround. "How a bank manages its non-interest-bearing expenses such as DP is a good measure of how effective that bank is running," James says. "But technology per se does not impact the bank in the same way as managing its loan portfolio. The major business of a bank is borrowing and lending money, and it is loan losses that get a bank in trouble. No bank has gone broke by spending too much on technology."

Pro-technology stance

Bankamerica is publicly taking a strong pro-technology stance. Although Lou Mertes, executive vice-president of Bankamerica systems engineering, was unavailable for comment, a bank spokeswoman says that Mertes and the bank believe that technology and its application "are absolutely critical to the bank as a way to help cut costs and generate revenue. The organization is strongly focused on specific projects to help the business units meet their goals through the use of technology."

The bank will not reveal current budget figures, but the estimated $5 billion designated for a five-year strategic business plan in early 1985 has no doubt been significantly reduced in these troubled times. Reports that the bank is centralizing its computer operations due to its problems are inaccurate, the spokeswoman insists.

All technology units and data centers — except for a few application areas within divisions — were organized under Bankamerica Systems Engineering (Base) in 1985, she says, and in early 1986 those application units were brought in to Base according to the original plan and not because of to financial problems.

Scaling back

Like several other large banks, Bankamerica mistakenly anticipated rapid growth in such areas as point-of-sale and interstate banking, neither of which has developed at nearly the rate that strategic planners predicted. Much of the reduction that Bankamerica has had to undertake in its DP arena is likely related to earlier overspending in these unfulfilled technologies. "The major portion of areas scaled back in DP don't relate to key day-to-day operations," James maintains. "They've cut back in R&D spending that may only have future payout."

As Bankamerica attempts to regain operating profitability and cut its retail bank expense rates, it can rely on a foundation of information systems that should make the task less formidable. Having already made its major investment in technology, it should, through the existing systems base, bring in the new applications necessary to manage the loan portfolio without additional spending, according to James. "Another bank without that base would be facing major investments to bring about a turnaround," he says.

James adds that Bankamerica can easily keep up with shifts in banking technology by investing in integrated software packages and other leading-edge offerings. "They are not shorting themselves on those things. Bringing in another IBM 3090-200 is just a blip for a bank as large as Bankamerica."

In the long run, technology will be a factor in Bankamerica's turnaround attempt, but good solid banking remains the key. "Technology in and of itself simply does not have nearly the leverage that effective management of the loan portfolio does," James points out.

GLENN RIFKIN

Cashing in

FROM PREVIOUS PAGE

is a more important factor than the systems themselves and that throwing technology at a problem will not solve anything. "We spent a lot of time trying to educate senior management as to how technology can impact the bank positively," Synnott says. "We now have a management that is enlightened to the point where they believe that technology can be a potent force. What they lack is the knowledge of how to bring that about. There has to be a lot of contact between the top systems people and the business managers."

In a time of great flux due to deregulation, a problem that many bankers face is simply articulating their needs to MIS. Consultant Gillis often finds that bankers don't know what they want or need. "There is a tendency to think that a magic black box will solve all the problems," Gillis says. "Because of this, the MIS guy needs to become more of a businessman."

Not all banks are willing to make the MIS executive a member of the planning team. "You have to communicate with management that there is a need to understand where the bank is heading strategically," Kuenemann says. "If you are turned down, you should pack your bags because you are probably topped out at that bank."

Coping with size, change

Synnott insists that one major obstacle for MIS is stabilizing the basic systems structure in order to move forward. As the business grows and changes, however, that becomes difficult. "Things move so fast that you never seem to be able to get past the day-to-day job of keeping the system running," he explains. "No sooner do you think you have a fairly stable environment than the bank goes out and acquires another bank, and you've inherited all their systems and data processing, which has to be absorbed in some fashion."

Another basic problem for MIS lies in the size of the bank. The nation's largest banks, like Bankamerica, have all made sizable investments in technology (see story page 66). As the barriers to interstate banking fall, market share will no longer be determined by state but by national holdings. But the majority of the country's commercial banks and thrifts are small, local operations hoping to avoid takeover or mergers with the onrushing wave of giant bank holding companies or superregional banking conglomerates.

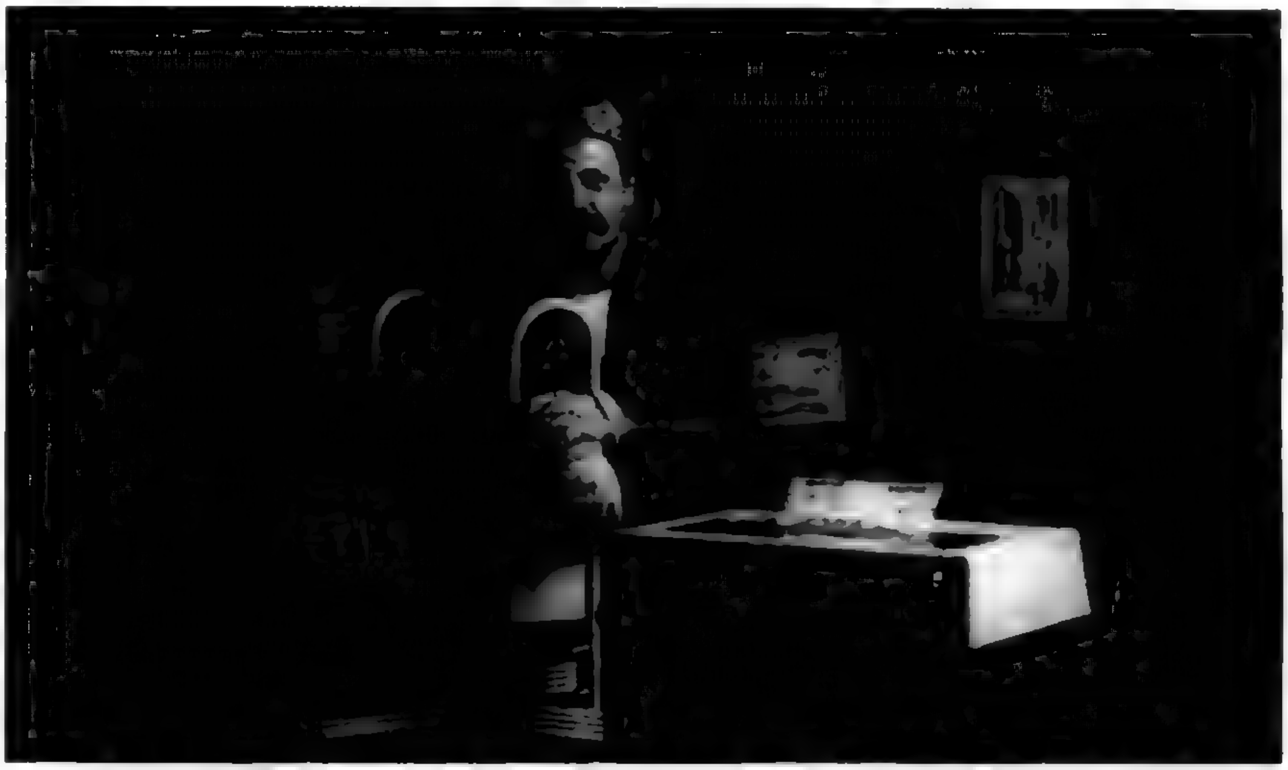
For these small banks, the use of information systems may be limited. "What's good for Citibank may not be good for a smaller bank," Eralp says. Many have already turned to service bureaus for their DP needs. For large banks with assets of more than $1 billion, better information can always improve the business decision processes, but for smaller banks, the options may be limited. Service bureaus provide an alternative but generally leverage their approach by running common systems across a large number of banks, thus leaving little competitive advantage for each individual bank.

As in any industry, banking's technology problems vary according to bank size, location and business focus. Bank of Boston, for example, is the largest bank in New England with $34 billion in assets, and Synnott says he believes it is unfair to characterize the bank as a single entity when discussing technology. The bank, he says, is actually a collection of five businesses including retail, wholesale, international, real estate and treasury and investment banking.

"There are businesses within the bank that have gained more of a competitive advantage with technology than others," Synnott explains. "There are certain businesses that are technology driven, supported by what I call 'super systems.' For example, a stock transfer in a business is largely a matter of tracking the issuance and cancellation of shares. It is a heavily technology-driven kind of business. Those that have had the best systems seem to have captured the business. There are, in fact, only five major banks in the U.S. holding 60% of that market."

At Bank of Boston, the

Continued on page 70



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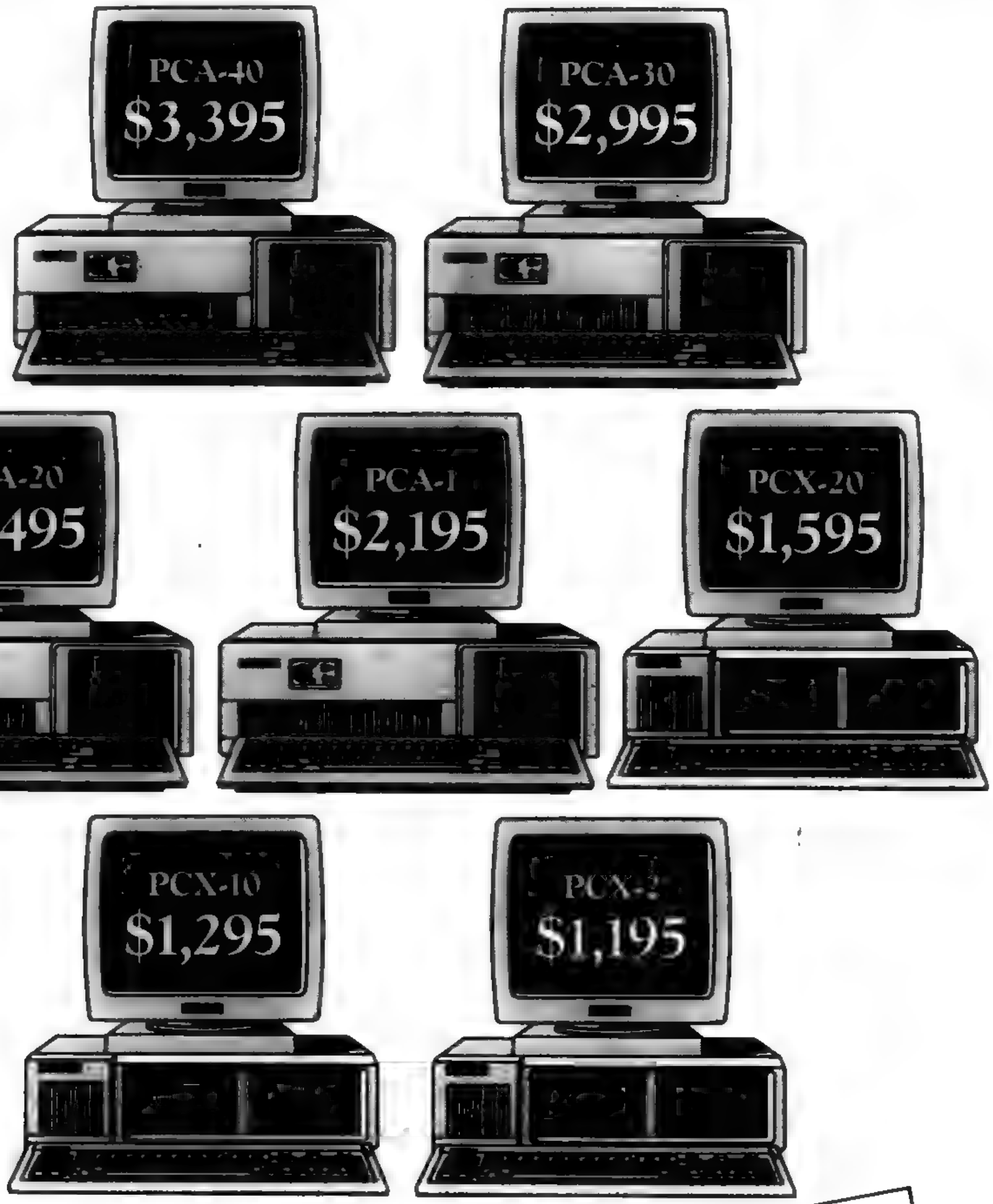

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Interview

Blazing banking trails

John Fisher is the force behind Banc One Corp.'s drive into technology. Since 1960, the senior vice-president has been a proponent of leading-edge information systems, making Banc One a clear-cut winner in marrying banking with technology.

John Fisher recently spoke with *Computerworld* Senior Editor Glenn Rifkin.

What do you think of the charge that banks are not employing technology effectively enough to gain a strategic advantage?
Some of the criticism is valid, based mostly on the false starts of major software vendors such as Hogan Systems, Inc. and Anacomp, Inc. — companies that held out great promise of being able to deliver the integrated processing capability that we need. That that type of software system was not born was more a criticism of the software industry than of banking.

Now it looks like the Hogan product will be delivered as promised more than a half decade ago, and we and Norwest Corp. have joined with Electronic Data Systems Corp. to bring to the market the kind of system that we thought we were going to have all along.

Doesn't banking have to take some of the blame?
Sure. We probably created much of the downfall of Anacomp and the difficulties with Hogan and others simply because we were so damn demanding, not knowing some of the preciseness we wanted in the future processing systems. But we don't have today what we hoped to have had five years ago. So we are having to go back in and restart. It's held up branch automation to a major degree. But I think the industry is now moving toward more advanced integrated processing capability and on-line information retrieval capability.

Some say that banking is a slow, conservative environment. Has this hurt its use of technology?
I think that's bull. The industry is conservative, but I don't think it's regressive, if that's what that criticism suggests.

Banking is conservative in its management, mostly because of the product that it provides. It deals in people's livelihoods and their futures, and so it requires a certain conservative approach as opposed to what a retailer would have to do, as an example.

But I don't think banking can be relegated as a regressive, noninnovative industry. We have been one of the early leaders in urging and formulating DP requirements.

Banc One invests heavily in research and development for information systems. What do you get out of being a pioneer?
There is the learning experience, which allows you to employ what you've learned more efficiently or quickly than your competitor. So there's that direct expectation. But then there are some collateral benefits, which I think are even greater than the direct benefits. The collateral ones have to do with the prominence that you are able to establish for yourself and thereby attract talent.

There's also a notoriety within the investment community. How do you get a financial analyst from New York to pay attention to what the hell is going on out here in Columbus, Ohio? You have to be able to wiggle your ears. P. T. Barnum used that phrase when talking about being able to draw attention to yourself. One of the collateral benefits of what we've done and what we do is to wiggle our ears.

What do you spend on R&D?
From 1% to 3% of after-tax profits on an annual basis.

Was that a difficult sell to bank management?
As a matter of fact, the energy for R&D got under way in the mid-'60s, so we have a long-standing track record of believing that this is the proper way to give the forward tilt to our organization. The R&D expenditures developed were mostly due to the early leadership we gave to the credit card. We started that business in 1966. And we were able to build a business plan that allowed us to move into the data processing of credit cards for other banks.

John Fisher, *senior vice-president, Banc One Corp.*

Does MIS have to champion this entire effort?
I don't know that it is an MIS guy that we are talking about here. I think it's senior management. The R&D marketer, or wherever the champion for R&D is located, ought to have the ear of senior management. It is senior management that is concerned about the direction of the organization. So senior management is the director of R&D as I look at it, not the MIS guy.

Now they may be one and the same, or R&D may be championed by MIS. But it's more likely to be on the marketing side, because the marketer is the guy who is trying to figure out where the market is: "Where is it headed? What can I expect them to want of me? What are the products I can deliver?" And that's mostly research, development, exploration, innovation.

You are a big proponent of the all-purpose debit card, but that does not seem to have caught on as once anticipated. Why not?
The all-purpose debit clearly has not been brought to the market. Today we have a separate automated teller machine debit identification mark and systems represented mostly by the regional switches and by Cirrus Plus.

My expectation is that we should have built an all-purpose debit service competing with the check and provided as a companion to today's credit card an all-purpose credit system. I think that's how it will evolve.

You've said banks are not just handling transactions, they're selling services. Is this what banking has become?
Our history in banking has been to efficiently handle transactions, and that's how we've won the right to provide the demand deposit service. That's been the principal core product of banking. But that product has no exclusivity now — savings and loans, credit unions, insurance companies — all kinds of people can provide that kind of service. Therefore it is no longer the unique bank franchise it was.

So banks have had to find other ways to generate revenue. And it is the sale of other services that the banking industry is now struggling to do. We have trust, travel and brokerage services — peripheral products being delivered aggressively in what used to be only a transaction environment, a bank lobby.

The emphasis in the past has always been on the teller. But that's changed now. The sales force is able to sell individual retirement accounts, mutual funds, money markets, investment counseling — products of the future — while retaining the importance of the transaction. ●

Cashing in

FROM PAGE 67

commercial finance business has prospered due to technology. Both effective credit management and record-keeping management systems allow the bank to make a profit and grow in a business that has been a losing proposition for many other banks. "Others don't have the economy of scale or the system to support it," Synnott says.

Synnott also points out that possessing the technology does not always ensure an advantage. In the area of cash management systems, for example, virtually everyone has jumped on the bandwagon, so even the early leaders are now hard-pressed to gain any advantage in that market.

"It is significantly more difficult to come up with a product in commercial finance or stock transfer. It requires a much larger investment over a long period of time. The key is to find something to make you unique and different while at the same time giving you the lowest cost product that the competition can't quickly match," Synnott states.

Integrated software packages

The early '80s brought promises of innovative integrated software application packages from such companies as Hogan Systems, Inc. and Anacomp, Inc. While Anacomp simply could not deliver, Hogan's Umbrella offering was cost- and labor-intensive, and the company offered no service or support for its complex product.

Faced with implementation schedules that often spanned five years, many banks turned angrily to Hogan seeking help, and the company, unable to answer the call, stumbled badly.

"I suspect that clients who bought the Hogan product seven years ago probably had a rough time installing it," admits Richard Aldridge, Hogan's executive vice-president of field operations. "If there's one indictment of Hogan now that is justified, it's that the product is so flexible that, in many cases, banks can't handle it. That is because the banks don't know how they do their own business, and they can't be asked to make all these decisions. We are trying to tighten down and deliver a more complete product, like a 'bank in a box' concept."

Although Hogan has since recovered and is briskly selling its products through an agreement with IBM, the promise of the integrated package remains unmet in many bankers' minds. And having been burned once, they are reluctant to try again. Others believe the perfect integrated package simply does not yet exist (see chart page 74).

"Integrated packages have never quite made it," Synnott says. "There is a big push to do it, and there's a big market for it. The biggest obstacle is that there is no single package available that is totally done and ready. And to scrap everything you've got and convert to a whole new system that is not all there is not an easy task."

Undaunted, a spate of software companies have leapt into this market. Vendors such as Hogan, Uccel Corp., Software Alliance Corp., Florida Software Services, Inc., Systematics, Inc. and soon Cullinet Software, Inc. and Electronic Data Systems Corp. (EDS) predict much promise in this area. According to research firm International Data Corp., this market will reach $1.4 billion by 1990 (see chart page 79).

> "IT IS the rare bank that acknowledges that investing in information is investing in a valuable asset."
>
> DAVID GILBERT
> BANKING DECISIONS SYSTEMS

EDS has jumped in by signing up such innovative banking companies as Banc One and Norwest Corp. to help create its integrated software product. "Our role in the venture is to identify how processes and procedures work within the bank," says John Fisher, senior vice-president at Banc One. "Once these procedures have been flowcharted, models can be built, and then software can be specified and coded as a result of that modeling." Fisher points out that Banc One has long been a Hogan bank but never got what it wanted from Hogan and decided to help build its own packages.

"The market is definitely there," says Steve Dark, vice-president of sales and marketing for Software Alliance in Berkeley, Calif. "EDS and Banc One wouldn't be in there if there wasn't a viable payback. Integrated packages will give the banks what they need, but we must set a reasonable level of expectation. The

Continued on page 74

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Can AI vault into banking industry?

BY BILL MARTORELLI
and JOHN HOSKINS

Without high technology, the face of modern banking would be unrecognizable. And because of the industry's historical dependence on computers, it seems logical that banks would be among the first to exploit the strategic potential of artificial intelligence and its most popular subcategory, expert systems — computer programs that duplicate human problem-solving techniques.

Over the long haul, banking will be one of the industries that will benefit most from this technology, as long as the needs of bank developers are met by tool vendors and expert systems application vendors.

Today, however, the promise is only just beginning to be realized.

Why is the industry lagging in its expert systems exploration? Partly because of the conservatism of banking. The perceived immaturity of the technology has prevented some cautious banks from taking the plunge.

Most banks, like many companies, have been unwilling to make a large investment in AI if a clear and thorough payback cannot be foreseen. The technology is of interest, but even banking MIS pros who have developed their own expert systems have had trouble justifying them on the basis of return on investment.

Economic justification for those banks just now delving into the area will be exceedingly hard to come by. The development of adequate return-on-investment measures for expert systems will be important for the future exploitation of the technology.

Trends hard and soft

The data processing environment in banking is dominated by systems from large vendors like IBM and Digital Equipment Corp. Bankers are often not highly receptive to special-purpose hardware and AI languages, which they perceive as exotic.

Instead, they are eager to embrace tools that run on familiar equipment, including IBM mainframes, the DEC VAX and the IBM Personal Computer.

A variety of AI delivery options within the conventional computing environments has begun to emerge. However, the use of high-end tools that require special training or experience with LISP — a widely used AI programming language — will likely be examined carefully by banking MIS professionals before being implemented.

Personal computers are of particular interest to MIS for low-cost investigation of expert systems and for the development of small applications that can be completed quickly. But the major role of the PC within banking AI will be as a delivery vehicle, and its role will accelerate with the emergence of Intel Corp. 80386-based microcomputers.

There is considerable ambivalence among bankers about the desirability of prepackaged expert systems applications. Many of the largest banks do not seem interested in purchasing these packaged applications at all, but instead choose to develop their own.

First Chicago Corp., for example, has been working on an expert system with an asset-based lending application.

Smaller banks, on the other hand, appear more willing to consider prepackaged systems, provided the products can be tailored to the banks' specific needs.

The requirement of customization should pose little difficulty, because many expert systems applications are sold as kits, to which a user must add specialized problem-solving techniques. The market for such

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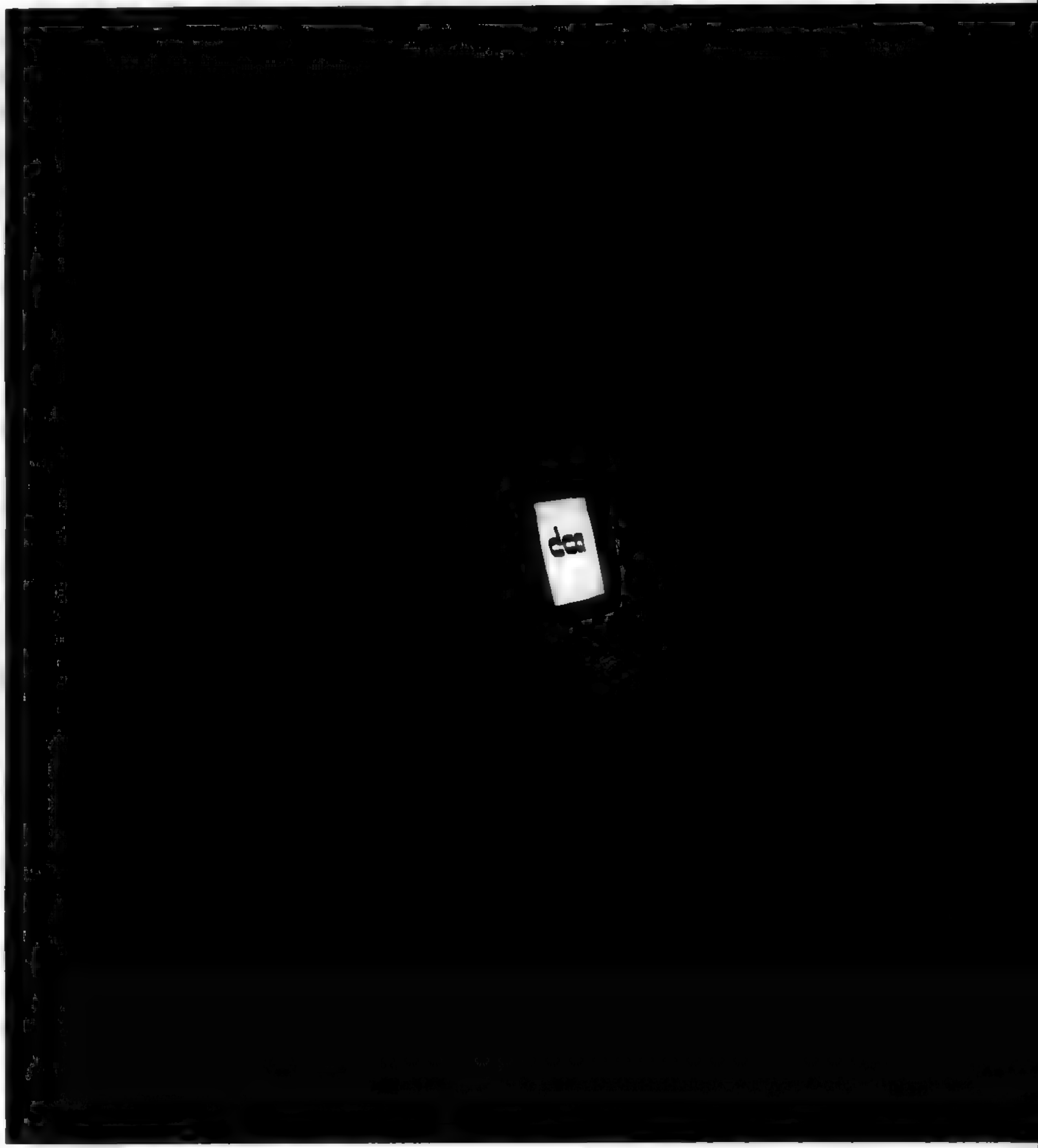
Martorelli is a senior analyst and Hoskins is a research analyst at New Science Associates, Inc., a South Norwalk, Conn., consulting firm specializing in emerging technologies.



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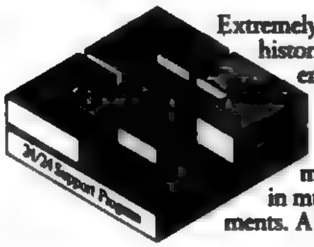

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systems is potentially very large, but burdensome financial, developmental and maintenance challenges await vendors seeking to compete in this market.

Even so, several companies are now offering prepackaged expert systems solutions for the banking industry, including Syntelligence, Inc. in Sunnyvale, Calif., which markets the Lending Advisor. Both Wells Fargo Bank, N.A. in San Francisco and First Wachovia Corp. in Winston-Salem, N.C., have joined Syntelligence as development partners in banking expert systems. Another vendor, Cogensys of La Jolla, Calif., is developing its own lending package, but its effort is only now coming out of the laboratory.

Two companies are marketing expert systems applications that attempt to format telex funds-transfer messages between banks. The majority of such traffic is now handled by a network, the Society for Worldwide Interbank Financial Telecommunications, better known as SWIFT, which requires that transactions be formatted for transmission in a certain fashion. The process of reading, understanding and formatting such messages is labor-intensive and time-consuming.

Cognitive Systems, Inc. in New Haven, Conn., has developed the Automatic Funds Transfer System — Atrans — which operates on DEC VAX hardware and seeks to reduce the need for telex operators and to increase accuracy. Atrans has been up and running since July 1986 at Citibank, N.A. in New York. More recently, Cognitive has been joined in the market by Citibank Information Resources, another unit of Citicorp, which is marketing a similarly positioned product called the Intelligent Banking Workstation.

MIS in the banking industry is concerned with two broad classes of expert systems applications — those targeted at key business functions and those oriented toward the data center. Trading as an application for expert systems is of particular interest as a way to augment — not replace — a trader's performance, thereby making a potentially vast contribution to profitability. Knowledge-based trading setups will serve as decision support systems with the capability not only to recommend a course of action, but to explain the reasons behind it.

Similarly, knowledge-based portfolio management systems hold the potential of improving the human portfolio manager's ability to maximize a bank's holdings of various investment vehicles. And Cognitive Systems has developed Courtier, a stock portfolio management advisory system, for Societe de Generale de Banque in Brussels. The product is designed to give information and advice to bank customers using a natural language interface in combination with the expert system.

There is also strong interest in applying expert systems to maximize the performance of the data centers and communications networks that are so crucial to modern banking. Applications such as network control and optimization and data center automation and operations support are already under development at some banks and will be increasingly common in years to come.

So which banks are taking the first steps? What is the future of expert systems in banking? While a few examples are evident, it is hard to gauge the technology's industrywide acceptance. A tight cloak of secrecy envelops the expert systems activities of most banks, underscoring the perceived strategic value of the technology and the hotly competitive nature of the industry as well as banking's general unfamiliarity with expert systems. With more experience, banks will come to realize that a competitor's mere knowledge of an existing expert system project does not mean that such an effort could be easily duplicated.

Most banking expert systems efforts are in the early stages. While a few projects are nearing delivery, tools and applications vendors still have their work cut out for them in demonstrating to banks that expert systems technology is not all sizzle. Indeed, opportunities exist for those banks willing to accept the challenge. ●

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Cashing in

FROM PAGE 70

change won't happen overnight."

The packages generally consist of a customer information system, an asset product, a liability product, both time- and demand-deposit accounting systems, general ledger, budgeting and an integrated loan product. They offer banks more communications between entire systems — a chance to view a customer's account as a whole rather than on an account-by-account basis.

Consultants such as Gillis are unimpressed thus far. "All they are doing is plugging the same jobs we did 25 years ago," he says. "Conceptually they are doing the same things using new tools. Big deal."

Roger Schindler, vice-president of Transdata Corp., a Salisbury, Md.-based banking consulting firm, is not quite as skeptical; he says he believes that these umbrella systems are the wave of the future. The current problem, however, is that the packages force the banks to move too fast. "It's a good idea, but banks have a resource problem: The costs are too high, and there are not enough people with the talent to implement the packages," he says.

While each software vendor promises its own advantages, they do agree that the packages remain a tough sell. Dave Iacino, marketing manager at Cullinet, says that prospective customers all display what he calls "a Missouri attitude." "They are interested, but they all say, 'Show me.' Our predecessors jumped into the pool and made a great big splash and said, 'We've got the answers for the banking community,' and then failed miserably. So the banks are still very skeptical," Iacino says.

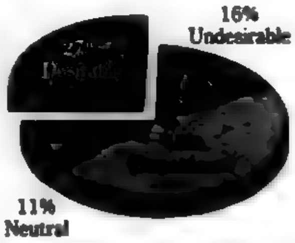
Risk management

Beyond integrated software packages, the question remains as to whether banks are making the transition from back-room to front-room applications with their information systems. Gilbert says he believes that the basic accounting systems, in place for the past 15 years, were simply never meant to provide management information and that the proliferation of ATMs and transaction processing does not indicate a full step forward.

"It is the rare bank that acknowledges that investing in information is investing in a valuable asset," Gilbert states. "To do so is very expensive and operationally complex." Gilbert points to such innovators as Banc One Corp. in Columbus, Ohio, (see story page 69) and Citibank N.A., and praises their research and development commitments to information systems. "But for every Banc One, there are 25 banks not doing what they should," he insists.

Banking software

A January 1986 survey of 1,500 financial institutions showed that acceptance of integrated application software is growing only slowly



INFORMATION PROVIDED BY TRANSDATA CORP
CW CHART

Gilbert chooses not to blame bank management for this shortfall. He says that banks bought the technology they needed at the time and that neither the vendors nor the banks' internal developers could have foreseen the evolution that banking was to undergo. "The only issue now is whether people recognize the problem and start taking moves to correct it," he states. "It is not an instantaneous path of correction."

Specifically, Gilbert identifies several areas of both strategic and operational shortcomings in current information systems. A major area of concern, he points out, is in both interest rate and commercial loan risk management. In interest rate risk management, the lack of detailed

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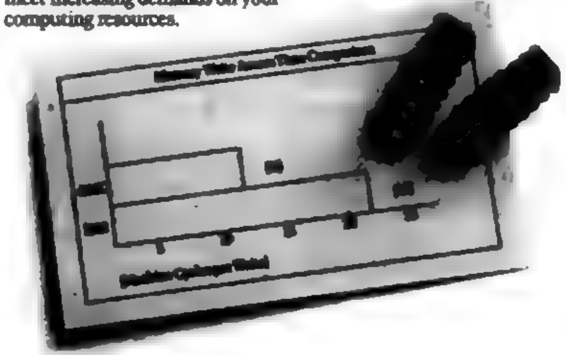

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information on "organizational exposures" puts banks in a precarious position if they cannot determine the risk incurred in their liability and asset management.

"With the systems in place now, banks can get an aggregate picture, but they can't get the detail from underneath without great difficulty," Gilbert says. "The application systems are simply deficient. I'm working with several banks right now on creating bridges between the accounting and analytical environments."

In addition, when it comes to commercial loan or credit risk analysis, banks have excellent accounting systems, but few banks can do detailed portfolio analysis, Gilbert says. A bank wanting to know what its risks were in the agriculture sector, for example, might easily call up its direct loans to farms. But when it searched for its other risk exposures to agriculture-related sectors, such as financing machinery dealers or chemical companies — which make fertilizers — the system would not easily find the relevant data.

"THE KEY is to find something to make you unique and different while at the same time giving you the lowest cost product that the competition can't quickly match."

WILLIAM SYNNOTT
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"If I'm really worried about what the agricultural cycle is going to do to my bank, I want to know all that information," Gilbert says. "How many banks can do that?" Portfolio management systems using artificial intelligence technology are entering the scene, but slowly (see story page 72).

Transactional systems

While the extraction of management information to gain strategic advantage is lagging, it is not the only area of unfulfilled expectation. The use of electronic transaction systems in the march toward a paper-free banking environment has not produced anticipated results either.

Although electronic wire transfer setups — for example, international systems like the Clearing House Interbank Payments System, or CHIPS, and Society for Worldwide Interbank Financial Telecommunications, or SWIFT — have been in place and used effectively for large banking transactions during the past 20 years, the domestic use of electronic banking in a retail environment is not living up to its original promise.

Despite predictions of a checkless society, the check remains a ubiquitous vehicle for financial transactions. In 1986, more than 44 billion checks were written in the U.S. alone. And automatic clearinghouse (ACH) and home banking — ideas designed to pare that number — have done little to alleviate the mountains of paper created by the checking system.

"When I see that the major banks in this country are unable to accept electronic payment, I find that incredible," states George White, president of White Papers, Inc., a Montclair, N.J., consulting firm specializing in electronic funds transfer systems. "You cannot pay Citibank, for example, from a home banking system for a mortgage, credit card payment or installment loan. You think of them as a leader in banking technology, and they don't accept payment other than with a check." White points out that home banking, highly touted with the advent of personal computers, has been a disaster. The few systems that do exist generally slow down rather than speed up the system.

In addition, the ACH — automatic electronic transfer of, for example, payroll and Social Security checks, a 15-year-old idea — has succeeded to some degree but nowhere close to that anticipated. Direct-deposit systems are in place nationwide, but last year only 700 million ACH transactions took place. The number sounds impressive, but White declares the system is vastly underutilized, pointing out that the statistic represents only 2% of the total check volume, and half of the 700 million is derived from existing paper transactions — like insurance drafts — transferred to electronic media.

"The check system works well, and it is cheap, so the banks haven't promoted direct deposit," White says. "The federal government has had tremendous success with direct deposit, getting over 40% of the recipients of Social Security to use electronic deposits. But less than 1% of bill-paying is done electronically today. The banks are nonusers; they offer it to others but don't use it themselves. It's a wasted opportunity."

Not everyone views the ACH as a failure, however. For Chase Manhattan Bank, the leading private sector provider

Continued on page 79

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Banks move to branch automation

Competition in banking industry requires innovative merchandising techniques

BY PETER A. COHEN

In the widening frontier of competitive banking, branches are strategic forward outposts. In addition to their traditional responsibilities for handling routine cash transactions and providing customer service, branches now perform a merchandising role: They are retail outlets for bank products.

Banks understand this new sales role for branches, and they are beginning to take steps to support it with technology.

A wealth of branch automation products are available to the bank MIS manager making purchasing decisions. Automated teller terminals, platform workstations, interactive automated teller machines, sophisticated application software and communications products are all proven applications.

The most significant hurdle for banks to overcome, however, is implementing these technologies.

The bank MIS professional must ask: How can I use technology most effectively, considering the banking habits of retail customers, the changing competitive environment, rapid technological advances and the computer systems already installed?

Testing the waters

Lacking a clear answer to this question, banks are proceeding with caution.

Most small and medium-size banks are still in the observation stages, awaiting the experience of others before committing themselves. These institutions may only now be installing automated teller terminals or ATM networks.

Larger banks are moving more aggressively with branch automation. Many have already instituted teller terminals and ATMs to enhance productivity. Now they are beginning to use systems that directly help the branch sell more products.

Platform automation systems are one example of such sales tools.

Major platform automation system vendors

Company	Product
Bunker Ramo Corp.	Aladdin
L.M. Ericsson	System 2100
ISC Systems Corp.	Pinnacle
IBM	4700
NCR Corp.	BAS 5000
Unisys Corp.	BF 7000

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Found on the desks of platform officers, these setups usually consist of workstations that are connected to an in-branch host controller — typically a small minicomputer — which, in turn, is linked to the bank's central mainframe. The workstation can run applications residing on the in-branch host, operate as a personal computer in Microsoft Corp. MS-DOS or access the mainframe as a terminal emulator.

Baybanks, Inc. in Massachusetts has installed workstations on the platforms of each of its more than 200 branch offices. Berman Technologies Corp.'s Cross Sell application running on an in-branch NCR Corp. Tower minicomputer enables platform officers to simulate for the customer the performance of various financial instruments.

Demonstrating the savings accumulated in an individual retirement account over 30 years, for example, can be an effective selling device.

> BANK MIS professionals must ask: How can I use technology most effectively, considering banking habits of customers, the changing competitive environment and technological advances?

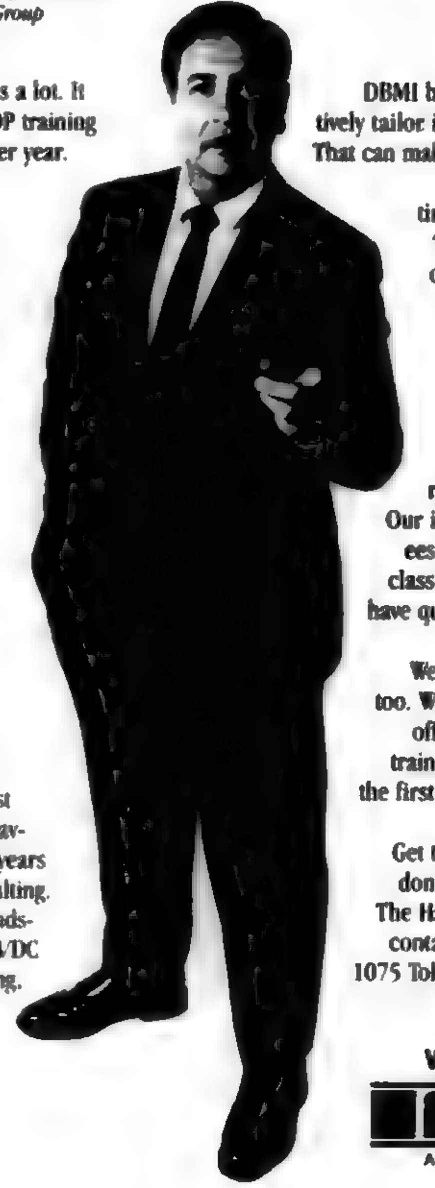
The application also includes a tickler file function, reminding a platform officer, for instance, of a customer's expiring certificate of deposit.

Because the workstation is linked to the central information file on the bank's mainframe, the bank officer can quickly review all of the customer's accounts, thereby serving the customer better and developing a stronger business relationship with him.

There are many platform automation systems on the market, and the bank MIS chief should consider several criteria in the evaluation process:

- **Vendor's experience.** Carefully

Cohen is a senior consultant with International Data Corp., a market research firm based in Framingham, Mass.



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assess the vendor's experience in providing platform automation systems. This is especially important in selecting software. Bunker Ramo Corp., Unisys Corp., IBM, ISC Systems Corp., NCR and others have all established reputations for reliable hardware, including teller terminals, platform and manager workstations and in-branch host controllers.

Many software packages and vendors, by contrast, are not so well established. And the success of the system depends heavily on the software:

- **Support and training.** Installing a platform automation system requires a high level of support from the vendor.

Software often must be partially customized, hardware configurations must be developed for each site and communications links to the mainframe must be built. Remember, too, the importance of effective training. The system will not work to advantage without skilled platform officers.

- **Connectivity and flexibility.** A platform automation system should be able to both communicate with existing branch systems and the central mainframe and to change as the bank's requirements change.

It should be relatively easy to add new terminals, printers or other hardware to enhance software applications or to expand communications capabilities.

- **Evaluation committee.** A committee reviewing platform automation systems should include representatives from retail banking and finance/auditing as well as from MIS. Branch managers' participation is essential in ensuring that the system can support the merchandising goal, which is selling bank products through the branches.

A few large banks have taken steps beyond platform automation in an effort to support the branches' sales role. A number of innovative projects are using interactive graphics systems to enable customers to browse through bank products by themselves. These systems typically include a touch-screen terminal on a personal computer running graphics-based software. The PC may be in stand-alone mode or may be connected to a remote processor.

The success of these installations, however, requires a detailed understanding of how the bank's customers use branches and how they make financial decisions.

Connecticut National Bank in Hartford recently developed a pilot installation of customer-activated touch screens, but only after completing an in-depth examination of customers' banking habits. The bank's research led Christopher Bergstrom, vice-president of the Delivery Network Development Group, and his team to design the system around several key elements.

- **Focus on the customer.** The system's presentation focuses on the customer's financial needs — such as buying a house, saving for retirement or paying for college. The program encourages the customer's involvement, solicits his questions and provides services in a more personal manner.
- **Make it credible.** The system is designed to earn the customer's trust as well as to avoid obvious biases in the presentation. Bank products are not the primary feature.
- **Avoid glitz.** The installations invite the customer's use. The touch-screen terminals are easy to use, and there is no effort to show off technology for its own sake. In fact, Connecticut National rejected a high-tech, chrome-and-glass setting for the system, choosing instead a more conservative, traditional look felt to be more approachable.
- **Make it accessible.** Bergstrom has been experimenting with installing the system in locations that are busy enough to be seen and draw users' attention to it, but not so busy that the customer might feel uncomfortable spending a few minutes using it.
- **Recognize limits.** The system is designed to help a customer understand the basic need of meeting a particular financial requirement. In considering a home mortgage, for example, a customer can use the system to become familiar with the terms and relationships of down payment, interest rate, terms, points and monthly payment.

When the customer is finished browsing, however, a knowledgeable platform officer must provide further information in order to close the sale. The terminal is not a substitute for an effective platform representative.

Over time, interactive terminals and other technologies will change retail banking. This process will, however, take time. It requires educating banks as well as customers. And as the rocky evolution of ATMs and home-banking systems has demonstrated, customers' banking habits change far more slowly than technology. ●

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Cashing in

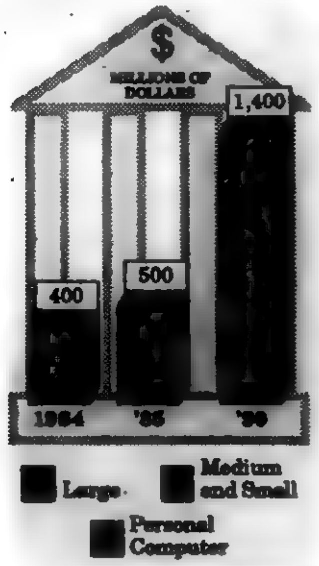
FROM PAGE 75

of ACH, the system works. "We are getting an adequate return on our investment, and the monthly volume is quite high," Giaquinto says. "It's not the greatest thing, but it isn't a dismal failure either. The system works best when there is a regularity to payments, such as car payments, payroll or insurance payments. That's where it's taken off."

Banc One's Fisher is also a supporter. "The ACH works," he contends. "If you get the politics out of it, it would work a lot better." The problem is that banks are more interested in protecting their existing marketing base than in building a workable low-cost ACH mechanism, Fisher explains. Encouraging more people to use the system is what is necessary, and that is starting to happen.

Banking / financial application software shipments

Once user skepticism is overcome, integrated application software packages will be in demand



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CW CHART: MITCHELL J. HAYES

"I'd like to see 80% of Social Security and 50% of payroll on it," Fisher says. "The guaranteed deposit is a unique and valuable consumer service. We've proved that by getting the little old blue-haired ladies to use it for their Social Security checks. The last person in the world you'd think would rely on electronics would be the retiree who has to have the money in the bank on the third of every month. Yet a third of all Social Security checks are handled through the ACH."

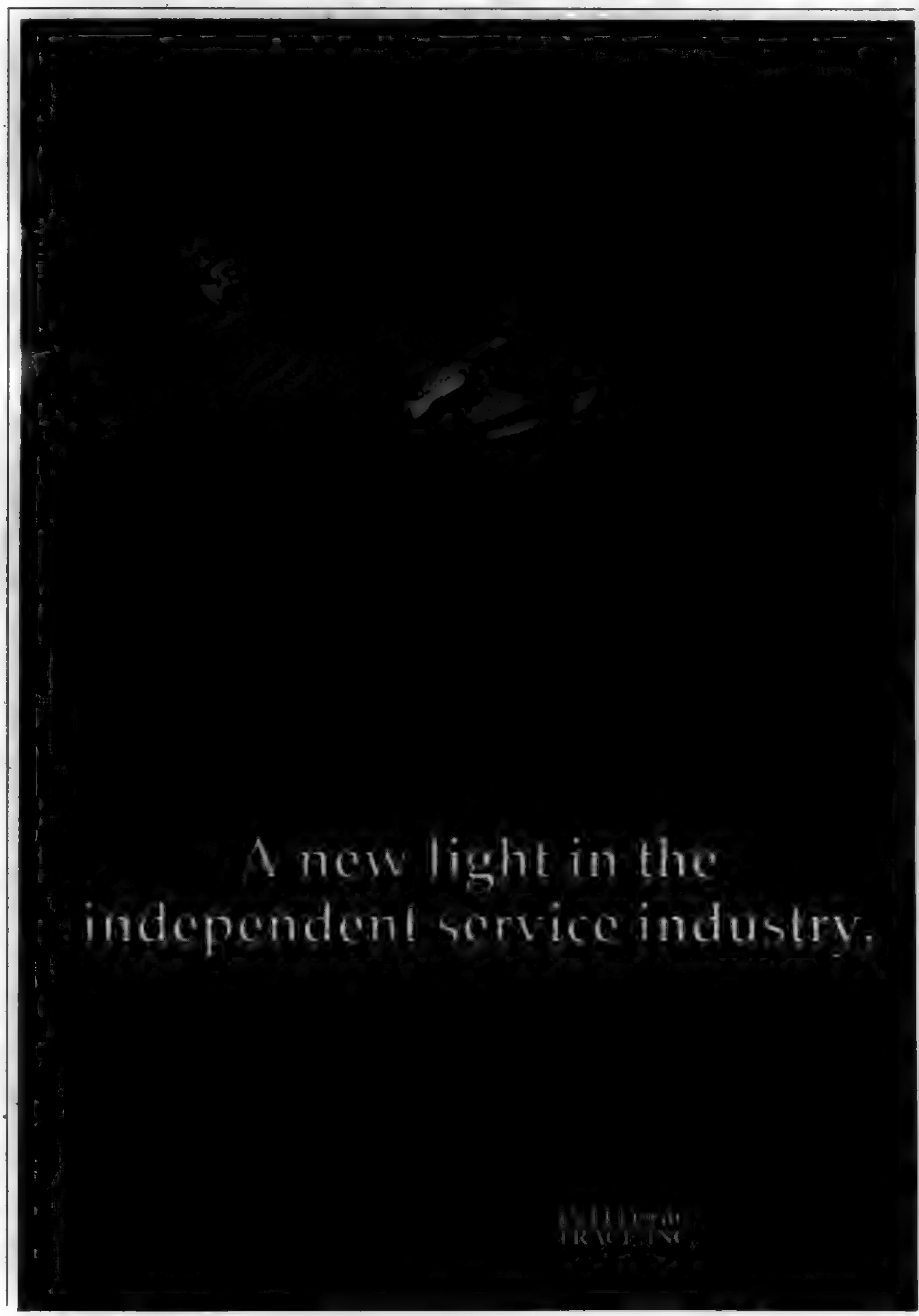
White, however, remains skeptical. He says that as long as the Federal Reserve System keeps the costs of the checking system down and technology keeps it moving fast, the need for electronic banking will never become a reality. "Unless there's some motivation to save money, you won't see the checkless society," White declares.

Communications woes

Banks are also facing data communications questions. Charlotte, N.C.-based NCNB Corp., the largest bank in the Southeast, is currently planning an implementation of a data communications network architecture to accommodate its 600 branches in five states.

According to Joe Whiteaker, vice-president of telecommunications, the bank is seeking to consolidate its existing networks, which focus on several different applications. "Each network evolved over the years," Whiteaker says. "Each has its own protocol, and technology didn't allow them to be consolidated. That has changed, and it is especially important for us to consolidate so that we can present one bank image to customers in every state."

Whiteaker is evaluating methods for consolidation and is consulting with both Citibank and Bankamerica Corp. "In time, everything is going to be available through an on-line network, and the emphasis is to have well-managed, cost-effective network services. Then it will be viewed as a strategic weapon in the marketplace," Whiteaker says. "Right now, banks fail because of bad loans. But in the not-too-distant future, a failure could occur because of a network failure; there's that much emphasis on network delivery." ●



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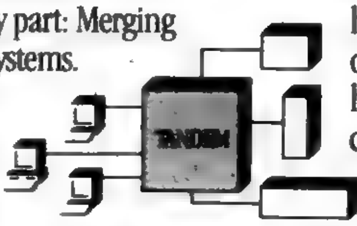

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IN DEPTH

Maintenance giant sleeps undisturbed in federal data centers

Control over software maintenance is not just 'nice to have' if you own 20 billion lines of code

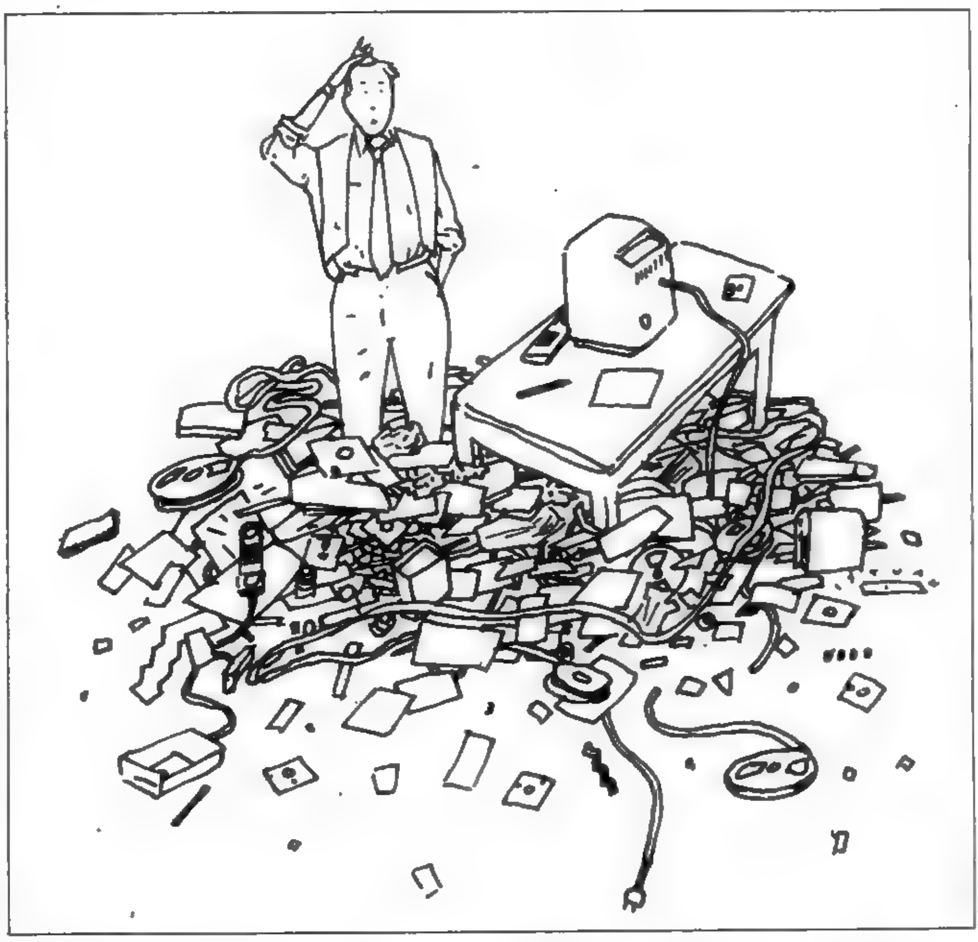
BY RICHARD HARRISON

During the past several decades, the federal government slowly and quietly accumulated what today amounts to the single largest portion of the world's software assets. No one possesses a true inventory count, of course, but the federal government is estimated to own about 20 billion of the world's 75 billion extant lines of code — and the number grows with each passing day.

There is probably no algorithm known to mankind that a federal programmer has not reduced to code once and possibly more than once. No computer language ever existed, at any implementation level, that is not represented in one or more federal source libraries.

Possibly the only other number of significance counted in Washington these days requiring more zeroes than the total federal software inventory is the combination of the national debt and the trade deficit.

Subsequently, federal software management techniques in general, and software maintenance practices in particular, have become important and pressing issues — issues that consume more of management's time than in the past but with fewer positive results.



ISTVAN BANYAI

Out of the spotlight

Given the ever-increasing magnitude of this problem, one would think the software maintenance management challenge would raise a few eyebrows, draw a little press, rattle a few cages or, at the very least, shake a few cores. But despite the annual expense of maintaining the federal government's software assets' reaching approximately $3.5 billion, little attention seems to be directed at the management problem.

Federal executives and information resource managers alike increasingly fail to recognize the scope of the maintenance management problems with which they are now faced. In their eyes, the expanding maintenance burden lacks visibility and defies solution. Still, the adverse impact of increased maintenance investment on advances in software management productivity has reached major, debilitating proportions: Each dollar that goes into maintenance drains the resources for development. Thus, the federal government's continuing romance with the code could devastatingly affect its ability to manage competitively.

Of course, federal managers do not totally ignore the need to stem the rising cost of software management. The Office of Management and Budget (OMB), for example, issued a binding directive, "Management of Federal Information Resources" (OMB Circular A-130, 1985), requiring, among other things, that maintenance costs be reduced by 25% during a three-year period.

But many, indeed perhaps the majority of, federal managers are more concerned with software development and the

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Harrison is director of the U.S. General Service Administration's Federal Software Management Support Center in Falls Church, Va.

- **Put an end to your romance with code**
- **OMB requires 25% drop in maintenance costs**
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means of increasing development productivity than reducing software management costs. They have become especially enamored with the promise of so-called fourth-generation technologies.

Software tools in general are constantly and consistently touted as the basis for drastic productivity increases in development environments. But, as Software Productivity Research, Inc. Chairman T. Capers Jones recently observed, the bulk of the productivity measures presently available within the industry to increase efficiency in software development do not necessarily live up to their claims. This is primarily because the tools being offered fail to automate the most labor-intensive aspect of the development process — communication.

Today's application generators and fourth-generation technologies are akin to yesterday's automatic program translators: They apply a degree of efficiency to a portion of the logistic that accounts for only a small percentage of the process. Unless, or until, productivity aids are brought on-line — thus increasing communication between those people and organizations that require support and those who develop the means of delivery — productivity in software development will continue to lag.

It's broke, and ya' gotta fix it

Doubtless, there is a need to develop more productive ways of building the federal government's software. But rather than place emphasis — and it is a significant issue — on better ways of putting more code into operation, the government must recognize that its existing assets consume the majority of its software management budget. Software maintenance consistently proves itself to be the information resource element least susceptible to meaningful productivity increases or cost reductions. Subsequently, federal managers must begin to shift their attention to maintenance and assume some responsibility for what they have already created. A compelling need exists to pursue development of improved maintenance practices.

It must be further recognized that this need is not the least bit technical in nature. Nor does it fall into the category of "nice-to-have but otherwise unnecessary." As Mel Colter, professor at the University of Colorado and one of the few academics today who focuses his attentions on software maintenance issues, points out, the financial stake is highly significant. Maintenance improvements will provide the greatest immediate return on investment of the goverment software management dollar.

Colter uses a simple example to prove his point. Assume, he says, that an MIS vice-president invests 45% of his DP dollar in new development and 55% in maintaining the existing inventory of code — a very reasonable assumption. Assume further that an equal level of increased productivity — say, 10% — can be achieved in both these investments. In which investment is the greatest absolute return realized? The answer, of course, is maintenance. The only odd thing is that in the federal government the existing investment splits are more commonly 70% to 30% in favor of maintenance, and thus the potential for return is even greater.

Notwithstanding the compelling economics, the government's maintenance costs continue to rise. Code inventories proliferate at such a rapid pace that it is almost as if they had discovered how to reproduce themselves. The government is rapidly losing the ability to count, much less manage, this code and the applications it was meant to implement.

A great number of research efforts are under way to develop and implement solutions to this problem; among them, the concept of reusability shows tremendous promise.

Study of this approach is certainly high on the agenda of various research corporations, such as the U.S. Department of Defense-sponsored Software Engineering Institute and the privately financed Software Productivity Consortium. Clearly, reusability, combined with a few other techniques aimed at building code in more efficient ways and, more importantly, building it so that it can be managed in implementation, are important steps that must be taken as soon as possible.

Advances in software production and operations must be brought on-line rapidly if there is to be any hope that the predictions of unrestrained and unmanageable growth will be curtailed. But despite scientists' and engineers' best efforts, the federal government may be looking at a 10- to 20-year germination period in developing these techniques and effectively putting them into use. Whether the U.S. can afford that much time, especially considering its competitive stance worldwide, is questionable.

For instance, Japan reportedly is

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running circles around the U.S. in increasing the code productivity — the number of usable, useful lines produced per day against the number of man-days it takes to produce them. It has also been reported that the Japanese are now having to run to stay ahead of Korea.

Experts argue the merits of this productivity race on a regular basis. They contend that Japan and other competitors have an easy row to hoe.

The competition does not create anything really new, these experts say; they simply find more effective ways of duplicating designs that U.S. programmers sweated blood to originate. Anybody could do that, according to these gurus, especially if they are subsidized by their government in the process.

If what these observers say is true, the U.S. need not foster any fears whatsoever. Since this country is not producing much in the way of new and better designs these days, all it has to do is wait. The U.S.'s competitors' grist mills will stop for lack of its shipping them more wheat to grind, and this country will be right back in the driver's seat.

IF CHANGE is simply truth passing in and out of fashion, then the time has come to make fashionable a simple truth: We can bridge the gap to the future by improving the maintenance procedures of the present.

Not likely.

It may be true that some of this country's competitors have jumped ahead on the basis of harvesting the seeds the U.S. sowed, but at least they were willing to engage in the harvest. They were also willing to invest a little of the return to ensure that they manage their farms well: They don't till their fields with mule-drawn plows.

If the U.S. is designing less with each passing year, this happens because it replants the same seeds in increasingly less productive fields. The amount of time and money invested in this endeavor is diverted from supporting development of new and better techniques with which it might otherwise husband its crops.

To shorten the germination period in the development of new technological processes that will allow the U.S. to regain a commanding and prominent competitive position in software management, it must invest greater sums of money and engineering effort in the research process, and it must do this within shorter periods of time.

The option to do so, however, will not be available if it must invest simultaneously in managing current software inventories using the same old techniques. The funds are simply not going to be available.

Understand the rules

But like a lot of problems faced today, the situation is not nearly as bad as it appears to be, so long as it is approached with the idea of changing it for the better. If change is simply truth passing in and out of fashion, then the time has come to make fashionable a simple truth: Federal software managers can bridge the gap to the future by improving the maintenance procedures of the present. If this is accomplished, the cost of current and near-term software maintenance operations will drop, creating additional financing for developing the techniques with which future problems can be approached.

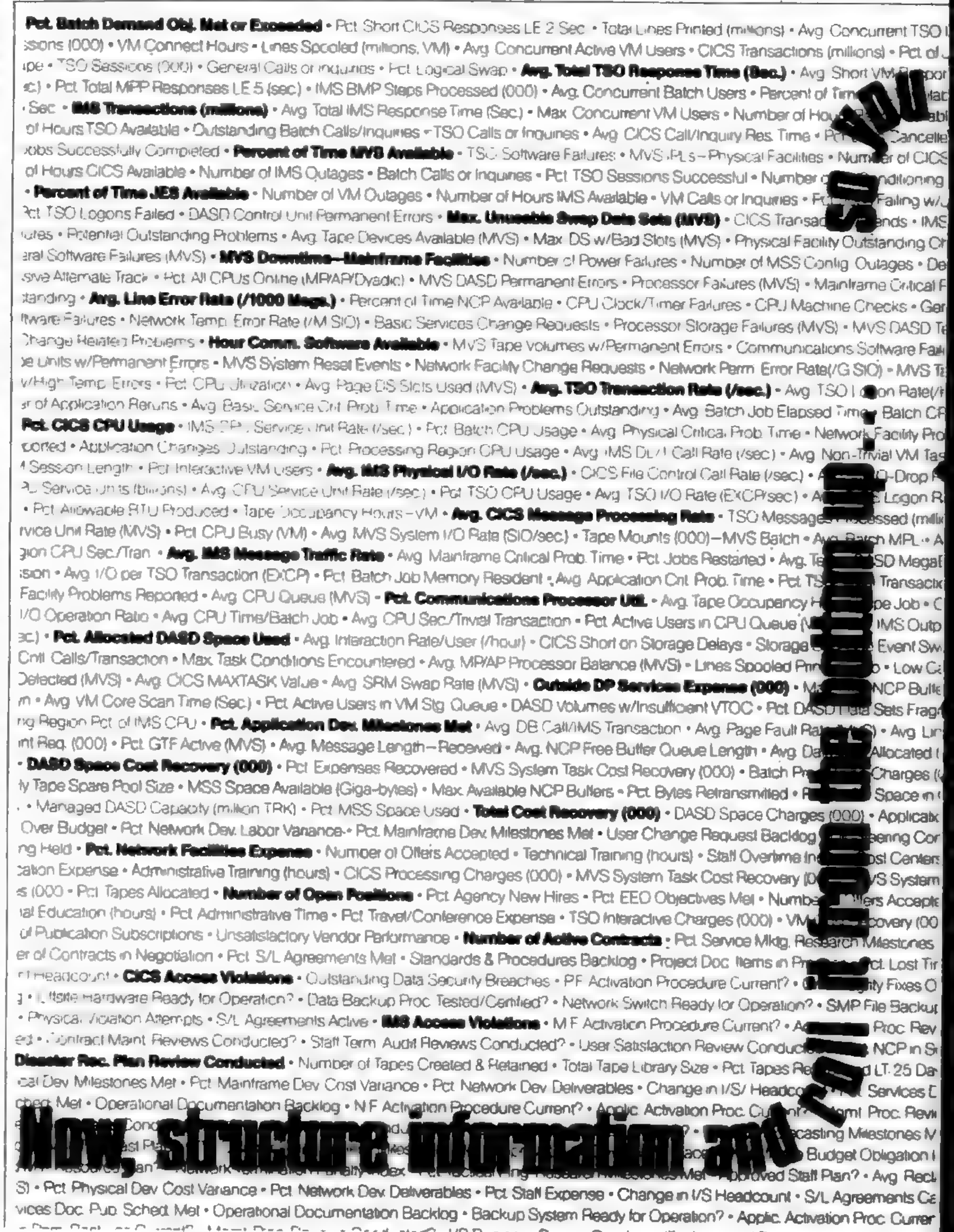
So what, generally speaking, can be done to work toward improved software maintenace management? The best answer is probably the same one the coaches come up with when nothing seems to go right on the playing field: Get back to basics. Before you can play the game, you must fully understand the rules and be capable of executing the fundamental plays.

In software management, the rules are predicated upon consistent methods, consistently performed. It makes not a whit of difference how elegant a design methodology is if it cannot be understood by the designers, if it cannot be duplicated or if, as is quite commonly true, its resultant product is totally unmanageable. Moreover, if various otherwise workable methodologies proliferate throughout DP shops, confusion reigns.

Thus, the first and most important step requires that every DP shop develop and put to use a formal method for consistently implementing its maintenance procedures. These procedures must define what constitutes maintenance in the shop and the training required for one to perform such work. They must describe the tools available for use and how they are to be used; they must set forth the standards by which the shop is governed and the quality control process imposed to ensure those standards are met. Nirvana is found in the complete integration of these procedures across development and maintenance lines.

Some will look at this suggestion and say, "Whoa! You've got it backwards. The software engineering environment must be established at the requirements and design level. If it's done right there, maintenance is a stroll on the beach." I would contend that federal DP shops have been strolling that beach for years and possess little more to show for their efforts than footprints in the sand.

It is certainly true that requirements analyses must properly interpret the users' needs, and system designs must implement those requirements in such a manner as to serve those needs. It is also true, however, that the systems being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designed, particularly in federal government operations, must take into consideration the return on investment made.

If putting systems up takes a year, or two or six — and it does — some assurance must be offered that these systems run sufficiently long and efficiently enough to amortize investment in the effort. It is not enough for developers to say that users are satisfied with their work on the day the system goes into production, only to find the selfsame users screaming bloody murder a week later when the system goes haywire and the maintenance folks can't make heads or tails out of its operating characteristics.

Maintenance is a user, too. Maintenance needs to get its two cents in when the system is going up; it needs to advise the developers of its requirements. To do this, it must employ clearly defined methods of operation. According to surveys performed by the Orlando, Fla.-based Quality Assurance Institute, about 40% of the shops in the private sector reportedly employ such procedures. No statistics are available on the percentage of federal DP shops with similarly defined maintenance approaches, but even assuming these shops are in no worse shape than private shops, they are in dire straits.

Power, yes; terminals, no

The second most important step is to provide appropriate technology with which to perform the job at hand. While most federal DP shops are generally well equipped in terms of gross processing power, few have acquired the diversity of equipment necessary to underwrite acceptable support for the thousands of programmers and analysts they employ.

The Federal Software Management Center still finds, for example, that despite the large numbers of equipment installed, programmer-to-terminal ratios are in the 5-to-1 range. Gross processing power is of little value if, for the privilege of use, the programmers are required to take a number and get in line.

Next to ease and convenience of system access, the lack of good software maintenance productivity tools is a highly significant problem. The government's notoriously complex and lengthy procurement regulations may account for some of the tool shortage. Even simple purchases seem to take ages to procure and cost a small fortune. The process has a way of discouraging the most determined DP managers from acquiring more and better tools. But rules are something with which we must all contend, especially in an economic sector financed by tax dollars.

It is likely, however, that the federal government's procurement rules are more often convenient excuses for maintaining the status quo than barriers impeding progress. Federal managers are frequently characterized as living in a fishbowl; their every action seems subject to constant review from a myriad of sources ranging from the individual taxpayer to Congress and everyone in between. As a result, they are quite adept at avoiding decisions that cannot, in one manner or the other, be thoroughly and reasonably justified or rationalized.

Federal managers are not afforded the luxury of making mistakes, even though a well-managed trial-and-error approach to problem solving is usually effective. Instead, safe rationalization can, and often does, become an end in itself.

One persistent rationale in acquiring maintenance productivity tools is that all software running today is going to be replaced eventually, so why bother investing in tools and people? Not surprisingly, this same rationale has persisted for a number of years. Unfortunately, it has fostered the creation of an embedded patchwork of maintenance practices that are becoming more difficult to finance.

It is foolish to ignore a software investment that has not been entirely amortized and continues to return a dividend. Even if the software does eventually go away, something will be established in its place and will require care. Regularly investing in software maintenance tools and training people to use them is, therefore, entirely worthwhile.

Software maintenance personnel are going to need tools to address the future, no matter what shape it may take. Failure to invest in maintenance will significantly impede progress, which will in turn push the future farther away. Much of

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making the future happen lies in adapting to cultural change, and extensive use of and reliance on tools is, in fact, a change in culture.

The final point addresses the problem of changing cultures. The fall 1986 "Software Maintenance Practices Survey" conducted by Bill Perry, executive director of the Quality Assurance Institute, posed the following question: "Do you have any programs or systems that have to be maintained by 'certain' people because no one else understands the logic?" Sixty-three percent of approximately 200 responding organizations answered yes. A corollary question followed: "If yes, how great a portion of your software portfolio is managed by these people?" The answer: 22% of each portfolio.

MAINTENANCE is a deteriorating process that, when combined with a lack of defined procedures and a high personnel attrition rate, often results in the most important programs being placed under the care of a handful of the most skilled members of the shop.

Perry probably should have asked one more question in this category: "What portion of this 22% constitutes the organization's more important operations; that is, just how much do you rely on 'certain' people to ensure that the system works every day?"

We hesitate to guess what the answer to the last question might be. Experience shows that 22% reliance on "certain" people is probably not unusual. Much of the federal government's software is quite old. It is common to find large elements of the inventory used continuously for 15 years or more — elements that have been subjected to a tremendous amount of maintenance. Maintenance is a deteriorating process that, when combined throughout the years with a lack of tools and defined procedures and a traditionally high personnel attrition rate, can and often does result in the most important programs being placed under the continual care of a handful of the most skilled members of the shop.

This tactic invariably satisfies the short-term needs of management and, to some degree, the psychological needs of these so-called certain people. Unfortunately, this tactic also probably creates as many problems as it solves.

For one, those outside this skilled handful find it much more difficult to understand the software they are charged to manage; this group includes both programmers and DP managers. In this regard, they are less productive than they otherwise could be.

Second, short-term approaches that rely heavily on the skills of a handful obviate an organization's ability to increase the return on its software investment. About 70% of all software maintenance work is classified as "perfective," which is a polite way of recognizing that most system designs are flawed both in terms of substance and durability. The fewer people involved in this process, the less time there is to analyze the perfective maintenance moves, resulting in a greater possibility that the perfective process will also be substantially flawed and be returned with increasing frequency for more maintenance. It is this vicious cycle that, more often than not, catalyzes a user hue and cry to initiate development of a new system to replace the one that never works, and the cycle continues.

Finally, programmers — like most people — resist change to one degree or another. Subsequently, management finds its suggestions for diversifying the work load, implementing new techniques, installing productivity tools and the like are consistently overridden by a suspicious group that sees the proposed changes as mere subterfuges aimed at reducing its importance to the operation.

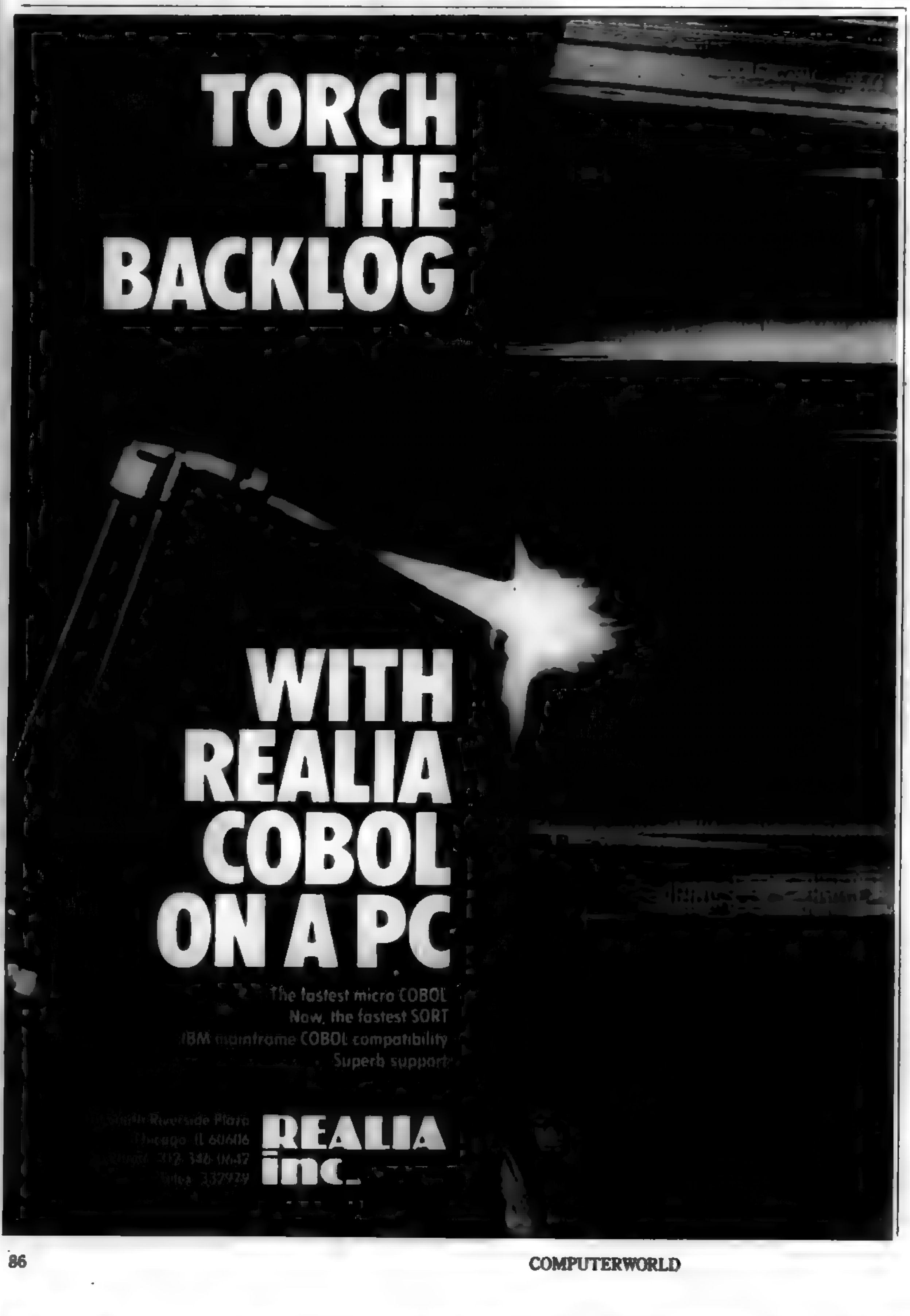
Under these circumstances, most attempts to innovate are either compromised to a meaningless degree or stalemated. Thus, federal managers must do their utmost to ensure that analysts and programmers make the transition through periods of cultural change relatively unscathed; otherwise, all hope of ever increasing federal DP shops' productivity may as well be abandoned at the outset.

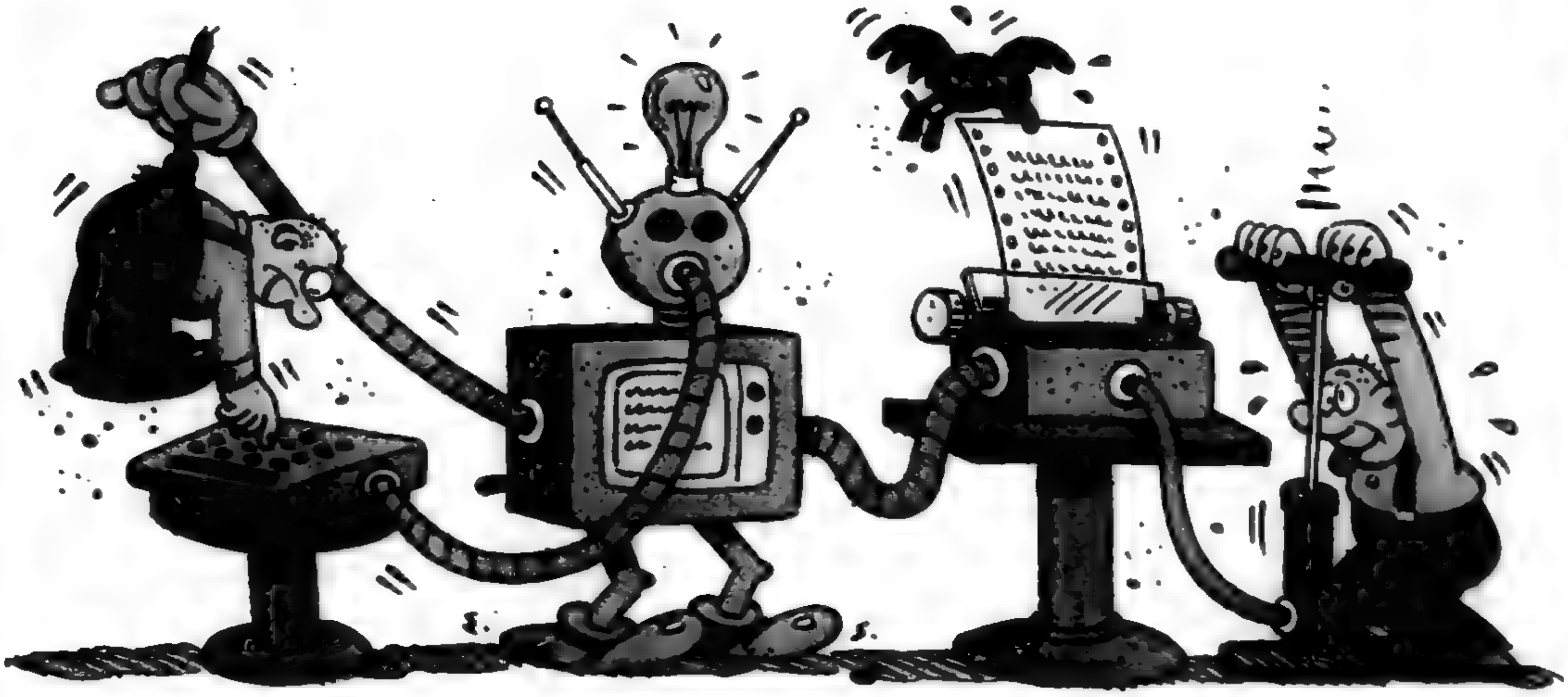
Bringing in the sheaves

Federal software maintenance is a fertile field just waiting to be tilled. For those who are capable of accepting the challenge, the harvest will be bountiful, productive and satisfying.

More and better maintenance practices, procedures, people and tools can generate the financing that will substantially offset the costs of advancing the federal government's technological processes and improving its ability to build and manage better software in the future. It is hoped that prudent federal executives will devote more thought to this issue than they may have in the past.

As a body, it is important that they take aggressive action to protect the investment made in the federal software asset. In so doing, they could contribute inestimably to improving the business of governing the country. One thing, though, is certain: Simply romancing the code no longer works. ●





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Get out from under

Project management techniques borrowed from other professions can rein in typical software budget overruns of 100% to 150%

BY WILLIAM DUNCAN

Thirty years ago, the typical software development project finished much later than planned, cost far more than was budgeted and contained less than the desired functionality. During the intervening years, programmers developed a variety of tools and techniques to correct these shortcomings. Spaghetti code was given up for the rigors of structured programming, design and analysis. Developers traded assemblers for compilers and now use fourth-generation languages.

And the typical software development project is still behind schedule, over budget and less functional than the user expected.

Three decades of minimal progress cannot be explained away with a single answer. One major factor for the gap between effort and success, however, is the lack of improvement in DP project planning and control practices. Many project plans budget time to review deliverables but not time to correct them. Ballpark estimates quickly become budget commitments. Control systems are used to demonstrate progress when there is none.

Project management techniques may be likened to a flat tire, software engineering techniques to premium gasoline: The extra octane will not improve performance until the tire is fixed. Yet many software project managers contend that accurate planning is impossible because of the unique characteristics of software development:

- Never-been-done-before projects.
- Unclear or conflicting specifications.
- Frequent changes in scope.
- Externally imposed schedule constraints.
- Technically naive users.

But are software project managers really so singular? If you spoke to a project manager in heavy construction or pharmaceuticals development, you would get a list of problems that are not just similar to the above, but identical. If the problems are the same, is there a chance that the solutions will be, too? Can DP really apply construction project management techniques to software development?

MARK THORNLEY

The answer is a qualified yes. During the past five years, I have worked with a variety of clients who have tried to apply project management practices of traditional engineering disciplines to software development.

Some developed task templates for frequently performed activities. Others recognized the need to change from task-based to resource-based scheduling. A few established independent estimating groups.

Most of these efforts, however, never achieved the expected results. Why? Because they failed to adopt the three key elements of the underlying philosophy of project management.

First, the project manager's primary responsibility must be defined as delivery of quality. Quality, in turn, is defined as producing a system that conforms to specifications. This emphasis on quality does not mean that a project manager should be allowed infinite time and resources to complete a system.

It does mean that the decision-making dynamic should consider schedule and budget issues in terms of the potential impact on quality. For example, code reviews, testing and other quality-control activities are often the first things cut when schedule slippages occur. Yet, when given the choice, every user with whom I worked opted for late delivery rather than diminished quality.

Best-laid plans

Second, project scope is defined by the project plan; system scope is defined by the specifications. This means users must review the plans as rigorously as they review the specifications. It also implies that software project managers must construct project plans that allow for such unexpected events as staff turnover and operating system bugs.

Finally, poor performance must be penalized. As long as there is no penalty for a poor plan, there is no incentive to develop a good one. A project manager should expect dismissal — and should be dismissed — for failing to meet any reasonable test of quality, schedule or budget performance. The minimum standards of performance insist that a project is on time, on budget and completed according to specification.

These philosophical underpinnings are crucial, since the penalties of implementing professional project management

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Duncan is president of Duncan Associates, a project management consulting firm in Lexington, Mass.

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- **Behind schedule, over budget: same old story**
- **The art of resource-based planning**
- **'Quality' doesn't imply infinite time or staff**

are invariably higher cost estimates and longer elapsed time estimates. Users and management, however, tend to prefer the reliability of the higher numbers to the uncertainty of project managers' current predictions.

Rubik's planning cube

The planning process begins with a set of specifications. These may be brief and general for a feasibility analysis project; they may be extensive and detailed for a systems implementation project.

The specifications are used to identify the tasks necessary to deliver the specified product. The task list and the planned project organization are used to estimate the work effort. Estimates are then combined with task dependencies and staff availability to develop a project schedule.

All these elements are combined with any assumptions that can be made about external constraints to produce the project plan. These activities interrelate like a Rubik's Cube. If we equate a good plan with a solved cube, they share a number of characteristics:

- Changes in one dimension cause changes, often unanticipated, in one or more other dimensions. For example, adding a task may require reassigning personnel, which means changing estimates and schedule commitments for existing tasks.
- There is more than one way to achieve a correct solution; once you have figured out a system, the solution is easy. Not only that, but you can teach others to find similar solutions.
- Arriving at the solution requires practice, patience, intuition, trial and error, lots of iterations and often help from somebody else.

The following scenarios cover the key components of planning — task identification, estimating and scheduling — and the interplay among them. The companies and situations in each section are real; only the names have been changed to protect the guilty.

Task identification

Able Co. is an old, established division of a Fortune 500 firm with more than 100 analysts and programmers working on traditional mainframe applications.

Joe was an Able team leader who had just been promoted. His first assignment was to "fix" a project that had already burned out two other team leaders in less than a year's time.

The project involved converting one of Able's key production systems to new, centralized hardware located at the parent company's facilities. The hardware vendor had promised that its conversion programs would complete 90% of the work involved.

The project had been budgeted at $100,000 but had consumed $200,000 to date and was nowhere near complete. In addition, the project had become a political hot potato, leading Joe and his boss to bring in an outsider to complete an independent assessment.

Joe was aghast when he saw the preliminary task list that was generated by the assessment. "I can't put all those things in my plan," he moaned. "I'll get fired!"

The tasks on the list that concerned Joe fell into two categories. The first group consisted of administrative tasks: periodic replanning, budgeting review and revision time for deliverables, holding status meetings and securing necessary resources like terminals and passwords for team members.

> ARRIVING at a solution in the project-planning process requires practice, patience, intuition, trial and error, lots of iterations and often help from somebody else.

The second group consisted of technical tasks with a political dimension. For example, source code had to be found before it could be converted. The installation lacked a reliable production source code library. As a result, conversion required testing several different source versions against the production object version to figure out which was current. In a few cases, no source was available at all.

Both the administrative tasks and the political issues would have been identified if Joe's predecessor had been required to develop a work breakdown structure. Developing this breakdown structure involves a functional decomposition of the work effort. In effect, it is a structured approach to task identification.

The output of the process may be a tree diagram, an outline or a Warnier-Orr diagram.

The key is for the lowest level of decomposition to list tasks with sufficient detail to estimate. For example, the "manage project" section of Joe's work breakdown schedule included the following items for developing the weekly team meeting agenda:

- Review prior meeting's minutes for open items.
- Review notes and correspondence for new issues.
- Draft agenda.
- Type, review, revise and distribute.

Providing sufficient detail means accessing directly comparable data from prior experience. Where no data is available, it should be developed before accepting the breakdown structure.

For example, the lowest level of detail in Joe's predecessors' plans was "convert

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source program." With no directly comparable experience in converting Able's programs from one machine to another, they left this lowest level insufficiently detailed.

If these developers had first tried to convert one or two programs, thus providing comparable data, they would have known to decompose the "convert source program" stage into several stages: find source, validate source, run vendor conversion program, test converted code.

Structuring the task identification effort in this fashion also facilitates the construction and reuse of common groups of tasks such as user interviews, deliverable preparation and review, testing and project management. A library of breakdown structures will also help highlight situations such as Joe's, in which some research was needed to provide sufficient detail.

Joe eventually bought into the task list. When all the work was estimated and costed out, the total conversion effort carried a price tag of more than $1 million. Joe presented the plan, and the project was killed.

Sample contingency factors

Base estimates for each task are subject to a certain level of uncertainty, as every project manager knows. Contingency factors like those below quantify the uncertainty for each type of task because some tasks are harder to estimate than others.

Tasks	*Contingency factor as percent of base estimate*
DESIGN	
Draft design	10%
Final design	15%
DEVELOPMENT	
Coding (clean compile)	10%
Debugging	15%
Documentation	15%
Integration testing	25%
OVERHEAD	
Vacation, holidays	2%
Administration, staff turnover	5%

CW CHART

Several months later, I heard that Joe had left Able, and nobody knew where he had gone.

I like to think that he got fed up with the mismanagement and quit, but I can't help wondering: Did he get fired because of "all those things" involved in his project plan?

Estimating

Wes is vice-president of MIS for Baker's Shops, Inc., one of the nation's largest retailers. The actual cost of his projects ranges from a low of 50% over budget to a high of four times the original estimate; the average is 80% over. Wes is pleased with these numbers, since his objective is to keep his average variance less than the industry average, which he perceives to be in the 100% to 150% over-budget range.

Jill is a project manager for Charlie & Co., an entrepreneurial firm building state-of-the-art micro-based graphics systems. Her defined objective for estimating is accuracy. Her actual costs are usually within a few percentage points of her original estimates.

Charlie's programmers and analysts clamor to work for Jill, since they seldom work nights or weekends to meet deadlines. Her boss is less enthusiastic — he accuses her of padding the budget.

> **WES'S approach does not satisfy the objective: to determine the maximum probable cost for resource allocation purposes. It reminds me of the old joke about the person with one foot on the stove and one in the icebox — on average he is comfortable.**

Drew is a programmer/analyst for Diamond Corp., a small service firm with only 10 people in its MIS group. He always estimates his projects high — three to four times what he really thinks is needed. As a result, he almost invariably completes his work ahead of schedule and under budget. This satisfies his objective of exceeding expectations. His users are alternately frustrated by the projected cost of his projects and delighted by the actual performance.

All three of approaches listed above produce good estimates in the sense that each meets the planner's objectives. But are these objectives appropriate? A construction engineer will tell you that the objective of estimating is to determine the maximum probable cost to facilitate appropriate resource allocation.

Wes's approach does not satisfy this objective. It reminds me of the old joke about the person with one foot on the stove and one in the icebox — on average he is comfortable. Drew's approach is to estimate the worst case or the maximum possible cost; again, the objective is not satisfied.

Only Jill's approach satisfies the objective set by construction engineering.

But even if you accept the value of an accurate estimate, just how do you go about developing one? Jill accomplishes it by reinventing three key techniques that

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are consistently applied in construction engineering.

- First, her estimates are resource based. A construction estimator knows that a foundation hole can be dug by bulldozers or backhoes; bulldozers do it quicker, cost more per hour and leave a different-shape hole than backhoes.

In the same fashion, Jill recognizes the need to accommodate different skill levels in her planning and to adjust her base estimates according to which individual was actually assigned to the task. A study launched several years ago showed that comparably experienced programmers took anywhere from three to 25 hours to solve the same problem in Cobol. Jill merely incorporated this insight into her plan.

- Second, she involves those actually involved in the estimating. After ensuring that they know she wants a maximum probable estimate, Jill asks each one to develop an independent assessment of the assigned tasks.

The estimators then meet as a group to review each other's estimates and to resolve discrepancies. If members of the group are unable to reach a consensus and if the estimate in question is significant, they do some estimate prototyping before approving the numbers. Jill's approach actually decreases the amount of effort devoted to planning by minimizing the amount of replanning needed.

- Finally, Jill recognizes that different tasks instill different degrees of uncertainty: Design efforts can always be estimated more accurately than can integration testing efforts.

To accommodate these inherent differences, Jill developed a base estimate using the techniques described above, then increased the base by a contingency factor derived from previous experience (see chart page 91). For example, if she estimates 200 hours for integration testing, she includes a contingency allowance of 50 hours — or 25% — in her budget. While the concept is generally applicable, actual numbers must be customized to each estimator.

Adjusting estimates
Contingencies are not fudge factors: A contingency allowance is used only when needed, and then it must be justified. Contingencies provide for those unpredictable occurrences commonly attributed to Murphy's Law — hardware problems, system software bugs and the like.

By adding a contingency adjustment to her base estimate, Jill is able to produce a risk-adjusted estimate that is very close to the maximum probable cost.

Jill's total contingency-adjusted estimate usually amounts to about plus or minus 15% of her baseline estimate. This compares favorably with U.S. Department of Defense guidelines for research and development projects, for which this figure is considered on the nose. It also fits the profile of most construction engineering projects, which typically have a management reserve of 15% to 20% to accommodate contingencies.

Scheduling alternatives

In these estimates, non-resource-based scheduling does not take task dependencies into account, so the "expected duration" often underestimates the project. Resource-based estimates do plan tasks in overlapping stages, but this may mean workers spend time idle. Options A, B and C propose three levels of staff utilization.

Estimates	*Man-Months of Effort*	*Planned Staffing*	*Expected Duration (in months)*
Non-Resource Based			
Original estimate	80	8	10
Resource Based			
Option A	80	5	16
Option B	84	6	14
Option C	90	9	10

CW CHART

Scheduling
Tom, a manager of applications development for Easy Street, Inc., is in charge of a 30-member group providing design and development services to a state agency as part of a long-term contract. Tom's scheduling algorithm is based on two assumptions: one, that four members is the optimal team size and, two, that any system worth creating should be done in fewer than 18 months.

Tom's planned completion dates are then easy to calculate once a level of effort has been developed — divide the estimate by the smallest multiple of four that would produce a result less than 18. For example, an 80-man-month project should require eight people, since assigning only four would make the project last 20 months. But despite the elegance and simplicity of this algorithm, Tom's projects are usually late.

One day, while discussing yet another slippage with one of his project managers, Tom suddenly saw the light: He realized his scheduling algorithm made no allowance for task dependencies. Tom ran right out to his local computer store and bought a micro-based project management package. He loaded first one project, then another, then another. To his surprise and chagrin, the dates the system calculated were remarkably similar to his own.

Tom naturally blamed the software and eventually asked me to help him select a new package. I was a little surprised, since I knew other MIS groups were using this package successfully. Tom's problem turned out to be pretty basic. He had loaded the package with only summary-level tasks and staffed them all with multiples of four. The software produced results similar to his manual algorithm because his gross-level inputs trivialized the program's calculations — garbage in, garbage out.

To help Tom understand the mechanics of scheduling, I took a representative project of 80 man-months and eight people and loaded it in stages. With the full work breakdown schedule loaded, detail-level-task dependencies pushed the earliest possible completion date to six weeks past Tom's 10-month calculation.

Next, I assigned specific individuals to each task and printed a resource utilization chart. One individual had scheduled three straight months of 14-hour-plus days; another employee indicated a total of six idle weeks at various points in the project.

I then added holiday and vacation schedules and limited each individual to 7½ working hours per day. The schedule now showed a 16-month project. Three people were fully utilized over the full 16 months. The remaining five had utilization rates varying from 20% to 80%.

Since Tom was also a believer in full-time assignments, the work effort was arranged to eliminate part-time slots. In the process, the level of effort estimates had to be adjusted: some up, some down. We ended up with three alternatives (see chart at left). The user department chose Option A: When push came to shove, they preferred cheaper to sooner.

All of Tom's project managers now use micros for scheduling, and Tom is delighted that milestones are met consistently. However, he still mourns the loss of his four-member project teams.

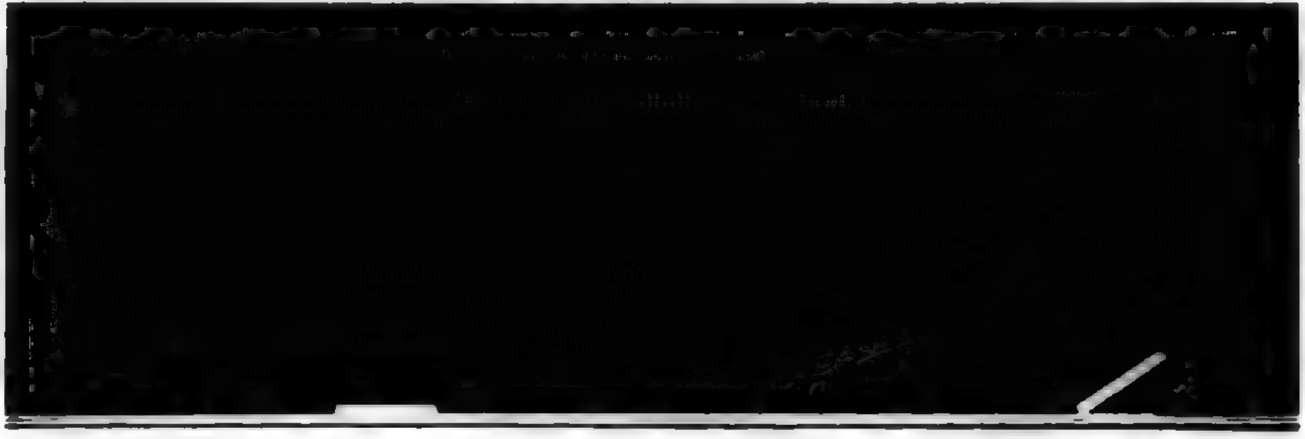
Measuring performance
Hank is in charge of new product design for Fox Systems Co., a commercial software developer selling minicomputer applications to a vertical market. In conjunction with his team leaders, Hank has developed a project reporting system that works off weekly time reports. Every Friday, each employee completes an electronic time sheet to record time spent and time remaining by task. In effect, the project is re-estimated on a weekly basis. Hank wrote a simple program to compare this week's estimate of effort remaining with last week's. On average, the balance remaining decreases weekly by about 1,200 hours.

Hank feels these figures indicate that the project is making good progress. The project is, in fact, making progress, but it is doing so at excessive cost. With 40 people working 40 hours a week, Hank is spending 1,600 hours every week to accomplish 1,200 hours of progress.

Hank's problem lies in trying to measure performance along a single dimension — work effort remaining. Unfortunately, the Rubik's Cube analogy for planning holds true for performance as well: Seemingly minor changes on one face of the cube may significantly change other faces. For example, a projected 2% cost overrun may seem trivial, but if that 2% occurs on critical path tasks, the schedule could be delayed by 10%, 50% or more.

The most effective performance measurement technique I have found is earned-value reporting, which produces reliable, quantifiable and comparable data on project performance. As a result, it is used extensively in many other project-oriented industries such as aerospace, pharmaceuticals, defense contracting and civil engineering.

Earned-value reporting



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> MANAGERS must avoid the temptation to view project management as the latest entry in the cure-of-the-month club. More reliable plans and performance measurement are necessary but even these are not enough. You still have to do everything else well, too.

works with four basic measures:

- The budgeted cost of work performed (BCWP) is the sum of the original estimates for all completed tasks. All tasks are either 0% complete or 100% complete.
- The budgeted cost of work scheduled (BCWS) is a total of the original estimates for all tasks planned to be complete by now.
- The actual cost of work performed (ACWP) is the total effort expended to date on both completed tasks and on work in progress.
- The estimate at completion (EAC) is simply the most recent projection of total project cost.

All four estimates are normally expressed in dollars, but hours or days work equally well on many projects. Some simple calculations convert the measures into variances:

Schedule Variance = ACWP - BCWS. This figure simply shows whether resources are being spent as quickly as planned. If not, the clear implication is that schedules will slip as the project progresses. Schedule variance is an easy way to communicate the impact of not staffing up as quickly as planned.

Budget Variance = ACWP - BCWP. This is the old planned calculation vs. actual calculation with an important twist: BCWP includes completed tasks only. Thus, the budget variance is a true variance that cannot be distorted by the project manager's naturally optimistic assessment of percentage of completion.

Estimate Variance = EAC (current) - EAC (original). This allows monitoring of the original estimate's accuracy. As the project progresses, estimates should be constantly updated to reflect greater knowledge of the task at hand.

Estimate variance, particularly when plotted from period to period, can provide advance warning of future project problems.

When an earned-value measurement is combined with a well-designed and fully detailed work breakdown structure, it provides a powerful monitoring tool, because each variance may be computed for any component of the breakdown structure.

Additionally, it is important to address significant variances only. For example, John, a project manager at Easy Street, drives himself crazy worrying about two- and three-hour variances on 100-hour estimates. He spends much of his time trying to juggle positive and negative variances between tasks. His projects always start strong and finish weak because he is too busy juggling to support his team when performance demands hit.

On the other hand, Sally at Baker's, Inc. totally ignores all variances for the first two-thirds of every project. Her theory is that there will always be time to catch up later. Needless to say, there usually isn't.

Professional project planning is a system for developing accurate and realistic plans. The techniques just described are the components of this system.

Thus, implementation should proceed through feasibility, requirements, design and development like any other system. Trying to do otherwise is a recipe for failure. Again, my friends at Fox Systems provide a case study in how not to do it.

Scott, a vice-president at Fox Systems, was in charge of a major development project that was expected to take three to four years and $12 million to $15 million to complete. Although Scott had never managed a project that required more than a year or involved more than 10 people, he was convinced that proper planning would bring this one in on time.

To support the planning effort, Scott developed an extensive "Planning Guidelines and Procedures" manual. The first plan completely filled a 3-in. notebook and was backed up by a 300-page printout of task codes, assignments, estimates and due dates.

Repeating cycles

Within three months, the project was well behind schedule. Scott updated the procedures to accommodate the perceived shortcomings of the previous effort. This new plan consumed yet another 3-in. notebook backed up by a revised 300-page printout. Three months later, the cycle repeated itself.

Morale on the project was incredibly low. The various team leaders complained that they spent all their time preparing and updating plans. "If I didn't have to plan," one said, "maybe I could get some real work done."

Scott's primary problem was that he had developed a system (the planning process) for a group of users (his managers) without ever involving them in the design process. No one had analyzed the users' requirements; no one had tried to show them how a good plan would benefit them.

Fox's effort was put on the fast track, with design proceeding alongside development. The parallel activities were highly interdependent. Thus, the planning process should have emphasized identifying resource conflicts and deliverable dependencies.

The managers needed reliable milestones along a three- to four-month horizon to guide their conduct of day-to-day team activities. They needed a schedule-driven system that would provide early warning of possible slippages.

What they actually got was an elaborate time reporting system that reminded them of how far over budget they were.

Only acceptable standard

Producing quality systems — software that conforms to the specifications in every regard — should be the project manager's primary goal. When properly implemented, the project planning and control techniques practiced in other professions can help achieve this goal. The following are key features of these techniques:

- Identifying tasks in sufficient detail to support accurate estimates.
- Estimating based on directly comparable experience to identify the maximum probable cost of completing the project.
- Recognizing that specific resources, instead of tasks, must be scheduled.
- Applying performance measures that help identify problems early enough to facilitate appropriate corrective action.

Project managers must also adopt the philosophy that guides other project-oriented industries. The most important element of this philosophy is the belief that coming in on time, on budget and according to specification are the only acceptable standards of performance.

Managers must avoid the temptation to view project management as the latest entry in the cure-of-the-month club. More reliable plans and more accurate performance measurement are necessary conditions to ensure quality software, but even these are not sufficient. You still have to do everything else well, too. ●

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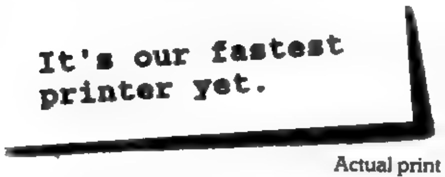

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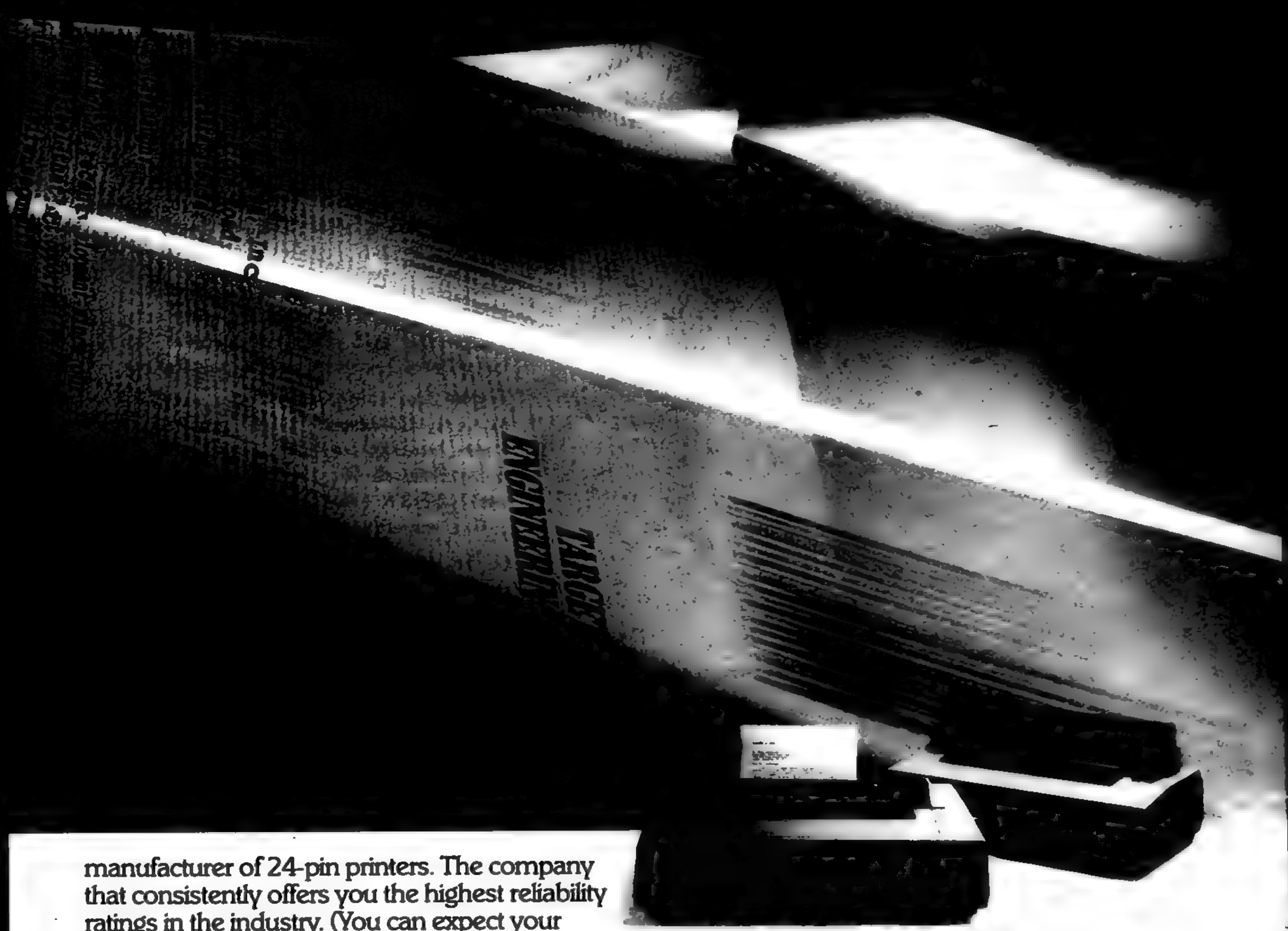

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TAKING CHARGE

Les Gilliam

Managing your vendors

Are you completely satisfied with the products supplied by your vendors? Are their services meeting your expectations? Are the costs reasonable and competitive?

If you are not satisfied, what are you doing about it? If you are satisfied, are you sure you are receiving all that is available and rightfully yours? Are you receiving the same level of service and support as the vendors' other customers? How can an MIS director achieve and maintain the best vendor relations possible?

Perhaps some of the ideas discussed below could prove helpful in getting what you deserve.

Appraisal of current conditions. Whether you believe you are satisfied or not, a complete appraisal of the quality and cost of each vendor's products and services is in order. An annual appraisal of all your vendors should not take much time but could prove to be time well spent.

Number of Vendors. The shops that use only one supplier could find themselves being taken for granted, since there is no competitive motivational factor present. If the vendor does not have to put forth a special effort to keep your business, then it will be inclined to give its

Continued on page 100

Time will relocate data center

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — About half of the 110 members of the data center staff at Time, Inc.'s Magazine Group currently are expected to accept relocation to Tampa, Fla., where Time plans to move the facility, according to one of the center's managers.

Moving the workers is only part of the challenge facing the Magazine Group's director of information systems. He also will have to fill the other positions on the Tampa data center staff — more than 100 systems operators and technical support personnel and 70 to 80 systems analysts and programmers.

Last September, Time announced it would make the move and relocate data processing for its book division from the Chicago facility to Richmond, Va., taking a $50 million charge against its third-quarter earnings.

Carl Gerami

The moves are in step with a trend toward folding data processing operations into operating units and in keeping with a general Time strategy that advocates pushing toward decentralization.

They have been spurred by rapid growth in the Chicago center's work load that has run up against physical constraints. The book division's work is going to Richmond to be near its headquarters, while the magazine operations are moving to Tampa chiefly because of favorable construction and labor costs.

The moves are still in their initial stages, with relocation of the personnel, hiring of the new employees and selection of new buildings yet to be finalized, according to Carl Gerami, director of information systems for the Magazine Group, who spoke about that group's move in an interview.

In addition, a finished data facility must be prepared in Tampa and Time would have to air-condition one of several building shells now being evaluated for it, said Gerami. "We expect to be able to plug our machines into a finished building by the fall of this year," he said.

All large systems activities for magazine circulation — as well as most DP functions for Time's New York-based advertising and financial groups — will

Continued on page 106

BOOK REVIEWS

Probing end-user computing

Managing End-User Computing in Information Organizations
By William H. Inmon

When you consider all the areas that end-user computing affects — not just reporting or decision-support capabilities but also budgeting, computing priorities and the organizational structure itself — then "managing" may not seem like a doable task.

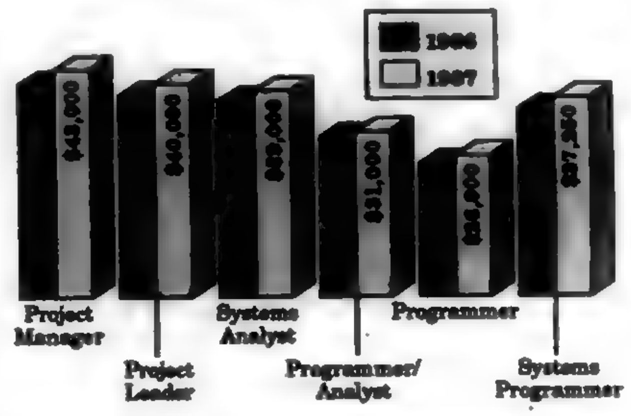
But in fact, because end users have whittled down data processing's duties, taking over the

Continued on page 104

Data View

MIS salaries

Average salaries for systems and programming and for technical services positions for large-scale installations



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CW CHART: MITCHELL J. HAYES

Hiring AI pros can be tricky

BY ALAN J. RYAN
CW STAFF

A variety of factors are pushing the demand for artificial intelligence professionals both up and down, but AI specialists tend to remain scarce and expensive, according to experts in the field. Hiring them can call for innovative approaches.

Joan Gable, manager of data processing placement at the New York office of recruiter Robert Half International, Inc., says she currently sees little demand for AI specialists. "Scientific and medical firms are doing development in AI, but we haven't seen much of it here," she says.

But others say that the demand for AI specialists, while not great, is on the rise. "There's more activity going on in [AI] than before," says Ronald LeBleu, managing partner at Software People Concepts, Inc. in New Haven, Conn. "More people have become interested in it and are beginning to find out what it's about," LeBleu says. Major insurance companies and computer manufacturers are among those hiring AI specialists, he adds.

Popular applications of AI include expert systems, easing the use of end-user programs, computer-integrated manufacturing, robotics and voice I/O, consultants claim.

"Because factories are trying to meet European and Japanese competition, they feel they have to be more efficient," says Daryl Furno, vice-president of the placement firm Halbrecht Associates, Inc. in Stamford, Conn. "The leading edge is computers.

Continued on page 108

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Managing

CONTINUED FROM PAGE 97

attention to others.

Recognize that the vendor has a limited budget and staff, just as you do, and must choose the priorities for the time invested. The other extreme is a shop that uses so many different vendors that no one vendor can justify a significant investment of time to become a partner in achieving goals. Look at it from the vendor's perspective. There must be a reasonable chance of a return on the vendor's investment.

Somewhere between these two extremes is the right arrangement, which allows you to get the most from your vendors. Many managers will tend toward dealing with fewer vendors in order to keep their computer systems compatible and minimize the knowledge base required. This allows the vendor to justify a greater investment on your behalf. It will also give you a bigger stick to use in getting the service you expect.

Choosing your vendors. Perhaps you are involved in selecting a vendor right now. How can you make the correct selection in order to avoid the kind of problems I am discussing? Of course, the product or service must meet your needs and the cost must be feasible. But is cheapest always best? Maybe you should consider the vendor's stability, to have some assurance that the support and future growth path will be there when you need them.

Another suggestion is to talk with other users. The vendor will, of course, want you to talk only with satisfied users. Use sources within your own industry, to be sure you are talking with objective users who will be honest.

Vendor responsibility. A mistake made by many companies is to rely too much on vendor representatives. Perhaps you know of companies that engaged a vendor to conduct a study and recommend a solution, which just happened to include the vendor's own products. Then the result proved less than satisfactory because there was a lack of knowledge and commitment on the part of the companies' own employees.

Use the vendor's representatives wisely but don't turn your business over to them.

Contracts vs. promises. Another area of potential trouble is in the lack of attention to formal contractual arrangements.

Your agreement with a vendor should be viewed as a formal relationship between two business entities. There is a chance that either you or the vendor representative, or both, will not be around for the duration of the use of the products. Are all the vital elements of the agreement included in the contract, or are there some handshake deals that could be easily broken?

Using an attorney to prepare the contract or advise you on its contents is a safeguard that could save you money and/or despair down the road. Also, the use of requests for proposals and formal bids from vendors creates a written commitment on the part of the vendor that will help assure its compliance.

Commitment and support. The MIS director should have realistic expectations of what the vendor can and should provide. You have the right to expect honest, professional, best-effort service from vendor representatives. But it is not realistic to expect perfection or an immediate comprehensive response to all situations.

Sometimes you may have to request a change in vendor representatives. If so, be prepared with the facts to substantiate unacceptable performance that must be corrected.

A MISTAKE made by many companies is to rely too much on vendor representatives.

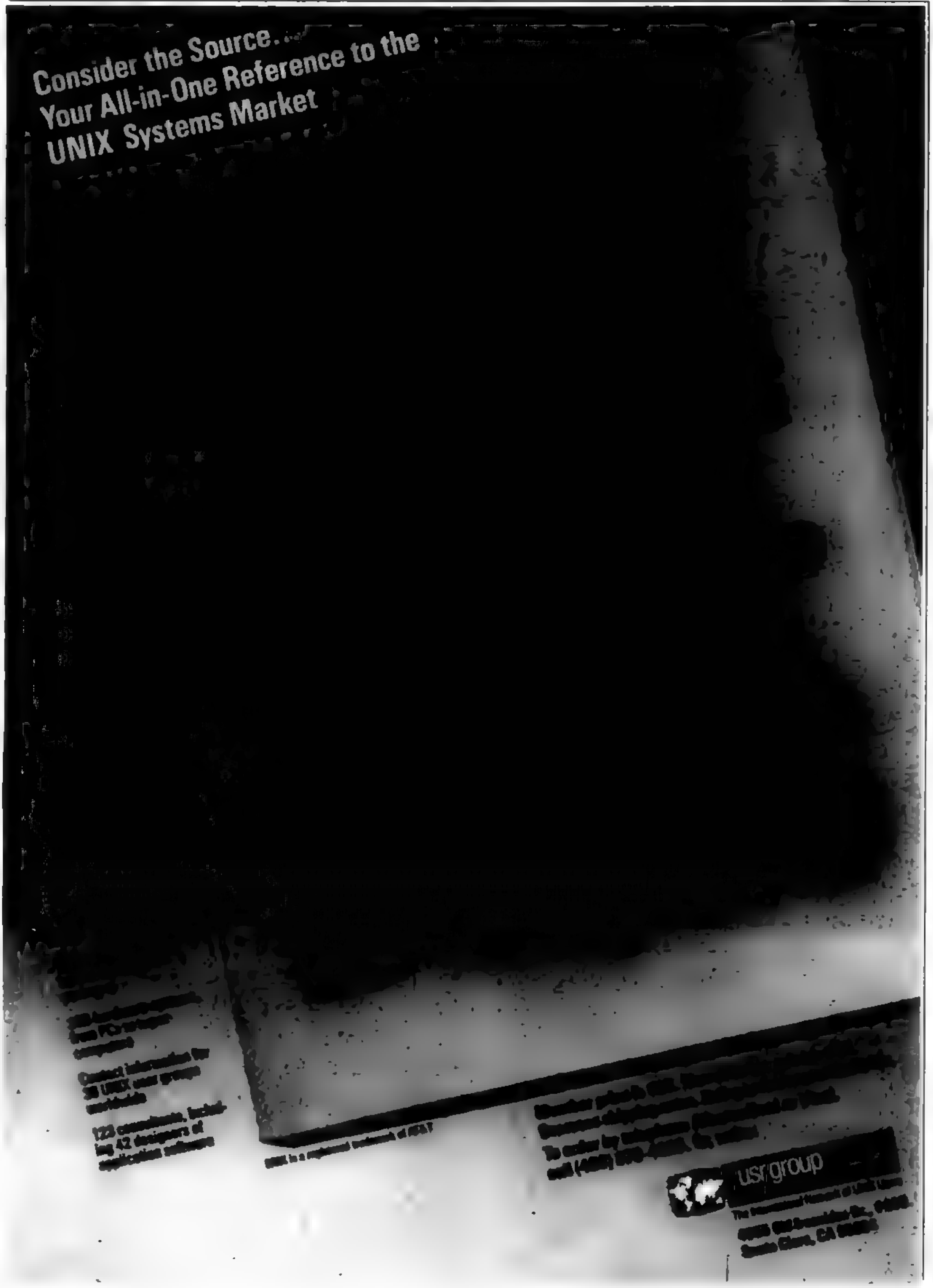
Multiple vendor situations. One of the most common difficulties in vendor relations is caused by the multiple vendor controversy. This is especially acute these days in the telecommunications area. Whether at installation time or problem-resolution time, finger pointing can easily occur. How do you deal with this situation?

A carefully worded contract will help. Dealing with vendor representatives who want a successful long-term relationship will certainly prove valuable. Demanding cooperation from all the vendors involved will be a necessity.

I contend that there is someone up the ladder in each vendor company who wants his company's part of the puzzle to work properly. Upper management of vendor companies does not like to hear complaints and does not like embarrassing stories to be made public. The MIS director must often escalate the problem to a high level before vendor representatives will give full cooperation.

It is my judgment that this lack of complete cooperation in a multiple-vendor situation is one of the most critical problems in our industry today. Those vendors, whether computer or telecommunications, that do not recognize the problem and adopt a policy of cooperation will eventually pay for it.

Gilliam is an independent computer and management consultant based in Ponca City, Okla. with more than 30 years experience in data processing.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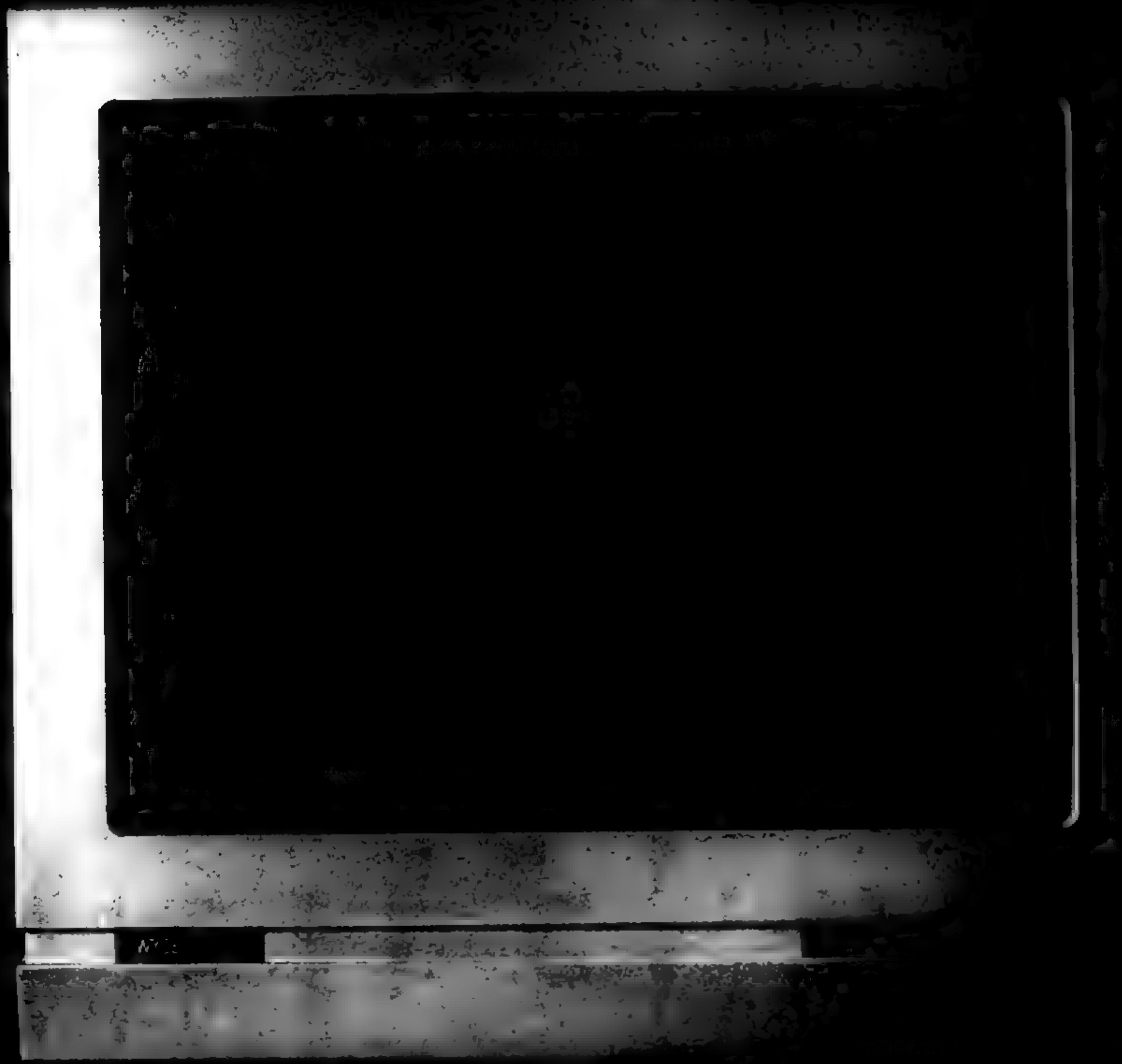

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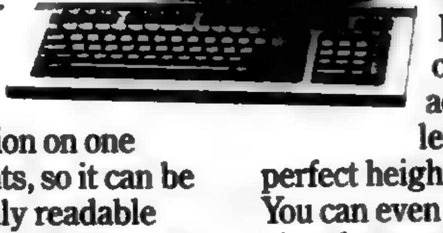

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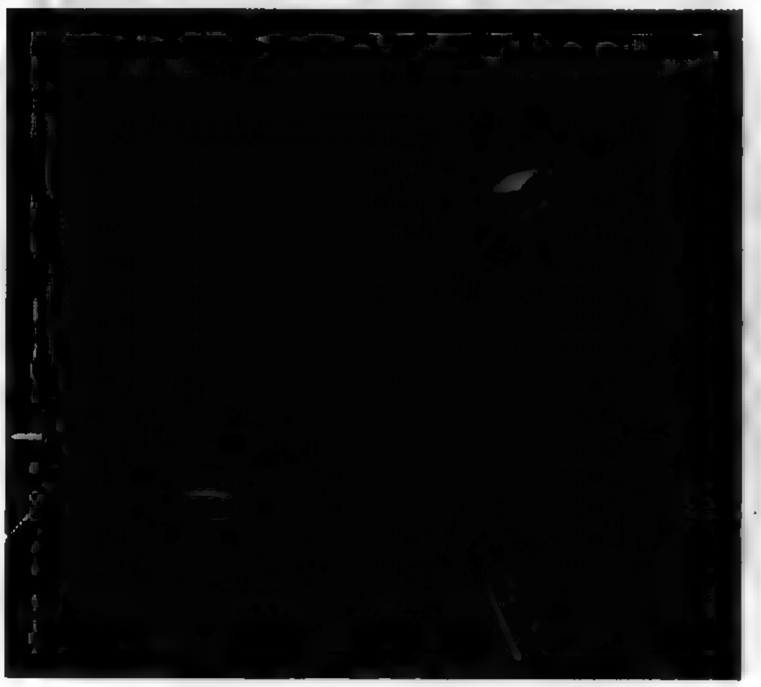

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Probing

CONTINUED FROM PAGE 97

tasks of specifying hardware and software and even developing custom programs with fourth-generation languages, then the only major task left to DP, argues the author, is to provide data.

Managing End-User Computing in Information Organizations outlines some fundamental differences between end-user computing and traditional data processing — data usage, level of detail, types of processing and so on. But the book goes much farther, examining the implications of end-user computing's need for effectiveness rather than efficiency, for example, and probing the limitations of a technology that was developed to serve traditional DP.

The author, a consultant and senior principal with American Management Systems, Inc., does spend some time on basic technology. Chapter Two instructs the reader about the necessary elements of end-user computing: hardware, software, communications, cabling, licenses, installation, training — even scheduling and data definitions.

But the weight of the text provides perspective. Chapter Three describes a company reaching a crisis point when "upper management became dissatisfied with the decision-support process because different people, using the same data, arrived at very different conclusions." This all-too-familiar crisis forces any company to make one of two choices: let business take its course, which will mean one department will gain credibility at the expense of all the others, or step in and insist on organizational discipline.

Here the task of merely providing data takes on real importance. Inmon argues that the mandate of organizational structure lies in the controlled "architected" use of data. He maintains that the high-level corporate data model must be identical to that used by end users. Otherwise, he writes, "There will predictably be *major* problems with the corporate information systems."

In later chapters, the author turns to the how-to's of constructing a sound DSS architecture. He seizes on some sensible but widely misunderstood principles of data extracting, which he blames for many of the inconsistencies that plague companies: "When an extract of an operational data base is done at 10 a.m., it is not surprising that the extract produces different results from one done at 4 p.m., since the operational data base is constantly being updated. . ."

Instead of simple extraction, Chapter Seven proposes a three-tiered extraction scheme, with each level a subset of the previous one — and therefore consistent.

Throughout, one of the strengths of Inmon's book lies in the specifics he provides: measures for figuring your success, equations for determining which application should be developed by DP and which should be developed by end users via fourth-generation languages.

But in trying to cover so much ground — from computing basics to the intricacies of data architecture — the author stumbles on the issue of who he addresses in his pages. If readers understand data extraction, will they need to be taught the difference between a token-ring and a star network topology?

The reader's best bet: Bypass the rather inaccessible table of contents. Instead, use the clear introductions and summaries at the beginning and end of each chapter to find appropriate sections and skip the others.

No reader should miss the author's parting shot to DP: "If the DP department is still in the early stages of control, then it is unlikely that the end user can evolve much further."

Hardcover, $30, 216 pages, ISBN 0-87094-941-1, by Dow Jones-Irwin, Homewood, Ill.

AMY SOMMERFELD FIORE

BOOKS IN BRIEF

The Cobol 85 Example Book

By Jerome Garfunkel

A definitive guide to the new Cobol 85 language written from an insider's perspective by one who is intimately involved with its development.

Paperback, $24.95, 322 pages, ISBN 0-471-80461-4, by John Wiley & Sons, Inc., New York, N.Y.

The Pick Operating System

By Joseph St. John Bate
and Mike Wyatt

A complement to the Pick manual, particularly useful to users wishing to develop their own systems.

Paperback, $24.95, 150 pages, ISBN 0-442-29276-7, by Van Nostrand Reinhold Co., New York, N.Y.

How to Use CICS to Create On-Line Applications

By Boris Musteata

Methods and solutions for understanding and working in the CICS environment from an applications point of view.

Paperback, $39.50, 525 pages, ISBN 0-89435-182-6, by QED Information Sciences, Inc., Wellesley, Mass.

Business Software Directory

Edited by Ruth Koolish

The third edition of this two-volume set includes 7,800 listings for micro and minicomputer software as well as for mainframe software that links to micros and minis.

Paperback, $175, 2258 pages, ISBN 0-943906-02-4, by Information Sources, Inc., Glenview, Ill.

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Time

CONTINUED FROM PAGE 97

be moved to Tampa by the end of 1988, Gerami said. The new data center will be part of a newly named Time subsidiary, called Time Customer Service, Inc.

The computer room will be anchored by one or more IBM 3090-class machines, although they have yet to be purchased or leased. MIS managers are also evaluating new office system computers, as well as optical scanning equipment for data entry and high-speed laser printers for promotional materials.

For the moment, circulation fulfillment for the Magazine Group, which tracks 12 million customer accounts, will continue from a data center in the Chicago Time-Life Building. The Chicago center houses an IBM 3084 and a 3090, but the machines there will be downsized once the move is complete, Gerami said.

The Chicago computers handle circulation lists for *Time*, *Sports Illustrated*, *Life*, *People*, *Discover*, *Fortune* and *Money* magazines, as well as *Time Canada*, the Canadian version of *Time*. The computers also run statistical analyses of supermarket buying patterns for Time's Selling Areas Marketing, Inc. unit, a function that will remain in Chicago.

Processing requirements are expected to be somewhat different in Tampa, which is not threatened by snowstorms but suffers from more variations in power supply due to occasional lightning strikes. For this reason, the company is considering the installation of both uninterruptible power supply (UPS) systems and auxiliary generators. "In Chicago, we've always run without a UPS system, and we've never had a problem, but most DP shops in the Tampa area are installing UPS systems," Gerami said.

Time's move to Tampa will result in the employment of 1,200 people in three facilities there, housed in a single 100,000-sq ft building.

The Tampa area has seen the addition of several key corporate MIS shops in recent years, including the National Administrative Center of Price Waterhouse, IBM's 1,400-employee Information Network facility, GTE Corp.'s Data Services and a Citicorp operation.

NCC moves to avert slump in exhibitors

BY DAVID A. LUDLUM
CW STAFF

Managers of the National Computer Conference (NCC) have orchestrated several moves aimed at reviving the show, but any changes appear unlikely to forestall considerable shrinkage in the number of exhibitors this year.

NCC management has abandoned Las Vegas as a conference site and scheduled future shows in major marketplaces — New York, Chicago and the Los Angeles area. It also has slated conferences after next year's for dates earlier in the year — April rather than June.

The managers have chartered two advisory committees — one representing the trade press and the other industry vendors — and designed 10 conference program tracks aimed at guiding this year's attendees to educational sessions and product exhibits.

NCC has suffered from the computer industry slump of the past two years and also from inroads made by more narrowly focused shows and ones geared to microcomputer technology.

In a recent meeting with *Computerworld* editors, Rolland Arndt, chairman of the NCC board of directors, suggested that the Interface Group, Inc.'s microcomputer-oriented Comdex show has been a major factor in NCC's decline. "We were somewhat slow to recognize the importance of personal computers," Arndt said.

Insufficient focus?

The lack of exhibits from Digital Equipment Corp. and Apple Computer, Inc., which put on their own conferences, have been thorns in the side of NCC, added Arndt, a former Unisys Corp. executive. The conference has also been hurt by perceptions that it is not sufficiently focused and does not emphasize software, Arndt said. He also acknowledged that the NCC bureaucracy became top-heavy and sluggish but added that such issues have been addressed. "We have cleaned up our act and are ready to go forward again," he said. The NCC board has hired a conference management consultant and is moving toward hiring a marketing or public relations agency, Arndt observed. It has also attracted a growing number of foreign attendees, primarily Japanese, with help from a U.S. Department of Commerce program.

However, commitments from exhibitors foreshadow continued decline for NCC when the show is held in Chicago's McCormick Place June 15 to 18.

Late last month, when a high percentage of the final total was expected to be signed on, only about 150 vendors planned to exhibit, according to marketing director Marty Byrne. That compares with 360 exhibitors in Las Vegas last year, about 425 in Chicago in 1985 and more than 700 in Las Vegas in 1984.

The number of people attending the exhibits and educational sessions rose from about 65,000 in 1984 to 85,000 in 1985, according to Byrne, but fell to about 45,000 last year, she said.

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Hiring AI pros

CONTINUED FROM PAGE 97

If AI can help with that, then they need to use all of that technology too."

On the supply side, availability of AI specialists is affected by employment at vendor companies, and many that were started in recent years have slowed or frozen hiring or even laid off workers, Furno notes. "The few that got started are presently gearing down so they can be profitable," she says.

But some start-ups take the place of those that shrink or close, Furno adds. "There is always the latest thing . . . In this case, it is mostly parallel processing and neural networks." These may call for different skills than traditional AI start-ups, she comments.

Meanwhile, the young age of the artificial intelligence field continues to restrict the supply of specialists. "There aren't any knowledgeable chiefs and not too many knowledgeable Indians," says Hershel Waldner, president of American Data Search & Management Consultants in New York. One or two years in the field means a worker is a veteran, he adds.

"The whole field of AI is very entry level . . . It's just not an established field," Gable says. Those who do have experience often got it through schools or other research institutes, she claims.

With about 16,000 AI specialists in the U.S. — excluding academics — and most of them working in expert systems, many companies have had trouble finding workers sufficiently experienced or whom they can bring up to speed, LeBleu asserts. If they do, they are often aghast at the specialists' hefty salaries — perhaps in the mid-$50,000 range with little more than a year's experience.

Waldner claims companies often solicit his firm to find an AI professional with three years of experience who will work for $35,000. "They don't realize that there is a law of supply and demand . . . and they don't know how to price out these people," he says.

Waldner advises companies to think through the process carefully. Rather than trying to play catch-up with a competitor, a company should first work with a strategic planner to see if it needs or really wants an AI unit. "This way, they don't spend all kinds of money doing [AI] when they don't want it," Waldner says.

He suggests employers ask themselves, What kind of people are out there? What are we willing to pay for AI? What can we expect from the AI professional? What should we look for? Can we hire someone working in a similar environment if nobody is available from our type of firm?

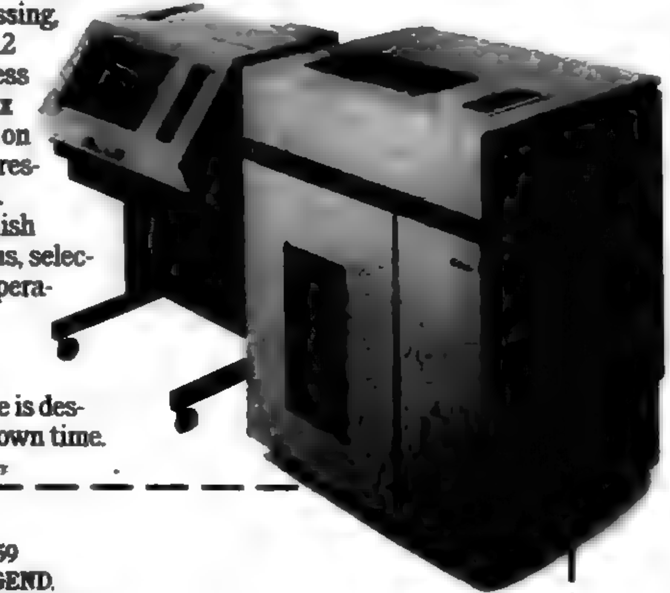
When seeking the AI professional, traditional pay scales based on experience and education sometimes have to be discarded, consultants note. But in some companies, strict rules prohibit the altering of those requirements.

"Even if you are the most brilliant AI person in the world, if you don't fit the formula to be making $60,000, they won't pay it to you," Furno says. These companies might have to hire people with less-than-required or no specialized experience.

Some companies have worked around such restrictions by hiring consultants at rates higher than they are allowed to pay employees, although the expense can be even greater than the going rate to hire an AI specialist as an employee, Furno comments.

Roger Sobkowiak, president of Software People Concepts, Inc. in New Haven, said most companies can realize significant near-term payoffs from AI by training employees and using conventional equipment.

LeBleu agrees. "Because it's a new field, I think there's a bit of mythology," he says. "I think a good systems person can be converted to [an AI specialist] within a short period of time with the proper guidance."



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Fifth Annual Computer Based Training Conference and Exposition. Atlanta, March 15-18 — Contact: Conference Registrar, Weingarten Publications, 38 Chauncy St., Boston, Mass. 02111.

Guide International. Anaheim, Calif., March 15-20 — Contact: Guide Headquarters, 111 E. Wacker Drive, Chicago, Ill. 60601.

Software Quality Assurance. Los Angeles, March 16-17 — Contact: U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903. Also being held March 23-24 in Washington, D.C., and March 30-31 in Chicago.

West Coast MAPICS Users Conference and Trade Show. San Diego, March 16-17 — Contact: The Cassman Group, Suite 165, 2377 Crenshaw Blvd., Torrance, Calif. 90501

1987 West Coast Manufacturing, Accounting and Production Infor-

Continued on page 110

Tom Wilson,
National Account Manager, Unisys

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Continued from page 108

mation Control System Users Conference. San Diego, March 16-17 — Contact: Salem Corp., 1654 Poplar Lane, Annapolis, Md. 21401.

Artificial Intelligence and Expert Systems. Cleveland, March 16-17 — Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held in Louisville, Ky.; Dayton, Ohio; Portland, Ore.; Fort Worth, Texas; Baltimore; Richmond, Va.; Concord, Calif.; Tulsa, Okla.; St. Paul, Minn.; Cincinnati; and Toronto.

Fifth National Conference on Measuring Data Processing Quality and Productivity. Orlando, Fla., March 16-18 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

National Conference on Ada Technology/Washington Ada Symposium. Arlington, Va., March 16-19 — Contact: GTE Government Systems, 77 A St., Needham Heights, Mass. 02194.

Electronic Data Processing Audit Managers' Roundup III. Orlando, Fla., March 16-19 — Contact: MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

TCP/IP Interoperability Conference. Monterey, Calif., March 16-19 — Contact: Advanced Computing Environments, 21370 Vai Ave., Cupertino, Calif. 95014.

Tutorial Week. Kissimmee, Fla., March 16-20 — Contact: Computer Society of IEEE, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Open Systems Interconnection. Washington, D.C., March 16-20 — Contact: The Omnicom Institute, Omnicom, Inc., 501 Church St. NE, Vienna, Va. 22180. Also being held April 27-May 1 in Minneapolis.

Workshop on Factory Communications. Gaithersburg, Md., March 17-18 — Contact: B217 Technology Building, National Bureau of Standards, Gaithersburg, Md. 20899.

Fifth Technology Opportunity Conference on Optical Storage of Documents and Images. Washington, D.C., March 17-19 — Contact: Rothchild Consultants, 256 Laguna Honda Blvd., San Francisco, Calif. 94116.

The National Association of Bank Servicers Semiannual Meeting. Tampa, Fla., March 17-20 — Contact: National Association of Bank Servicers, Suite B, 5008 Pine Creek Drive, Westerville, Ohio 43081.

The International Phoenix User Group Meeting. Atlanta, March 18-19 — Contact: Livingston and Associates, P.O. Box 30619, Cleveland, Ohio 44130.

Testing Computer Software. Los Angeles, March 18-20 — Contact: U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903. Also being held March 25-27 in Washington, D.C.

1987 Template User Network Annual Conference. Arlington, Va., March 18-20 — Contact: Template, 9645 Scranton Road, San Diego, Calif. 92121.

Innovative Systems 1987 User Group Conference. San Francisco, March 18-20 — Contact: Innovative Systems, Inc., 341 Fourth Ave., Pittsburgh, Pa. 15222.

MARCH 22-28

Electronic Computing Health Oriented (ECHO). Hot Springs, Va., March 22-25 — Contact: Electronic Computing Health Oriented, 10401 Fernwood Road, Bethesda, Md. 20034.

Computer Graphics '87: Applications for Excellence. Philadelphia, March 22-26 — Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

Managing the Information Resource. Los Angeles, March 22-27 — Contact: Nolan, Norton & Co., One Cranberry Hill, Lexington, Mass. 02173.

Sixth Annual International Spectrum U.S.A. '87. Las Vegas, March 23-25 — Contact: International Data Base Management Association, Suite 104, 9740 Appaloosa Road, San Diego, Calif. 92131.

Strategic Data and Systems Planning '87. Arlington, Va., March 23-25 — Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

National Capacity Planning Conference. Washington, D.C., March 23-26 — Contact: National Capacity Planning Conference, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

Walker Inter/Actions Users Conference. Denver, March 23-26 — Contact: Walker Interactive Products, 100 Spear St., San Francisco, Calif. 94105.

Datacon '87. St. Louis, March 24-25 — Contact: Datacon, P.O. Box 1401, St., Louis, Mo. 63188.

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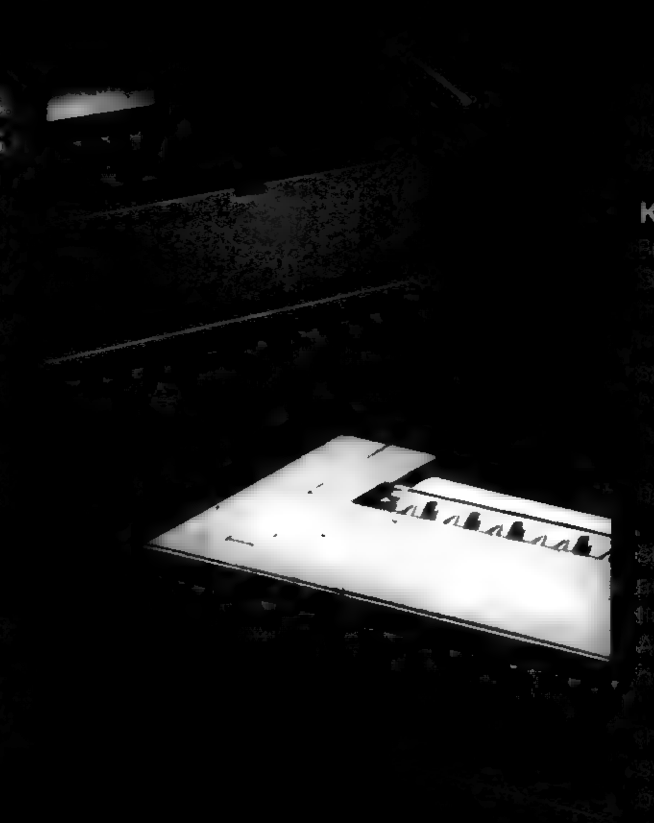

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- 90 Computer/Peripheral Dealer/Distributor/Retailer
- 75 User Other ______
- 95 Vendor Other ______ (Please specify)

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- 23 Dir Mgr Supv Analyst of Systems
- 31 Dir Mgr Supv of Programming
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- 35 Dir Mgr Supv OA/WP
- 38 Data Comm Network/Systems Mgt

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Bohdan Szuprowicz

T1 takeovers tempt IBM

Some manufacturers of very high-speed data communications equipment have been wondering who among them might end up as the next IBM acquisition or subsidiary.

The issue centers around IBM's strategic need to offer its mainframe clients the ability to use T1 transmission channels that are available from major communications carriers. These are basically private data-transmission links capable of operating at speeds of 1.544M bit/sec. in North America and more than 2M bit/sec. internationally.

Since the breakup of AT&T, large corporate users have been increasingly moving to set up their own T1 networks to take advantage of this technology.

The market for T1 equipment was estimated to have doubled in 1986 to reach $250 million. It is now being forecast to increase by at least 60% this year and is expected to hit the $1 billion mark within the next few years.

This means venture capital is flowing, new start-ups are entering the fray, and even staid old IBM is finally taking notice of the market.

Piquing interest

At first blush, it would appear that IBM could easily build its own T1 network equipment through its Rolm Corp. subsidiary. On the other hand, the market so far has been too small to interest Big Blue, which has left the field open for several start-ups and traditional multiplexer firms.

But with IBM now showing interest, existing T1 equipment makers have good reason to believe that IBM may be on the prowl to acquire one of them, or strike a deal to sell their products under an IBM logo.

One of the reasons is Stratacom, a 1986 start-up specifically targeting T1 equipment and network management markets.

Continued on page 119

Firm strives to regain strength

BY JAMES A. MARTIN
CW STAFF

SAN ANTONIO — Although Datapoint Corp. offers what is largely considered a solid line of office automation and communications equipment, the company's misfortune in recent years has created an increasingly negative image that has been a significant factor in Datapoint's continued decline, insiders said.

In addition to a recent $65.9 million second-quarter net loss and the reduction of 786 jobs worldwide, the company has experienced a variety of scandals, setbacks and unpleasant surprises in the past few years that would overwhelm almost any corporate reputation.

Datapoint reported operating losses in 1985 and 1986, suffered lawsuits that alleged it misrepresented financial results, has been slow to introduce new technologies and cut its worldwide work force from 8,822 in 1982 to 2,695 following the recent layoffs.

There has also been a highly publicized takeover and leveraged buy-out attempt by well-known Wall Street financier Asher B. Edelman. More recently, 13-year Datapoint executive and Chief Executive Officer Edward P. Gistaro resigned suddenly and without explanation [CW, Jan. 26]. Gistaro could not be reached for comment last week.

As a result of these developments, potential Datapoint customers and the firm's installed base have heard only the bad news about the company lately, observers said.

"They definitely have a very negative image that will be difficult to overcome," said Gwen Peterson, vice-president of computer products research at Dataquest, Inc. in San Jose, Calif.

One measure of its sagging reputation is the lack of Wall Street analysts following Datapoint. This year's edition of *Nelson's Wall Street Research*, a comprehensive listing of analysts, lists only five who watch Datapoint. However, none of those reached by *Computerworld* said they have continued to pay attention to the company.

Continued on page 116

IBM combines forces with Sterling

BY CLINTON WILDER
CW STAFF

DALLAS — In another move to strengthen its position in the banking market through independent software vendor partnerships, IBM has announced a complementary marketing agreement with Sterling Software, Inc.'s financial software group.

Under the agreement, the companies will combine the marketing of IBM's Check Processing Control System (CPCS) and hardware with Sterling's CPCS installation services and specific check-processing applications software. The pact is IBM's most recent under its Industry Marketing Assistance Program.

The deal is also IBM's third significant banking software vendor partnership within the past year. After last year's controversial OEM deal with Hogan Systems, Inc., IBM is the exclusive U.S. marketer of Hogan's mainframe banking applications.

IBM also sells Software Services of America, Inc.'s teller terminal networking software through its Commercial Systems Integrator program [CW, Sept. 15, 1986].

Sterling has never competed directly with IBM in check-processing software, according to Larry Fournier, vice-president of marketing for Sterling's financial software unit.

Fournier added that the IBM agreement will give Sterling more access to accounts at the beginning of a buy decision, rather than after a customer has already licensed an IBM CPCS, he said.

Ashton-Tate gears up for acquisitions

BY ALAN J. RYAN
CW STAFF

TORRANCE, Calif. — Ashton-Tate, shortly after reporting its strongest fiscal year to date with revenue of $210 million, announced plans to sell two million shares of its common stock. Company watchers say Ashton-Tate is gearing up to acquire other firms with the additional funds.

Last week, Ashton-Tate said it plans to file a registration statement with the Securities and Exchange Commission within the next 30 days covering the public offering of the stock.

At current stock prices, which are hovering around $25 per share, the sale should net the company slightly more than $50 million, analysts said. The company said it will use the funds as working capital and for other general corporate purposes, including the possible acquisition of other businesses or

Continued on page 120

Inside

- Feds seize illegal MS-DOS copies. Page 117.
- [redacted] rises. Page 117.
- [redacted] South Africa. Page 119.

CAD/CAM vendors shifting focus

Computervision, Intergraph rolling out engineering workstation tools

BY ROSEMARY HAMILTON
CW STAFF

Faced with declining demand for large turnkey systems, the two largest computer-aided design and manufacturing (CAD/CAM) vendors have been implementing bold changes during the past few years. But while the strategies of Computervision Corp. and Intergraph Corp. appear similar on the surface, they have many fundamental differences.

Both vendors no longer associate themselves solely with their minicomputer offerings, as is evidenced by the engineering workstation products they have been rolling out for more than a year. But the vendors also appear to be putting their proverbial eggs in different baskets.

Computervision is playing up its successful Cadds 4X software and is now calling it the company's flagship product. Meanwhile, Intergraph is focusing on its hardware capabilities and is mapping out plans that center on its workstation platform.

"They've taken different approaches, and, on the surface, Computervision's is easier to swallow," says Laura Conigliaro, a vice-president at Prudential-Bache Securities.

Computervision has recently begun a slow recovery from a disastrous 1985, a year in which it reported a whopping net loss of $80.8 million. In addition to its financial setback, Computervision lost the No. 1 CAD/CAM market share position to IBM. Intergraph, meanwhile, which had been keeping up steady growth, took the No. 2 slot, pushing Computervision to No. 3.

Bedford, Mass.-based Computervision's troubles were attributed primarily to its proprietary minicomputer systems, which were losing appeal in a market that wanted 32-bit workstations that supported industry standards.

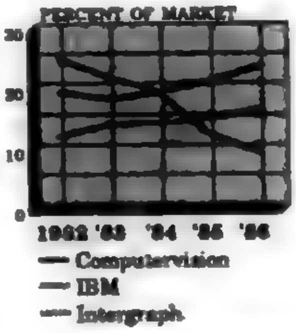
Acknowledging that Cadds 4X software was its trump card, Computervision opted to port it to a system based on a workstation from another vendor, Sun Microsystems, Inc.

The move was hailed by analysts and users alike, and although Computervision will not release specific sales information, Caddstation has clearly contributed to improvements on Computervision's balance sheet.

Buried within this strategy, however, is what analysts say is a major flaw that could eventually harm the vendor. Caddstation is sold as a bundled system only, and the vendor's unwillingness to make Cadds 4X software

Continued on page 120

Contrasting fortunes
Five-year CAD/CAM market share history



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FROM PAGE 113

"They simply are no longer a force in the business," said one analyst, who asked not to be identified. Another said that Edelman's takeover caused most analysts who still covered Datapoint to lose interest. The second analyst, who also requested anonymity, explained that, "when a company becomes an arbitrage stock, the value of it becomes determined by the arbitrageur and not the market."

Aside from its troubled reputation, however, Datapoint offers a strong product line that allows the interconnection of disparate office automation operating systems, a problem most of corporate America is tired of grappling with, according to Andrea Rossi, analyst with Rossi Consultants in Marblehead, Mass.

"We need someone out there who can integrate office automation systems, and they have the products," she said.

Datapoint's return to profitability will be a long haul, but the company's strategy of focusing itself as an office automation interconnect vendor, cutting costs and increasing marketing efforts is the right one, according to Peterson.

"The underlying theme today in Datapoint's product line is the ability to take diverse operating environments and allow them to share data through the Arcnet [Datapoint's proprietary local-area network]," Peterson said. "That approach is what is needed today."

The troubled communications and office automation vendor recently reported a quarterly net loss of $65.9 million, or $5.02 a share, compared with a loss of $6.5 million, or 37 cents per share, for the year-earlier period. Revenue fell 6.8% to $74.3 million, compared with $79.8 million a year ago.

Datapoint's elimination of 786 jobs worldwide reduced its domestic work force by 37% and its international force by 13%. Those positions were scattered throughout the company, a spokesman said.

The net loss of $65.9 million included special charges of $56.8 million as a result of Datapoint's efforts at corporate realignment. Those charges include $13 million in severance packages for fired employees, $12 million in write-downs on the value of unsold products, $6.4 million for early termination of office leases and $25.4 million related to the write-down on fixed assets such as office equipment.

Although Datapoint's domestic sales force was cut from 200 to 116, the company has added several key executives in that area to direct its public image and sales force.

Ron Meyers, Datapoint's director of international marketing for the Americas and the Far East, has been appointed senior vice-president of marketing and sales. Insiders said they believe Meyers' position is a strategic one, as Datapoint has not had anyone in that capacity for more than one year and sorely needed that position filled.

In addition, F. Terry Eger, formerly the Los Angeles district director for Wang Laboratories, Inc., has been hired to fill the newly created position of vice-president of domestic sales. In another key appointment, James Behan has been named vice-president of worldwide product marketing.

As previously announced, Doris Bencsik, the company's highly regarded chief operating officer, continues to replace Gistaro on an interim basis until a CEO is selected. Many insiders said they believe Bencsik would make a good Datapoint CEO, with previous experience as director of engineering for Data General Corp.'s small-business systems division.

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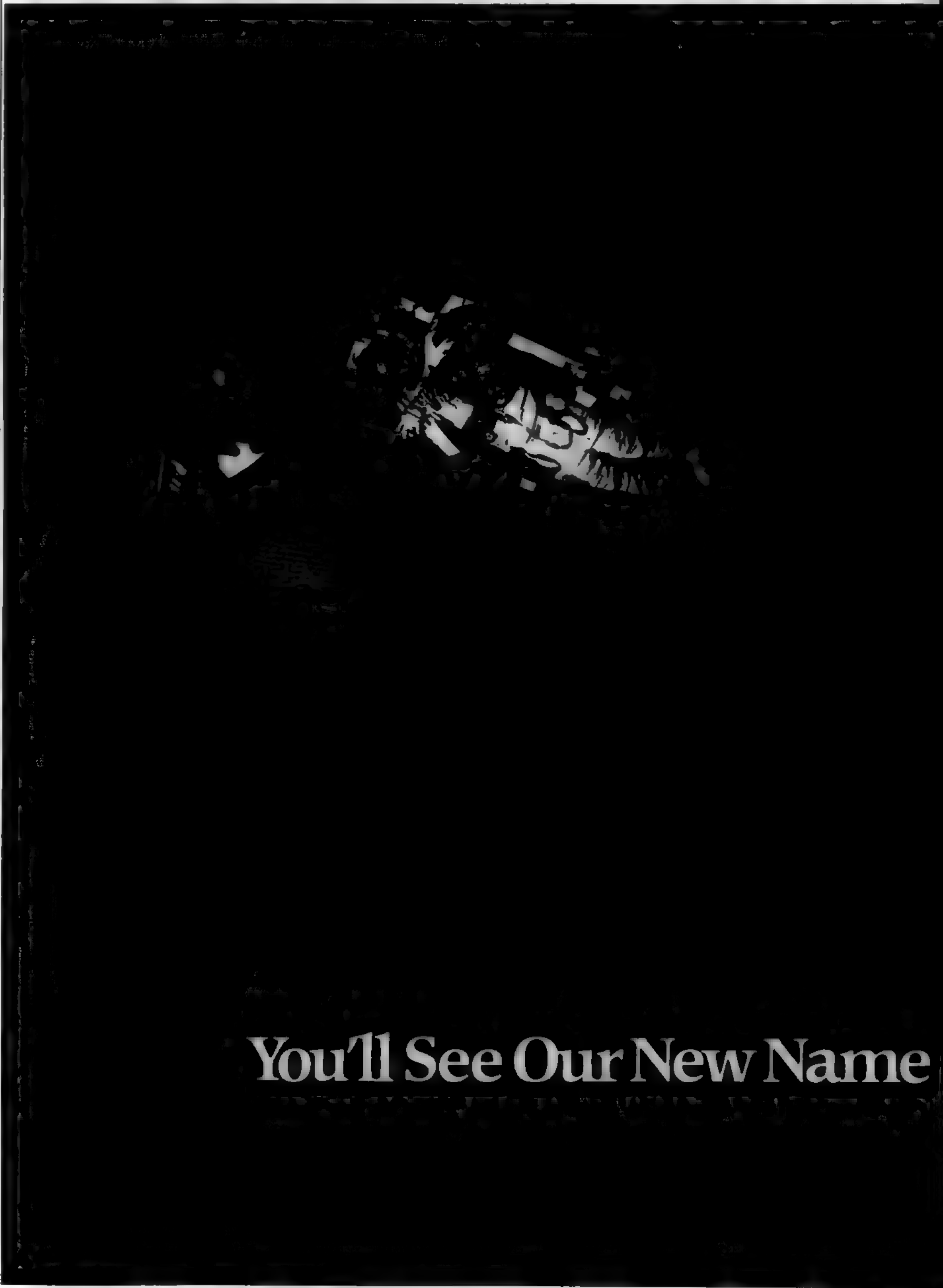

Feds seize illegal MS-DOS copies

BY DOUGLAS BARNEY
CW STAFF

REDMOND, Wash. — Microsoft Corp. has announced that federal agents recently seized 15,000 copies of a Taiwan-developed operating system that are allegedly illegal copies of Microsoft MS-DOS.

Microsoft obtained a temporary restraining order against Wetex International and California-based Quadrant Corp., firms allegedly involved in the importing and distribution of Falcon MS-DOS. The restraining order prevents them from infringing on Microsoft's copyright.

Few details of the case have been released.

"All we know is that a company in Taiwan was shipping 15,000 copies of what is called Falcon MS-DOS to the designated receiving party, Wetex, and apparently was to be shipped by Wetex as agent to Quadrant," said Microsoft corporate attorney William T. Poke.

"The sample that we have taken a look at indicates that in all cases, at least 50% is copied Microsoft MS-DOS code," Poke added.

No charges have been filed against Wetex or Quadrant.

Poke said the company in Taiwan that is shown as the shipper on the bill of lading is called Favorlon.

He added that Microsoft still does not know with certainty what firm manufactured the product in Taiwan.

When seized, the shipment had already made it through U.S. customs. Microsoft was unsure whether the packages were intended to be sold individually or bundled with personal comput[illegible]

According to Microsoft, the shipment seized was not the first to reach the U.S.

"We are aware of a product that is called Falcon MS-DOS being distributed to a limited extent in the U.S. We are also aware that a product by the same name — we don't know if they are identical — has been distributed in the Far East, certainly in Taiwan," Poke said.

The seizure was made in mid-February, according to officials.

Wherever We Do Business.

Electronics deficit up

BY JAMES A. MARTIN
CW STAFF

PALO ALTO, Calif. — Worries about the U.S. trade imbalance were heightened recently by a report from the American Electronics Association that estimated the U.S. worldwide trade deficit for electronics increased 49% in 1986.

The U.S. electronics trade deficit with Japan, a major subject of concern in the semiconductor and computer industries, was $20.4 billion, an increase of 17% above the 1985 deficit of $17.5 billion, the association reported.

The U.S. trade balance with the world was negative for most industry segments. It was only positive for computers and office products. Even so, the positive balance in those two segments dropped 50% and 13%, respectively.

AEA President J. Richard Iverson called the accelerating growth rate of the worldwide trade deficit "alarming." He attributed the rate to the "strong push" by Pacific Rim countries other than Japan into the U.S.

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HP to stay in S. Africa

BY JAMES A. MARTIN
CW STAFF

CUPERTINO, Calif. — Although IBM, AT&T, Honeywell, Inc. and others have recently made highly publicized departures from South Africa, Hewlett-Packard Co. has voted in favor of the company retaining its sales operations in Johannesburg.

At the Palo Alto, Calif.-based company's annual meeting, a shareholder proposal that HP "expeditiously withdraw" from South Africa was soundly defeated. Some 175 million shares were cast to oppose the proposal, with only 20 million shares voting in favor.

"Hewlett-Packard continues to believe in our presence there," said William Hewlett, a co-founder of the company and retiring vice-chairman of the board. "We feel we can best confront apartheid by remaining in South Africa, and we are committed to confronting it with action."

Companies restricted

But U.S. corporations are "severely restricted in what they can do in South Africa," said Albert J. Wilson, associate general counsel of Teachers Insurance and Annuity Association of America, a New York-based equities fund concern that owns more than three million HP shares.

HP's belief that it can affect changes in the racist government is "naive at best," Wilson said. "U.S. companies have not been able to make any changes there, and there's no indication that South Africa is prepared to dismantle apartheid," he said.

Rather than making progress, HP's continued presence in South Africa will indirectly support the racist regime, Wilson said. "The company's products are crucial to South Africa, and HP has no control over the final use of those products by the government or the police in the apartheid system. Also, HP can be forced to sell their products to them as long as they're in South Africa, and all of this can be done in secrecy as well."

Analyst David Wu, of San Francisco-based S.G. Warburg & Co., said he agreed with the shareholders' vote. "Commercial organizations are not important enough to affect any political policies of a country," Wu said. "If Hewlett-Packard were to withdraw, it wouldn't bring apartheid down."

Wilson said his investment company would not divest itself of HP stock but would continue its efforts to convince the company to withdraw from the politically troubled nation. Hewlett said that due to the number of shares in favor of the proposal to withdraw, the proposal could be entertained again at the 1988 shareholder's meeting.

HP's operations in South Africa are strictly sales-related, according to the company. The South Africa sales force generated some $37 million in fiscal 1986 revenue. Although several major computer vendors have withdrawn from South Africa, they have often done so after previous shareholder resolutions failed. IBM announced its pull-out decision late last year, but in April, its shareholders had overwhelmingly rejected a proposal to withdraw.

T1 takeovers

CONTINUED FROM PAGE 113

Significantly, this venture was started by ex-Rolm executives who left after the IBM acquisition. Their departure may have deprived IBM of its most creative T1 designers — who have since received more than $11 million from leading venture capital firms, and have announced with unusual confidence that they expect to capture at least 15% of the T1 equipment market in the next few years. Thus IBM may not have the advantage it thought it had when it acquired Rolm two years ago.

Network Equipment Technologies is another start-up in the T1 game that has been growing rapidly and already captured an estimated 6% of the market. It has been mentioned as the most likely IBM take-over candidate. But the company is a very independent, well-financed entity, with at least $24 million in venture capital and about $50 million from its initial public offering in January. The stock has all the earmarks of becoming another darling of institutional investors, who may run up its price and prevent a takeover at a price acceptable to potential acquisitors.

As a result, IBM's acquisition appetite is now believed to have shifted to Timeplex, Inc., a well-established multiplexer vendor and leader in T1 network equipment with an estimated 30% market share. With annual sales of more than $100 million, Timeplex has the resources and know-how to build the sophisticated high-end T1 equipment that could fill gaps in IBM's existing data communications product lines.

Whether the current excitement in the T1 equipment marketplace will result in an IBM takeover is, of course, highly speculative. It is more likely that IBM may choose one of the vendors as an OEM supplier of its T1 products.

Whatever happens, one thing remains certain. An IBM-selected company and its stockholders cannot go far wrong and will undoubtedly benefit greatly from such an association.

Szuprowicz is president of 21st Century Research in North Bergen, N.J.

"One phone call...and I can place my clients' advertising in virtually any computer market in the world."

Ellen Freeman is president of Freeman Associates, a media planning and buying service for high-tech advertisers. With 11 years of agency experience, Ellen is one of a handful of people who understands how to plan media for high-tech companies. She has been involved with international as well as domestic programs, and she has definite opinions about the services of CW Communications.

Ellen explains, ***"High-tech companies generally don't have the information they need to evaluate international markets. But CW International Marketing Services makes it easy to explore foreign markets by offering in-depth marketing knowledge and expertise."***

Ellen recognizes the frustration of media buyers when considering foreign media. She says, ***"There are so many factors involved — time and language differences, commission structures, exchange rates, taxes, translation, mechanical specs. Billing alone is a nightmare."*** **She adds,** ***"But CW offers the single-vendor solution. One phone call to a local rep, and I can place my clients' advertising in virtually any computer market in the world."***

She continues, ***"There is a definite lack of research available on foreign publications in comparison to the volume of circulation and readership information provided by U.S publications."*** **However, Ellen trusts CW International Marketing Services to help her make media choices. She explains,** ***"CW brings more information to the table than any company I've dealt with. No one else makes international buying as easy."***

Ellen sums it up, ***"There are too many things U.S. media buyers take for granted. Buyers generally don't even know the right questions to ask when dealing abroad. CW helps us plan and buy media in multiple countries — all in one 'American' package, eliminating costly errors."***

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Ashton-Tate

CONTINUED FROM PAGE 113

additional technology.

Analyst Charlotte Walker of L. F. Rothschild, Unterberg Towbin in New York said she believes Ashton-Tate is trying to downplay the importance of its acquisition plans. "They were hotly after acquisitions in the 1986 period. They'll de-emphasize it this year, but they'll make the acquisitions anyway," she predicted.

In its financial performance, Walker said Ashton-Tate's results were good, but, she said, they were "actually shy of my expectations." She said the company's cost of sales was down significantly, to 13% or 14% from 16% in fiscal 1986. "That easily gave them $1 million or more in profits," she said.

Ruthann Quindlen, an analyst with Baltimore-based Alex Brown & Sons, Inc., said the results were "better than our estimates. Revenue was slightly lower, but earnings per share were slightly higher."

Manufacturing improvements have reduced Ashton-Tate's cost of sales and increased the strength of its international sales, Walker said. Ashton-Tate's international sales traditionally account for 25% or more of the company's business, Quindlen said. U.S. sales for the company will grow, based on the underlying unit hardware growth of 10% to 20%, she predicted.

But the rosy picture could get dim, the analysts said.

"We expect in about a year there will be increased competition from Microsoft Corp. and Lotus Development Corp. and minicomputer data base manufacturers, such as Oracle Corp. and Informix," Quindlen said.

Ashton-Tate will face increasing competition in the competitive environment, Walker said, particularly in the data base world. She said the competition would come from public and private companies.

Sales for its 1987 fiscal year, ended Jan. 31, were $210.8 million, a 73% increase over sales of $121.6 million reported last year. Earnings for the annual period were $30.1 million, an increase of 81% over income of $16.6 million reported in fiscal 1986.

CAD/CAM

CONTINUED FROM PAGE 113

available separately could cut off other market opportunities.

"Clearly, it's widely perceived that Computervision's strength is the depth and range of its software," says Bruce Jenkins, an analyst with Daratech, Inc., a CAD/CAM market research firm in Cambridge, Mass. "The expansion of that software is what will be crucial to its success."

According to Bart Salmon, Computervision users are less concerned with this issue than they were a year ago. When Caddstation was first announced, Salmon says there was more talk about it. "Now users understand the benefit of paying attention to the whole system. There is still some talk, but it's very small," Salmon adds.

Computervision plans to continue to beef up the Cadds 4X functionality and says that is the primary focus in research and development. "It's highly unlikely that a company like Computervision is going to be successful in developing CAD/CAM solutions as well as developing new computers," says Dick Paulson, the firm's vice-president of research and development. "We don't feel that we are doing our customers any service to invest our R&D money in the computer race."

Intergraph opinion differs

Apparently, Intergraph does not hold the same opinion. Having introduced the Interpro 32C last year, the Huntsville, Ala.-based company says it now plans to extend that to a full product line.

The workstation developed at Intergraph is based on the Fairchild Semiconductor Corp. Clipper chip, a microprocessor that reportedly processes five million instructions per second.

With this hardware, Intergraph announced plans last month to move into the stand-alone workstation market — a high-risk venture, some analysts say.

"On the surface, this makes very little sense," says Prudential-Bache's Conigliaro. "I'd like to think they're not talking about competing with Apollo Computer, Inc. and Sun. I'd like to think it'll be more of a niche approach."

Intergraph executives say they hope to see the system accepted as a general-purpose workstation and plan to pursue OEMs.

"What Intergraph is attempting to do is test the company to see how it would fare as a general-purpose vendor," says Daratech's Jenkins. "They're rolling high and it's a very daring move, but one of the few that we can imagine them doing," he adds.

Unlike Computervision, Intergraph had no major setbacks in the 1980s, a fact that will certainly cushion its risky strategy. It managed steady growth selling systems based on Digital Equipment Corp. hardware.

However, Intergraph's success as one of DEC's largest OEMs has been challenged within the last year as DEC changed its approach to its OEMs.

"It's not as easy for us as it was before in terms of dealing with DEC, simply because their corporate direction has changed," says Allan Wilson, an Intergraph vice-president. Wilson cites cuts in discounts provided to OEMs as well as DEC's proprietary stance with its BI bus as two examples.

"Within 10 days we had the names of the best distributors in three foreign countries."

For nearly two decades, Land Grant has been involved with high tech in a variety of capacities. He is president of Land Grant & Company — a business devoted to export consulting and profitable concepts in global trade for high technology producers.

Land realizes the importance of networking in international business. And, he's been using CW International Marketing Services to help him expand his list of distributor contacts. *"CW's worldwide offices are nodes on a network — in touch with current trends as well as the customers and international middlemen U.S. manufacturers are seeking,"* he explains.

Land discusses how CW International Marketing Services helped his client, Phoenix Technology: *"Locating qualified candidates was one of our first steps in helping Phoenix select the right distributors. Within 10 days, we had the names of the best distributors in The United Kingdom, West Germany and France."*

CW International Marketing Services is the only source, aside from the Commerce Department, that provides comprehensive distributor information broken down by country and product line. *"For years, we had to gather and cross-reference distributor information from a hodge-podge of government and international trade sources. Now, CW provides us with a better source of fast, top-drawer information,"* says Land.

In fact, selected international market information is so scarce, Land is currently writing a guide entitled the *High-Tech Exporter's Sourcebook*. And he plans to continue relying on CW International Marketing Services for distributor contacts. He explains, *"The real added value of CW is its people and expertise in-place around the world."* He adds, *"Because CW Communications is a network of international offices, CW International Marketing Services has worldwide contacts and marketing information unavailable elsewhere."*

To find out how CW International Marketing Services can work for you, call Frank Cutitta, Managing Director, at 800-343-6474 (in MA, 617-879-0700).

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EMPLOYMENT TODAY

Bank automation creating DP jobs

BY DENA ALLMAN
SPECIAL TO CW

Banks are facing increased competition from nonbanking companies that offer financial services and from other banks that are merging or consolidating to become regional entities. In response to these changes, many institutions are striving to create computer systems that offer additional services to their customers.

This change in the nature of banking has led to the widespread use of networking operations, such as automated teller machines, and the installation of microcomputers in nearly every department.

These trends add up to new opportunities for data processing professionals in the banking industry. Currently, there is a high demand for systems analysts, systems software programmers, telecommunications specialists and MIS managers, according to banking personnel recruiters.

But there is a catch. Despite their drive toward automation, most banks still prefer to hire DP professionals with banking experience. In some cases, they will even hire non-DP people who have banking backgrounds rather than experienced professionals, according to Andrew Guercio, vice-president of human resources at Northwest National Bank of Chicago.

Banks often hire recent college graduates because they are committed to the company for the long haul, says Tom Pitts of Robert Half International, Inc., a DP and financial services placement firm in New York. Because of their lack of experience, the graduates are willing to learn the bank's policies, and they can easily be moved from one department to another, he explains.

Established DP professionals with no financial experience are less attractive to a bank, Pitts adds. They are more difficult to train because they have been exposed to nonbanking environments for a long period of time, he says.

"DP people tend to identify themselves as data processing professionals and not as bankers. This ends up being a limitation for them in the banking industry," says Kit Needham, center manager of the American Bankers Association (ABA) in Washington, D.C.

To help DP professionals in other industries learn about banking, the ABA annually conducts a week-long course consisting of lectures that offer an overview of the industry and detail the daily decisions banking executives must make. This year, the course will be held twice: from July 26 to August 1 and from August 2 to August 8. Both sessions will be at the University of Colorado in Boulder.

Weighed against a bank's bias toward employees with financial backgrounds is the need for experienced professionals in the programming and telecommunications areas.

"We are seeing more of an emphasis in networking and microcomputer skills," says Lou Galterio, vice-president for corporate information and communications systems at Bankers Trust Co. in New York.

Organizational changes caused by bank consolidations have created a demand for professionals experienced with more sophisticated systems than those required by a single, smaller bank. "Banks are striving to implement these new systems in order for the mergers to be more successful," says Siobhan Mulroy, a market research analyst for Dunhill Personnel Systems, Inc. in Carle Place, N.Y.

Although professionals with specific skills, such as programming, are in demand, banks are also looking for people who can creatively develop new systems and applications that adapt to the changing needs of the bank and its customers, says Frank Kelly, managing director of human resources at Bank Administration Institute in Rolling Meadows, Ill.

Mergers and acquisitions in the southeastern part of the country are making that region a high-growth area for banking opportunities. DP personnel are needed to help financial institutions there deal with the increasing number of mergers and acquisitions.

Bank DP
Percentage of U.S. DP personnel employed in the industry

Programmer/Analysts	29%
Programmers	23%
Systems Programmers	13.5%
Systems Analysts	8.5%
Electronic Data Processing Auditors	4.0%
Systems Developers	3.2%
Electronic Data Processing Analysts	2.9%
Operations Analysts	1.4%
Systems Managers	1%
Others	0.7%

INFORMATION PROVIDED BY DUNHILL PERSONNEL SYSTEMS INC.

The southwestern region is also identified as a growth area, particularly Texas and Oklahoma.

Salaries for DPers in banking are comparable to those of information systems employees in other industries. Recent college graduates can expect to start at between $20,000 and $25,000.

A recent survey by Robert Half International indicates that salaries for DP professionals in banking increased an average of 5% from last year. The highest rate of change was among positions in large banks, where operations managers' salaries rose from between $30,000 and $40,000 to between $33,000 and $43,000, nearly a 9% increase. By contrast, salaries for operations managers in smaller banks rose only about 3%, from between $30,000 and $39,000 to between $31,000 and $40,000.

Systems programmers' salaries rose more than 6% in large banks and almost 6% in smaller ones, with salaries ranging from $30,000 to $43,000. Programmers in general saw an increase of more than 8% in smaller banks and 6% in large ones, with salaries ranging from $22,000 to $30,000.

The survey is based on job listings submitted by employers to the recruitment company's offices nationwide.

Although banks pay competitively, they demand more from their employees, Galterio says. DP professionals in banking have to make an extra effort to make their systems reliable and accurate, he adds, because a large number of people and organizations depend on them.

Allman is a free-lance writer based in Chicago.

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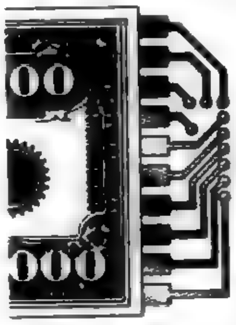

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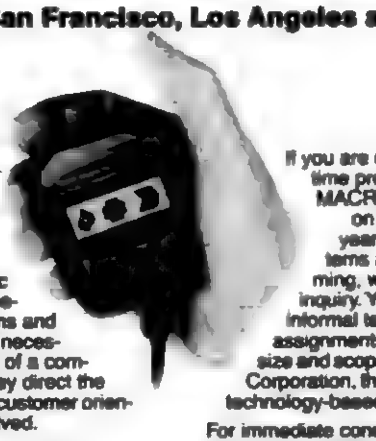

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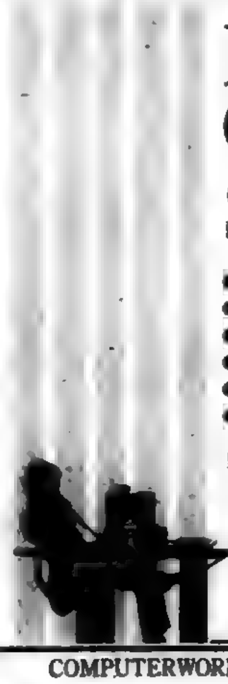

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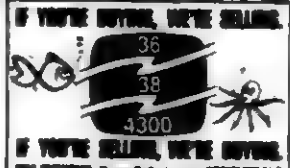

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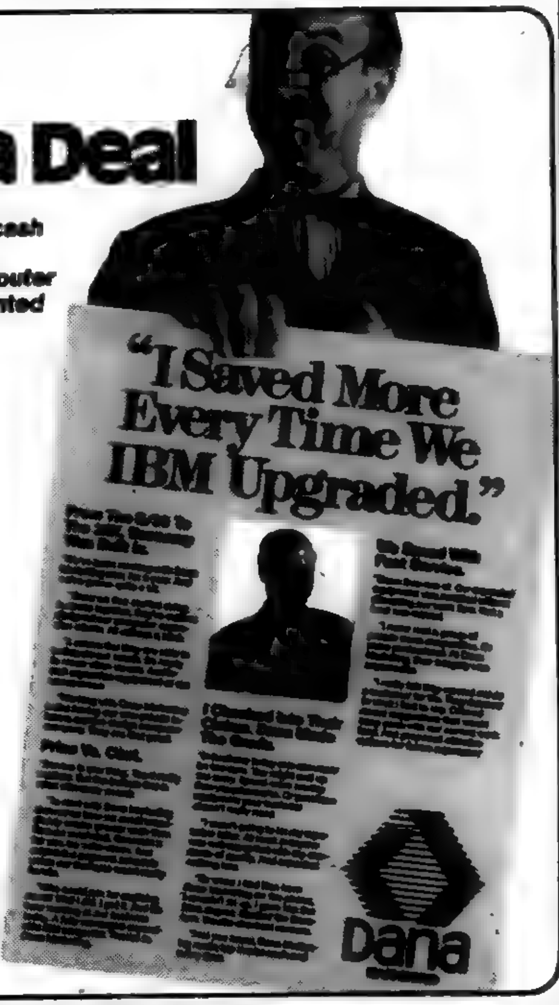
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Absolute Security 75
ADR 3
AM Satellite 116-117
Amdahl 44
Applied Management 61
Artificial Intelligence 35
AT&T 92,114-115

BASF 107
BMC Software 77
Bridge Communications 48
Business Software Technology 14

Cambex 13
Candle Corp. 88
Cincom 38
Codex 45
Communication Networks '87 59
Compaq 49-56
Computer Associates 78
Cullinet 32-33
CW Circulation 122
CW/MS Testimonial 119,120

Data Base Management Inc 76
Data Design Associates 62
Data General 28-29
Data South 67
Dataware 85
D&B Computing 36-37
DCA 72-73
Duquesne 90

EMC Corp. 74
Emergency Power Engineering 80-81

Federal Communications 39
Financial Technology 10
Fischer Innis 19
Flagstaff Engineering 46
4 G Data 42
Forthright Systems 6
Fujitsu 64

Genicom 112
GE/RCA 106
Group Operations 24

Help/38 Systems 60
H&M Systems Software 143

ICCP 15
Informix 97
Innovation Data Processing 7
Intelogic Trace 79
Intermec 39

JD Edwards 83
JDS Microprocessing 93

Landmark Systems 23
Lawson 70
Local Data 12

McCormack & Dodge 43
Michaels Ross & Cole Ltd 118
Micro Data Base Systems,Inc. 104
Morino Associates 84-85

National Advanced Systems 91
National University 48
NCR (Insert) 64/65
NEC 94-95
Netec 63
Novell 111

Oracle 11,31

Printronix 108

Radio Shack 63
Rapid Systems Development 117
Realia, Inc. 86
Relational Technology 18
Retrieval Technology 40

Salomon Brothers 22
SAS Institute 20-21,41
Sequent Computer 27
Software Engineering of America 9
Software Quality Engineering 13
Software Technology & Research (STAR) 26
Sorbus 87
SQ Software47
St.Johns Consulting 10
Stratus 71
Syncsort 5

Tandem 80
Tandon 68
Technology Software Concepts 110
Telenet 102-103
Televideo 58
Telex 105
Tone Software 26
Toshiba 30
Travtech 59
Tymnet 96

Uccel Corp. 24
Ultimate Corp. 121
Ungermann-Bass 98-99
Unisys 109
Universal Data Systems 34
USR/Group 100

Ven-tel 144
Veritex 10
VM Software 118

Walker Interactive 25
Word Perfect 82
Wyse 101

Xerox 46-47

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The house

CONTINUED FROM PAGE 1

designed specifically around the new 90,000-square-foot data center.

The nine-story, 732,000-square-foot building is simply an MIS manager's fantasy fulfilled. According to Mel Sotnick, principal designer on the project, Shearson was unusual in that it opted for form and function above any other consideration.

"Most people worry about how a building is going to look. Jack Owens was only concerned about how it functioned as a data center. He was willing to give up, for example, all corner offices with a river view so that we could handle the difficult cabling and channeling questions that arose," says Sotnick, senior managing principal designer for Kling Lindquist, the Philadelphia design engineering firm that worked with Shearson.

The building, which houses Shearson's three IBM 3090 Model 400s, a 3090 Model 200, a 3084 and a Unisys Corp. A10, operates 24 hours a day, seven days a week. It is virtually self-sufficient. Not only do features include a state-of-the-art dual uninterruptible power supply, but the building can provide its own water supply from a 150,000-gallon tank in the basement. Each of the four data center floors provides 50,000 square feet (offering a potential 200,000 square feet of data center space) connected to 22,000 square feet of front-office space — enough room to hold an entire football field with end zones and sidelines.

In addition, the level of redundancy in virtually every aspect of the building, from pipes to buss ducts (electrical conduits) to chilled water risers, is, according to Sotnick, unsurpassed in any data center in the country.

"I'm 99.9% sure that the electrical and mechanical systems can't go down," adds Dennis Cronin, Shearson's vice-president of facilities engineering. "Of course, the only sure things in life are death and taxes, but we thoroughly tested out this building with a full-design stress test to prove out the systems beforehand. That is not ordinarily done, but we wanted to know what the system could do."

More than 2,100 *backup batteries provide emergency power.*

CW PHOTO BY GLENN RIFKIN

The building, purring like a new engine for four months now, was designed to provide nonstop operation, and failure of no single building component can shut it down. "The building was designed so that we can complete any mechanical or electrical testing or maintenance without any effect on the end user," Cronin says. During the design phase, Owens says, he constantly asked what elements could shut a system down, and every potential snag was outfitted with a sophisticated backup.

Owens says he also carefully studied the geometry of the plan before building. Starting with the premise that he wanted uninterrupted 50,000-square-foot spaces, he designed an offset core that left a huge rear section of the building for the data center and 22,000 square feet of front-office space. Ceilings range from 16 to 24 feet high, and all cable chases and electrical closets are set in the corners — an unused space in data centers — rather than in prime computer locations.

All floors in the office space are raised so that cabling for networking systems can be easily installed, repaired and upgraded, and a dual-redundant fiber-optic connection was placed throughout the building.

The road to state of the art, however, was a long one. In the early 1980s, Shearson realized a new center was imperative. The planning process was spurred by MIS and supported by senior management.

"It wasn't a hard sell to management at all," Owens says. "For years, management has realized that MIS is not an adjunct to what we do but is really the vehicle through which we do our business. Without MIS, we can't operate or do business. The chairman, Peter Cohen, was an active participant and one of the driving forces in the negotiations for the building."

Although Shearson merged with American Express Co. during the early planning process, the new data center was strictly a Shearson project. The firm continued to grow through mergers and acquisitions during the planning. "Every time we thought we had the needs and requirements set, we'd turn around and find we were dealing with something 40% or 50% bigger," Owens says.

Although this constant starting, stopping and restarting was a hindrance, it afforded Owens' MIS team and the company's facilities management staff further opportunity to study the options. They began to realize what they did *not* want.

At the outset, in fact, there had been no intention of building a stand-alone data center. Like everyone else constricted by a downtown setting, Shearson was seeking a new data center within an office complex. "We asked three questions," Owens recalls. "First, How much money would we have to invest to create the environment we thought we needed? Second, How close could we come to that environment starting out in an existing structure that already had inherent limitations? And third, When we got done, how close would we be to the ideal of what we wanted?"

Shearson's new data center *building adorns its Manhattan neighborhood.*

Several extensive engineering studies persuaded Owens that trying to fit into an existing or new office structure would cost "sizable" dollars and that there were some limitations that simply could not be overcome. The research also indicated the ideal data center would look more like an industrial warehouse than an office building — another stumbling block.

"We had a lot of professionals, both on the support staff as well as the development staff, who we wanted to keep close to the data center," Owens explains. "We decided that due to the way we operate — with the reaction time and availability requirements we need — having the programmers in close association with the operational people was a benefit we wanted to keep."

The final requirements were clear: quality office space for professionals and a highly available, reliable and secure data center. The only solution: a building designed from scratch.

City block in Manhattan

Working in conjunction with both the city and New York state, Shearson acquired a sizable parcel of land — the equivalent, Owens says, of more than a city block in lower Manhattan.

Set amid rows of gloomy warehouses and loading-docks in what is known as the Tribeca section (the triangle below Canal St.), the Shearson building shines like a new penny in a stack of old change.

The data center was conceived and constructed in relatively short order. After a 14-month period of negotiation, rezoning and bargaining for the land, the building was finished in 23 months.

During the land negotiations and the building process, Owens and his design team members immersed themselves in the exercise of planning a perfect solution. Bringing together DP needs and skills within construction constraints was a step into uncharted territory for Owens' team. Component failure impact analysis, used extensively in designing hardware systems, is not generally considered in building design, but it was in this case. "A lot of the disciplines that DP uses every day in high-availability systems are not thought processes that construction people generally use," Owens says. "So we had to bring them together."

Cost justification was simple: Without this facility, Shearson could not grow and compete. The securities business was evolving into a 24-hour, seven-day-a-week on-line operating environment; there was no room for system failure. In fact, there was not even room to bring down the facility for a weekend of maintenance or repair work. "This is a major issue data centers are facing today," Owens declares. "The idea of a nonstop operation was not widely designed into operating facilities."

Asking again and again which systems could shut down the operation, Owens drew cutoff lines. Any financial cut to a component that could shut the operation down for more than eight hours, for example, was immediately eliminated.

"People would say, 'You don't do these things. Nobody does these things,' " Owens relates. "And I said, 'Why not? Can you prove to me it will never fail?' "

That attitude, while proactive, is costly. In order to cut the costs of the extensive redundancy, Owens focused on shrinking the footage necessary to hook systems together. "The cost is in the footage," he explains. "We looked at the geometry of the cooling system, chillers, data center emergency generators and the electrical switch gear and said, 'Hey, if we can package all this stuff together to minimize distances between them, we can achieve the results we are looking for while minimizing the cost.' "

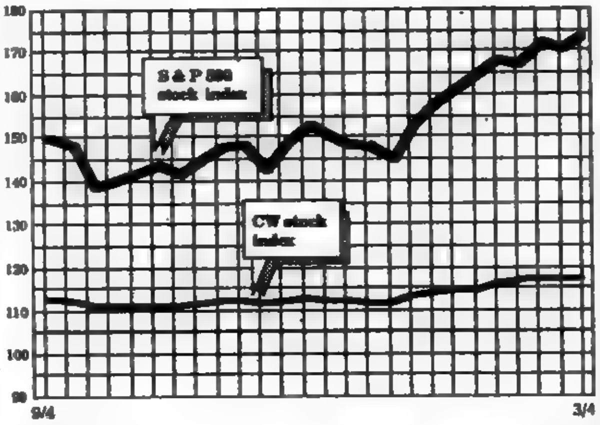
Shearson upgraded to 3090s when the move occurred, and that decision has already paid dividends. On a recent record day on Wall Street, the system monitored and handled the load without any noticeable degradation of performance.

Nonetheless, Owens is modest about his project. "I don't think it's absolutely unique. I'm sure there are eight or 10 data centers with similar capabilities in the country. We might have pushed the methodology and level of redundancy a bit further, but I don't think we've redefined the state of the art," he says.

Kling Lindquist's Sotnick, whose firm is a leading designer of data centers, disagrees. "I'd have no hesitation taking a client there to show them what is now the state of the art."

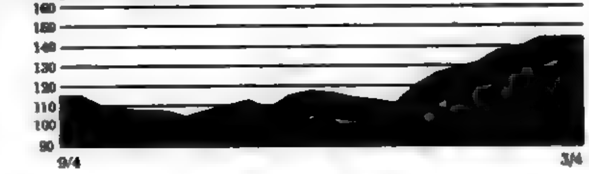
Owens is also pragmatic. "We knew that today's state of the art would not be state of the art over the lifetime of the building," he says. "So we built in the ability to grow and add to the base mechanical systems in the building, to expand the data center and to build flexibility into the communications systems."

STOCK TRADING INDEX

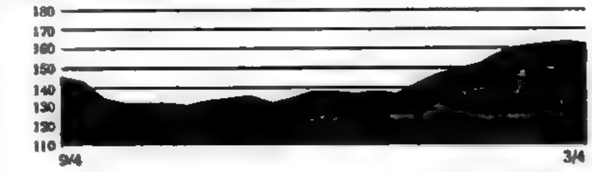


Indexes	*Last Week*	*This Week*
Computer Systems	142.2	**142.2**
Supplies & Accessories	163.0	**162.0**
Software & DP Services	131.5	**131.5**
Semiconductors	106.2	**110.0**
Peripherals & Subsystems	127.8	**129.8**
Leasing Companies	119.0	**122.2**
Composite Index	117.1	**117.3**
S&P 500 Index	169.8	**172.6**

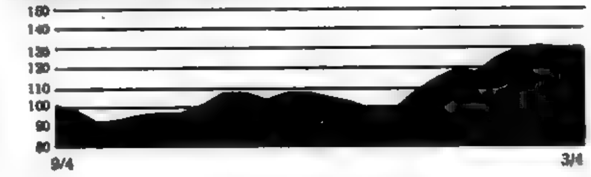
Computer Systems



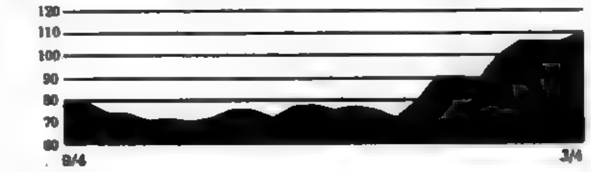
Supplies and Accessories



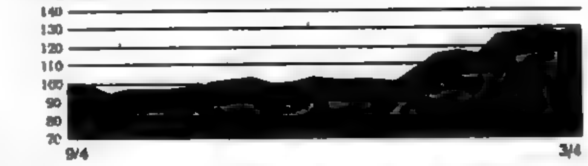
Software and DP Services



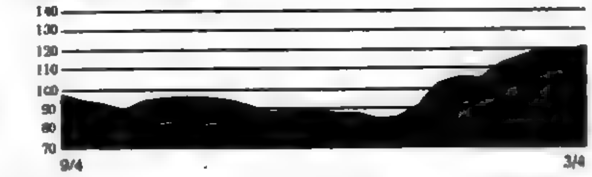
Semiconductors



Peripherals and Subsystems



Leasing Companies



Stock trading summary

CLOSING PRICES WEDNESDAY MARCH 4 1987

Computer Systems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4.88	-0.1	-2.6
O	ALTOS COMPUTER SYS	19	10	16.13	-0.6	3.7
A	AMDAHL CORP	40	14	37.63	1.1	2.9
O	APOLLO COMPUTER INC	23	9	19.38	1.5	7.2
O	APPLE COMPUTER INC	71	24	67.63	1.5	2.2
N	AT&T	28	22	23.13	0.1	0.5
O	C P T CORP	6	3	4.25	0.6	12.8
N	COMPAQ COMPUTER CORP	35	12	31.25	0.9	2.7
A	COMPUTER CONSOLES INC	12	6	9.38	0.4	3.8
O	CONCURRENT COMP CORP	23	11	15.38	-0.9	-6.0
N	CONTROL DATA CORP	31	20	28.25	1.5	5.0
O	CONVERGENT TECH	12	4	10.88	-0.8	-7.4
N	CRAY RESH INC	122	65	120.25	+2.4	+2.0
O	DAISY SYS CORP	15	8	11.50	0.1	1.1
N	DATA GEN CORP	45	25	36.50	-1.1	-3.2
N	DATAPOINT CORP	9	4	5.13	0.4	6.8
N	DIGITAL EQUIP CORP	167	76	166.25	+11.3	+7.3
N	FLOATING POINT SYS INC	46	11	15.38	-0.0	-0.0
N	GOULD INC	29	15	19.13	0.1	0.6
N	HARRIS CORP	40	27	37.88	+0.5	+1.3
N	HEWLETT PACKARD CO	60	36	55.25	+1.1	+2.1
N	HONEYWELL INC	84	58	69.50	-0.9	-1.3
N	IBM	162	116	139.88	1.9	1.3
O	IPL SYS INC	4	2	2.50	0.3	9.1
N	ITT CORP	65	43	65.00	+2.9	+4.6
N	M A COM INC	19	12	14.63	-0.0	-0.0
N	MATSUSHITA ELEC INDL LTD	136	69	118.50	-3.8	-3.1
O	MENTOR GRAPHICS CORP	29	11	27.13	0.8	2.7
N	NBI INC	14	8	10.63	+0.5	+4.9
N	NCR CORP	66	40	65.75	+1.3	+1.9
N	PRIME COMPUTER INC	26	16	21.75	-0.0	-0.0
O	STRATUS COMPUTER	34	17	32.00	0.8	2.3
O	SYMBOLICS INC	15	4	3.94	0.2	4.5
O	TANDEM COMPUTERS INC	66	22	65.13	+5.4	+9.0
N	TANDY CORP	55	31	53.38	+0.6	+1.2
N	TEXAS INSTRS INC	168	103	166.75	+8.4	+5.3
A	ULTIMATE CORP	35	13	24.00	+1.4	+6.1
N	UNISYS CORP	113	58	104.38	4.0	3.7
A	WANG LABS INC - B	22	11	15.50	-0.5	-3.3
A	WANG LABS INC C	22	11	15.75	-1.0	-6.8
N	XEROX CORP	75	49	73.00	0.8	1.0

Supplies & Accessories

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	30.00	1.0	3.2
N	BARRY WRIGHT CORP	25	14	17.75	1.3	6.6
A	DUPLEX PRODS INC	23	18	22.00	-1.0	-4.8
N	ENNIS BUSINESS FORMS INC	34	22	31.50	0.4	1.2
N	3M CO	140	95	126.88	0.6	0.5
N	MOORE LTD	28	20	23.50	0.4	1.6
O	STANDARD REGISTER CO	53	32	49.75	-1.5	-3.1
N	WALLACE COMPUTER SVCS	50	37	47.25	-0.0	-0.0

Software & DP Services

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	4.25	-0.3	-6.3
N	ADVANCED SYS INC	21	12	19.63	-0.3	-1.3
N	AGS COMPUTERS INC	38	17	37.75	+1.8	+4.9
O	AMERICAN MGMT SYS INC	31	13	28.75	0.5	1.7
O	AMERICAN SOFTWARE INC	27	9	25.00	+2.3	+9.9
N	ANACOMP INC	7	3	7.13	-0.9	-14.0
O	ANALYSTS INTL CORP	11	4	10.25	-0.0	-0.0
O	ASHTON TATE	30	10	26.38	0.1	0.5
O	ASK COMPUTER SYS INC	17	9	16.00	0.3	1.5
O	ASTRADYNE COMP IND	3	1	1.78	0.1	3.4
N	AUTOMATIC DATA PROC	47	29	43.25	1.6	3.6
O	BOOLE & BABBAGE INC	11	4	10.00	-1.0	-11.1
N	COMPUTER ASSOC INTL INC	44	17	40.25	-0.6	-1.6
O	COMPUTER HORIZONS CORP	15	10	13.50	0.3	1.8
O	COMPUTER NETWORK TECH	10	4	4.44	0.3	6.6
N	COMPUTER SCIENCES CORP	54	30	52.50	-2.8	-5.5
O	COMPUTER TASK GROUP INC	19	11	15.63	-0.0	-0.0
O	COMPUTONE SYS INC	6	0	0.19	-0.0	-0.0
O	COMSHARE INC	16	10	14.25	-1.3	-9.6
N	CULLINET SOFTWARE INC	16	6	10.25	0.1	1.2
O	CYCARE SYS INC	17	7	9.13	0.1	1.4
O	DUQUESNE SYS INC	25	9	24.25	23.3	48.9
N	GENERAL ELEC CO	106	71	105.75	-3.0	-2.9
N	GENERAL MTRS CORP	50	24	39.13	-1.9	-5.0
O	HOGAN SYS INC	15	7	12.63	0.3	1.9
O	INFORMATION SCIENCES INC	4	1	1.50	-0.3	-20.0
O	INFOTRON SYS CORP	18	7	8.50	1.0	10.5
O	KEANE INC	16	5	8.63	0.4	4.2
N	LOGICON INC	38	22	26.13	-0.1	-0.5
O	LOTUS DEV CORP	25	8	22.13	1.4	5.9
O	MANAGEMENT SCI AMER	21	11	19.25	0.9	4.3
O	MCI COMM CORP	13	5	5.88	-0.5	-8.3
O	MICOM SYS INC	19	10	14.75	-0.0	-0.0
O	MICRO PRO INTL CORP	6	2	4.94	-0.1	-1.3
O	MICROSOFT CORP	80	26	79.75	-5.3	-7.0
O	NATIONAL DATA CORP	27	16	24.25	0.6	2.5
O	ON LINE SOFTWARE INT	23	10	21.25	0.4	1.7
O	ORACLE SYS CORP	42	13	41.50	-6.0	+16.9
N	PANSOPHIC SYS INC	42	25	38.63	-0.6	-1.6
O	POLICY MGMT SYS CORP	30	15	28.00	1.0	3.4
O	PROGRAMMING & SYS INC	13	8	11.75	0.5	4.1
O	REYNOLDS & REYNOLDS CO	42	27	35.75	0.3	0.7
O	SCIENTIFIC COMPUTERS INC	8	4	7.75	-0.0	-0.0
O	SEI CORP	27	15	24.75	-1.0	-4.2
O	SHARED MED SYS CORP	53	30	34.38	3.0	8.0
O	SOFTWARE AG SYSTEMS INC	22	10	15.50	2.4	13.3
O	SOFTWARE PUBG CORP	16	5	14.25	0.4	2.6
A	STERLING SOFTWARE INC	21	10	13.50	-0.1	-0.9
N	SUNGUARD DATA SYSTEMS	20	10	19.75	-0.3	-1.3
N	UCCEL CORP	34	17	33.00	1.3	3.6
N	URS CORP	22	13	20.88	0.3	1.2
O	VM SOFTWARE INC	39	12	36.00	-0.3	-0.7

Semiconductors

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	34	13	21.25	0.3	1.2
N	ANALOG DEVICES INC	25	14	20.63	-0.1	-0.6
O	ANALOGIC CORP	14	10	11.88	-0.5	-4.4
N	APPLIED MAGNETICS CORP	29	13	28.00	-4.6	-19.8
O	AVANTEK INC	23	14	18.63	-0.9	-4.9
O	HADCO CORP	6	3	5.25	-0.4	-7.7
O	INTEL CORP	39	16	36.50	1.3	3.3
O	MICRO MASK INC	7	2	6.00	-0.3	-4.3
N	MOTOROLA INC	51	34	48.50	0.5	1.0
N	NATIONAL SEMICONDUCTOR	16	8	15.75	-0.0	-0.0
N	TERADYNE INC	30	16	23.38	-0.6	-2.7

EXCH N - NEW YORK A - AMERICAN P - PACIFIC B - BOSTON
L - NATIONAL M - MIDWEST O - OVER THE COUNTER S - SPLIT

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Peripherals & Subsystems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	8.63	0.4	4.2
A	ANDERSON JACOBSON INC	3	1	3.00	-0.9	-41.2
O	AST RESH INC	25	11	21.75	-3.5	-19.2
O	ALTOTROL CORP	10	5	7.50	1.0	11.8
O	AVANT GARDE COMPUTING	7	3	4.00	-0.0	-0.0
O	BANCTEC INC	13	6	10.75	0.6	5.5
N	BOLT BERANEK & NEWMAN	60	37	54.75	-1.0	-1.5
A	CETEC CORP	9	5	6.13	-0.3	-4.3
A	COGNITRONICS CORP	6	2	3.00	-0.0	-0.0
N	COMPUGRAPHIC CORP	27	16	22.00	0.3	1.1
N	COMPUTERVISION CORP	23	10	20.88	0.1	0.6
N	CONRAC CORP	18	12	18.00	-0.5	-2.9
A	DATAPRODUCTS CORP	18	11	14.00	0.1	0.9
A	DATARAM CORP	18	7	7.63	-0.4	-5.2
O	DATA SWITCH CORP	9	5	7.00	-0.3	-3.7
O	DATUM INC	7	4	6.00	0.3	4.0
N	DECISION INDS CORP	15	8	10.88	0.6	5.4
O	ENDATA INC	9	5	8.63	0.1	1.4
O	EMC CORP	34	11	27.25	1.5	5.2
O	EVANS & SUTHERLAND	38	20	37.50	-3.5	-10.3
N	FLOATING POINT SYS INC	46	11	15.38	-0.0	-0.0
O	GANDALF TECHNOLOGIES	9	5	8.50	0.1	1.4
N	GENERAL DATACOMM IND	15	8	12.88	-1.9	-17.0
N	HAZELTINE CORP	30	16	29.75	-0.0	-0.0
O	ICOT CORP	13	8	11.38	0.5	4.7
O	INFORMATION INTL INC	18	13	14.50	-0.0	-0.0
O	INTECOM INC	7	3	3.00	-0.0	-0.0
O	INTERLEAF INC	15	8	9.50	1.1	10.6
O	MEGADATA CORP	7	2	5.25	0.9	14.3
A	MSI DATA CORP	15	10	14.00	0.3	1.8
N	NASHUA CORP	29	20	29.13	-1.8	-6.4
O	NETWORK SYS CORP	19	10	17.00	0.1	0.7
N	NORTH AMERN PHILIPS CORP	48	35	42.00	-0.3	-0.6
N	NORTHERN TELECOM LTD	45	27	42.38	-0.5	-1.2
O	NOVELL INC	43	14	42.25	-5.0	-13.4
N	PARADYNE CORP	11	4	6.75	-0.9	-14.9
A	PENRIL CORP	8	4	4.50	0.1	2.7
N	PLESSEY PLC	39	24	38.00	-2.0	-5.6
O	PRINTRONIX INC	15	10	11.38	0.1	1.1
O	QMS INC	16	11	10.13	-0.0	-0.0
O	RAMTEK CORP	7	3	5.00	-0.1	-2.6
N	RECOGNITION EQUIP INC	27	10	21.63	-1.6	-8.1
O	SCAN TRON CORP	19	11	11.50	-0.0	-0.0
N	SCIENTIFIC ATLANTA INC	16	9	15.38	-0.1	-0.8
O	SEAGATE TECHNOLOGY	42	9	36.63	0.5	1.3
N	STORAGE TECHNOLOGY	7	2	4.75	-0.6	-15.2
O	SUN MICROSYSTEM INC	32	11	28.25	0.4	1.3
A	T BAR INC	8	5	7.63	0.3	3.3
A	TAB PRODS CO	19	12	18.63	-0.8	-4.2
O	TANDON CORP	8	2	3.75	-0.3	-7.1
A	TEC INC	7	3	3.75	-0.0	-0.0
N	TEKTRONIX INC	43	27	39.13	0.6	1.6
O	TELEVIDEO SYS INC	4	2	2.38	0.3	6.5
N	TELEX CORP	102	52	92.00	4.9	5.0
N	TIMEPLEX INC	36	14	35.00	-0.1	-0.4
N	TITAN CORP	12	6	7.50	-0.0	-0.0
O	VISUAL TECHNOLOGY INC	1	0	0.44	-0.0	-0.0
O	WYSE TECH	29	13	28.25	-0.5	-1.8

Leasing Companies

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	27	15	27.00	+1.4	+5.4
N	CONTINENTAL INFO SYS	14	7	13.13	+0.9	+7.1
O	FINALCO GROUP INC	5	2	2.88	-0.0	-0.0
O	PHOENIX AMERN INC	8	3	6.75	-0.0	-0.0
O	SELECTERM INC	12	5	5.75	-0.0	-0.0
N	U S LEASING	50	38	50.25	+1.6	+3.3

Mid-week rally roars

DEC, Apple bounce back; IBM, Cray, TI rise to occasion

A mid-week kicker boosted computer industry stocks, particularly those of Digital Equipment Corp., which introduced three mid-range systems and a dramatic price structure overhaul last week (see story page 1).

On Monday, when the Dow Jones Industrial Average dropped 3.52 points and the National Association of Securities Dealers Automated Quotations fell 1.06 points, Apple Computer, Inc. slipped 2½, despite the announcement of new Macintosh models.

Apple, which had reached a record high of 69⅛ the previous week, dropped another 2½ points to 65 last Tuesday before recovering on Wednesday and Thursday to 68½.

The overall recovery occurred on Wednesday and Thursday, when the Dow advanced by 49.9 points and DEC soared 9¼ points on Wednesday and 4½ points on Thursday.

Other gains were posted by IBM, up 1¾ on Wednesday, Cray Research, Inc., which was up 4 points on Wednesday and 3¾ points the next day, and Texas Instruments, Inc., which climbed 7⅛ points during the two-day surge.

JAMES CONNOLLY

Alpha aims macro at MIS users

Features include full-blown programming language

BY DOUGLAS BARNEY
CW STAFF

BURLINGTON, Mass. — Alpha Software Corp. next week plans to announce Keyworks Advanced Version, a $299 macro generator and programming language aimed squarely at MIS professionals. The product is set to ship sometime this month.

Unlike other random-access memory-resident macro generators that simply record and play back keystrokes, Keyworks Advanced Version has a full-blown programming language.

"The user can control other applications, read screens and decide what branch a macro should go down, depending on what the screen says," an Alpha source explained. "Let's say you have automated logging on to a mainframe to exchange data. The mainframe sends back a message, either the data was accepted or rejected. Keyworks could read rejected and, as a result, branch to a series of additional commands; or, if accepted, take another approach."

A beta-test user in a large corporation agreed. "When you are trying to communicate with a mainframe, the potential for problems is tremendous. It is very possible that you would get a message or you would have to hit the CLEAR to clear off the screen first," the user said.

Runtime copies of the advanced version will be available for $20 to $40, according to Larry Rafsky, president of Gari Software, Inc., a Roseland, N.J.-based independent consultant. "I would see MIS buying one copy of Advanced Version and many copies of the runtime," Rafsky said. With the runtime version, users reportedly can use macros created for them but cannot create elaborate macro systems. An Alpha official told *Computerworld* the runtime pricing has not been set.

'A step beyond'

The package and the runtime version have a broad range of applications. "It allows us to automate the execution of any program. It goes a step beyond plain keyboard macro programs by allowing you to read from the screen and issue different keystrokes to the program based on the results of what is on the screen," the beta-test user said.

Automating communications with a host computer is one key feature. "We make it so the person says, 'I want to take the file from Displaywrite and put it in a document on the mainframe.' They pick a pop-up menu of all the documents, arrow down to it, hit RETURN, and away it goes," the user said.

Rafsky has already used Keyworks Advanced Version to automate a communications system. "The package is memory-resident underneath Lotus's 1-2-3 and stays resident while the user is in Lotus and controls the micro-to-mainframe link. Keyworks talks to the communications package, does the download, reformats the data," he said.

Keyworks will compete largely with the Automator/MI, a $2,000 product from Direct Technology Ltd. in Middlesex, England.

Paradyne

CONTINUED FROM PAGE 1

which it will pay $1.2 million in fines and related costs.

Government investigators had charged that Paradyne misled the Social Security Administration (SSA) at a key procurement test by secretly using a Digital Equipment Corp. PDP-11 processor instead of the Zilog, Inc. Z-8000 processor that Paradyne had proposed in its bid. Investigators also said Paradyne misled the agency by bidding a P8400 controller that was not an off-the-shelf item, contrary to the bid specifications.

Paradyne countered that the processors were functionally equivalent and denied that it misled the SSA about the availability of the P8400 controller.

According to the terms of the settlement, Paradyne's president and chief executive officer, Robert S. Wiggins, resigned when the settlement was announced Thursday. Wiggins, one of eight Paradyne officials named in the indictment, had offered his resignation as a bargaining chip in the settlement negotiations, a Paradyne spokesman said.

Named to replace Wiggins was Jerry T. Kendall, formerly Paradyne's vice-president and chief operating officer. Paul J. Ferri, a Paradyne board member for 14 years, was appointed chairman of the board.

Paradyne is now free to conduct business with the federal government. The data communications vendor was barred from bidding on government contracts in the wake of the December 1985 45-page indictments. The indictment alleged Paradyne and certain officials attempted in 1981 to defraud the U.S. government to secure a $115 million contract, the largest ever awarded by the SSA.

Most significantly, Paradyne can now refocus its attention on attempting a return to profitability after years of taxing, time-consuming legal concerns and disappointing sales. Since the Securities and Exchange Commission began investigating the SSA contract in 1983, Paradyne's legal costs in the matter have totaled $18 million, according to a company spokesman.

"It's the end of a long nightmare for Paradyne," said Andy Schopick, a senior analyst with the Gartner Group, Inc. in Stamford, Conn.

The inevitable question in the matter, according to Schopick, is why the company waited three years before settling out of court. "There were probably other opportunities to get out of this thing, and they've wasted a lot of time and money," he said. "One has to question the management decisions regarding this matter."

Rather than worrying Paradyne users about the company's guilt in the matter, the settlement should reassure them that the company is back on track, said Paul Bloom, an analyst with Johnson, Lane, Space, Smith & Co. in Atlanta. "Users should feel comfortable that the company can now focus on new products rather than having to deal with litigation," he added.

Under the settlement, Paradyne agreed to establish a "company government contract oversight committee" and a "government procurement ethics program," the company said.

In addition, Paradyne's contract with the SSA has been modified to allow the SSA to phase out Paradyne communications equipment in favor of IBM's 3270 network system. Paradyne equipment is to be phased out gradually beginning this May and ending in December 1988.

The value of the settlement was estimated at $8.125 million, $2.9 million of which is to be covered by Paradyne's insurance policy. Other settlement costs are covered by an $8 million provision the company set aside at the end of 1986.

Wiggins — a 13-year Paradyne veteran — and other officials are not required to admit to any wrongdoing. Charges against Wiggins and three other officials were deferred under a one-year pretrial diversion agreement and, if the agreement is successfully completed, will be dropped. Charges against four other officials were dropped.

The agreement "neither admits nor proves that the government was defrauded by the company or any individual," said Paradyne's senior vice-president and general counsel, James L. Slattery.

INSIDE LINES

Hurry up and wait. While some small software developers must wait another six months, sources report that a major bank in New York already has a beta-test version of Microsoft's semiannounced 286 DOS. The smaller developers, pleased that an official beta-test version of the operating system will ship within six months, would still like an early peek at the software. But that's something Microsoft, in most cases, is unwilling to give, developers report.

In that case . . . NEC Electronics was rebuffed in its bid to disqualify Judge William Ingram in its lawsuit against Intel. NEC sought the disqualification when it learned in October that Ingram owned interest in Intel stock through an investment club while presiding over proceedings in the lawsuit. In the suit, which is still pending, NEC is seeking a judgment that micro code is not copyrightable subject matter and that the control function in some NEC V-series microprocessors does not infringe on any valid Intel copyrights.

Lighting the information path. The technology is still very much in the laboratory, but optical computing took another step forward last week when IBM scientists said they have developed an experimental high-speed chip designed to transform light into electrical signals. IBM claimed its chip is fast enough to read 40 encyclopedia volumes every second. The chip isn't a pure optical product but rather a hybrid gallium arsenide chip that incorporates dissimilar communications and computing circuits.

Show me. At Interface '87 later this month, Spectrum Concepts will announce what it claims is the first commercial LU6.2-based data transfer application. The fruit of some three years' programming efforts, XCom 6.2 will eventually support LU6.2-based peer-to-peer data transfer among a wide range of minicomputers, mainframes and microcomputers, the vendor says. If it delivers on this promise, XCom 6.2 will confound industry pessimists who have claimed that we wouldn't see commercial LU6.2-based applications until the 1989-to-1990 time frame.

Buyer Beware. A report is circulating that Unisys, the Sperry-Burroughs hybrid, is considering dropping the Unisys 5090, a Unix multiuser system for which Sperry acts as OEM for Arete Systems in San Jose, Calif. The concern, apparently, is that the 5090 overlaps somewhat with the Burroughs XE550, now the Unisys 5070. A Unisys spokesman said no such plan was in the works. However, he would not rule out the possibility that some products might be discontinued in the future because of technological advances.

Netting an elusive project. Look for 3Com shortly to announce a family of "net stations" and explain how those products fit into their strategy. Observers predict the line will include a diskless workstation and a workstation featuring a built-in network adapter card. Incidently, do you remember 3Com's Distributed File Server concept for a data base server and standard interface? Announced last summer, the project isn't dead, insists a 3Com executive; rather, it's "dormant." Also involved in that project, according to sources, is data base vendor Ashton-Tate.

The German connection. New Jersey Bell, a Bell Atlantic telephone company, and Bell Communications Research, the research and development corporation that belongs to the seven holding companies, will conduct an Integrated Services Digital Network (ISDN) trial this fall. The system will use a Siemens EWSD digital switching system interworked with AT&T's 1AESS analog switch, multivendor customer premise equipment and experimental station equipment. If successful, this will allow customers to use existing networks for ISDN services.

An intelligent decision. Inference Corp., the expert systems firm that boasts over 500 installations of its artificial intelligence software, plans to port to the DEC VAX in a month or so. The package has previously been specific to AI workstations and Sun Microsystems hardware. Inference is also at work on a version of its products for the IBM 370 architecture.

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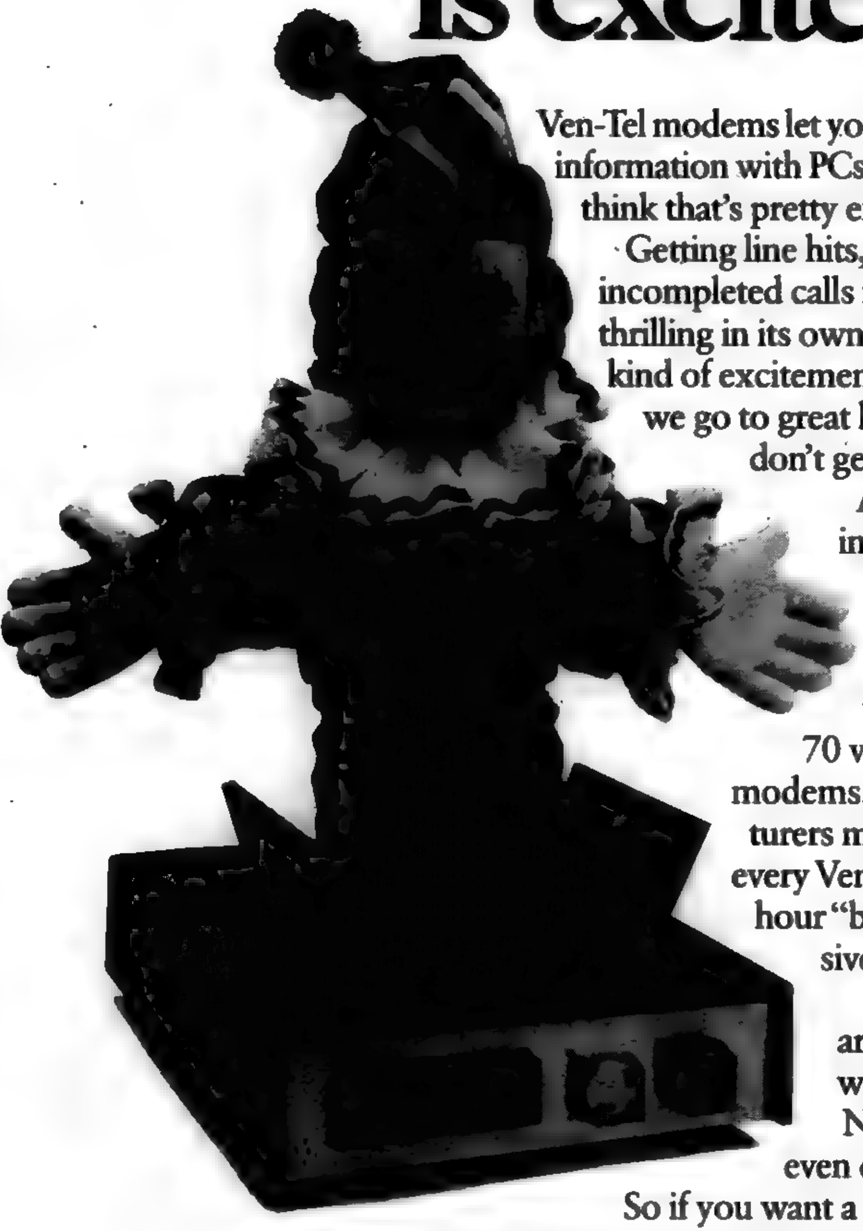

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COMPUTERWORLD

INSIDE

Spotlight — Graphics software pulls business facts into focus. Center pullout section.

In Depth — IBM's announcements raise the stakes for midrange customers. **Page 63**

VM will be the glue that binds IBM publishing systems from mainframe to PCs. Page 12.

Communications managers, in a response filed last week, opposed the Justice Department's proposal to allow the regional Bell holding companies to offer long-distance services. Page 2.

Codex and U.S. West aim for new market in network management with windows, graphics and Help screens. Page 8.

Resignation and disappointment are the emotions that DEC users expressed in response to the company's broad price overhaul. Page 6.

Korean clones gear up for second assault on the U.S. market. Page 15.

Plugging its Framework package as a development system, Ashton-Tate rolls out a developer's tool kit. Page 122.

IBM adds functionality to its System/38 Mapics II offering, claiming to place it on par with the System/36 version. Page 19.

MIS winds to redirect Lotus TAC

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. is readying a major rerelease of The Application Connection, a personal computer-to-mainframe data extraction product that will shield users from mainframe syntax, allow machines other than PCs to extract mainframe data and provide a link to IBM's DB2.

The release, scheduled to ship mid-year, was designed from the feedback from large corporations that demanded an easier way for PCs to access host data. Users also insisted that TAC work with a broader range of applications and architectures.

TAC, which allows PC users

Continued on page 8

Industry awaits copy-proof PCs

With new bus, 3½-in. format, IBM to attempt freeze out of clone makers

BY PATRICIA KEEFE
CW STAFF

AUSTIN, Texas — IBM is expected to announce in early April the first in a series of new microcomputers, signaling both its commitment to a 3½-in. disk format and movement toward a closed architecture.

According to informed sources, the IBM machines will include a high-end addition to its Intel Corp. 80286-based Personal Computer AT family along with a low-end Intel 8086-based computer targeted at the home and education markets.

In addition, sources said Microsoft Corp. will unveil DOS 3.3, an incremental upgrade said to improve the programming environment and to correct bugs in DOS 3.2, including problems not addressed by the patch-disk upgrade released in November 1986.

The new computers will reportedly incorporate proprietary features — including graphics and a nonstandard bus structure — designed to throw the clone makers off IBM's back and to rebuild its shrinking microcomputer market share. For example, the nonstandard bus means users cannot migrate their existing PC AT add-on boards. Sources speculated that IBM may unveil some add-in cards next month.

"The word in [Silicon] Valley is that it will take $2 million and 18 months before the machines can be copied," said Michael Murphy, publisher of the newsletter, "California Technology Stock Letter," and a partner in a small software company.

Despite the proprietary changes, most existing software, including that written to take advantage of IBM's Enhanced Graphics Adapter standard, will run on the new machines, the sources said.

However, software that is written to take advantage of the capabilities of the new computers will not run on their older siblings. This software is not expected to be available for several months.

IBM will reportedly take advantage of surface-mount technology and robotics to cut manufacturing costs, significantly downsize the new computers and help bolster efforts to keep clone makers at bay. Surface-mount technology is said to be much harder to reverse-engineer or copy.

According to the sources, the new products include the following features:

- 80286 desktop — 10-MHz clock speed, 3½-in. floppy disk drive with 1.5M bytes of storage, 256K bytes of random-access memory, three horizontal expansion slots, IBM pro-

Continued on page 5

Wait and wonder
Big business stalls purchases, compelled to wait for IBM direction. Page 4.

SOFTWARE SLUGFEST

DBMS contenders in grudge match

BY CHARLES BABCOCK
CW STAFF

ALAMEDA, Calif. — Oracle Corp. and Relational Technology, Inc. have a lot in common: They are both young companies making their fortunes in relational data base technology; they are both pioneers in the field of distributed data bases; and they both find it hard to resist taking jabs at each other.

"Relational Technology," says Peter Tierney, vice-president of marketing at Oracle, "is obsessed with competing with Oracle."

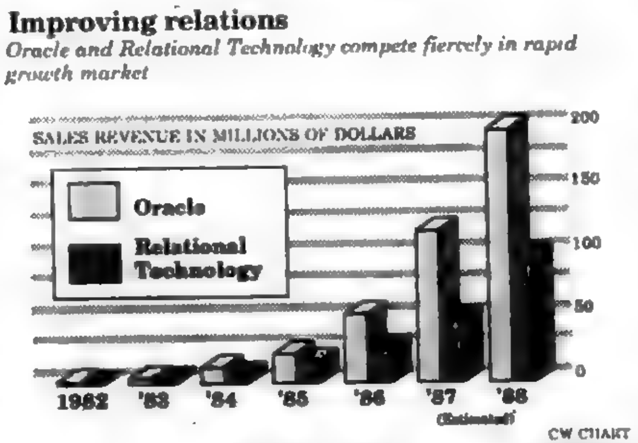
Tierney ought to know. Until two months ago, he was vice-president of marketing at Relational Technology. He left in the midst of a reorganization and was replaced by P. Michael Seashols, who had been hired by Relational Technology from Oracle a year ago.

"When you start getting in each other's soup that way, the seeds of competition are pretty well sown," observes Kenneth J. Burke, vice-president of Alex Brown and Sons, Inc., a Baltimore brokerage house.

The two companies, situated on opposite sides of the San Francisco Bay, are marketing what many observers regard as similar relational data base management systems. Their announcements tend to come quickly upon the heels of one another, and their strategic directions sound much the same. But when company officials talk about the competition, they paint each other as poles apart.

Both companies have moved rapidly into distributed data base technology, not because there are many customers but because

Continued on page 121



Improving relations
Oracle and Relational Technology compete fiercely in rapid growth market

CW CHART

Tandem SQL called top performer

BY JEFFRY BEELER
CW STAFF

CUPERTINO, Calif. — In a move that former IBM fellow E. F. Codd hails as a major data base advance, Tandem Computers, Inc. today is expected to announce implementation of SQL on its Nonstop transaction processing systems.

With this announcement of its Nonstop SQL, Tandem marries the most widely recognized element of relational data bases to an existing architecture that permits the company's systems to expand modularly.

The result is that Tandem's 10-year-old Encompass data base management systems now reportedly combine relational-like ease of use with perfor-

Continued on page 122

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IN THIS ISSUE

Fonts, picas and H&J. Desktop publishing strategies include IBM's using 9370 as the hub and PCs as separate publishing workstations, Interleaf porting its software to IBM and DEC environments to provide an integrated, corporatewide electronic system and Bettex offering its graphics workstation to systems builders in manufacturing, military and education. **Pages 12, 13, 51.**

NEWS

4 Corporation managers say they will hold off on PC purchases until IBM introductions are made.

4 Volkswagen discovers massive foreign exchange loss; could be biggest computer fraud in history.

5 Wang denies report, says eight vice-presidents, not 27, left company.

6 DEC users react to price hikes with disappointment and acceptance.

8 Codex, U.S. West release tools for opposite ends of network management Help facilities market.

10 Users postpone purchases of hybrid network offerings, may wait for advent of ISDN.

14 Analysts see IBM rebounding; DEC remaining strong in '87.

15 PC clone prices should drop as South Korean production speeds up.

15 Microsoft improves Windows by exchanging technology with Sun.

122 Ashton-Tate hopes integrated micro software package with own programming language will boost Framework development system.

SOFTWARE & SERVICES

19 U.S. government uses it clout to push for adoption of emerging Posix standard.

19 IBM improves Mapics II for System/38 with three application packages.

19 Excelerator users get link to virtual disk on mainframe.

MICROCOMPUTING

31 Apple slowly gaining inroads into corporate world.

31 Analysts divided on usefulness of IBM experimental speech-recognition system.

31 Chicago Black Hawks choose system to automate ticket sales.

System/36 users, place your bets. Page 63.

NETWORKING

41 University of Wisconsin gives AT&T high marks.

41 End-user firms, colleges, vendors seek distributed processing solutions.

SYSTEMS & PERIPHERALS

51 Wang announces 2200VP small-business system replacement.

51 Bettex offers workstation engine to variety of systems builders.

MANAGEMENT

79 National Computer Security Center's usefulness probed.

79 Management accountants recommend charging users standard rates.

Quotable

> *"The word in [Silicon] Valley is that it will take $2 million and 18 months before the [new IBM PCs] can be copied."*
>
> MICHAEL MURPHY
> "CALIFORNIA TECHNOLOGY STOCK LETTER"

COMPUTER INDUSTRY

89 Cullinet purchases software package license from Computer Associates.

89 IBM forms marketing agreement with Syntelligence.

89 GTE folds PBX and digital-switch business into Fujitsu venture.

89 Analysts predict growth in supercomputer commercial applications.

EMPLOYMENT TODAY

106 Employers will equally consider nondegreed applicants with experience.

SPOTLIGHT

Business graphics software: Learning to say it with pictures. Follows page 62.

IN DEPTH

63 Mid-range monte: Recent announcements leave users gambling on IBM's plans. By Michael Sicilian.

71 High-tech selling: Sales/marketing software may be adolescent but some profit-oriented firms respect it. By Jim Wallerstedt.

OPINION & ANALYSIS

17 Newquist watches exodus from sinking MCC ship.

19 Inmon discusses the drawbacks of normalizing data.

31 Zachmann declares Toshiba winner in portable PC market.

41 Horwitt applauds Mountain Bell's plunge into co-location.

51 Connolly reflects on deaths at DEC.

79 Beeler cautions about warranties that can backfire.

89 Wilder reports on Cebit introductions.

DEPARTMENTS

16 Editorial

83 Calendar

115 Buy Sell Swap

Users berate plan to deregulate Bells

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Business communications managers oppose the Department of Justice's proposal to allow the regional Bell holding companies to offer certain long-distance services, a spokesman for the International Communications Association (ICA) said last week.

The battle about the Justice Department's proposed changes in the AT&T divestiture decree heated up last week as interest groups filed their first round of comments to U.S. District Court Judge Harold H. Greene.

Although the department's proposed change in AT&T divestiture rules would give users seven new vendors to consider, the managers are concerned that the telephone companies would compete unfairly and drive firms such as MCI Communications Corp. and U.S. Sprint Communications Co. out of business, said Brian R. Moir, the ICA's counsel.

Bell monopoly strong

At a press conference, Moir and other critics said the Bell companies still have monopoly power over the local networks and thus could discriminate against companies that need access to the local loops.

The Justice Department recently urged Greene to change the decree to allow the holding companies to enter the equipment manufacturing and information service businesses and offer long-distance services outside their regions [CW, Feb. 9].

There were few surprises in the comments. Existing vendors in each of the three markets vigorously opposed entry by the Bell companies for fear of monopolistic actions, while the seven holding companies argued that they should be released from outdated regulatory restraints on competition.

Fearing competition

Long-distance firms that cropped up after AT&T's divestiture said they felt threatened by the Justice Department's proposal, but the holding companies have charged that they simply fear competition.

"By definition, competition cannot flourish against a natural monopoly," responded a spokesman for Allnet Communication Services, Inc., a Birmingham, Mich.-based long-distance company. "We're not afraid of competing with the Bell companies, but they have advantages that no one else can have," he said.

Nynex Corp. Chairman Bud Staley reported that the New York-based holding company supports speedy implementation of the Justice Department recommendations. However, Staley added that Nynex is disappointed it will not be allowed to offer interexchange service within its region.

Analysts said the Bell companies had wanted permission to resell the services of AT&T, MCI and U.S. Sprint within their territories as well as to provide large business customers in their regions with customized, private interexchange networks.

Spokesmen from Bell Atlantic Network Services, Inc. in Arlington, Va., said Bell Atlantic wants to go beyond the services suggested by the Justice Department and offer a variety of interexchange services inside its region, including private and packet networks and 800-number and WATS services.

Data communications equipment vendors strongly opposed lifting the manufacturing prohibition, arguing that the Bell companies would enter into joint ventures with certain manufacturers and buy only from those vendors, which would be detrimental to other suppliers.

The opposition

The Computer and Business Equipment Manufacturers Association, the Independent Data Communications Manufacturers Association (IDCMA), the Electronics Industry Association and the North American Telecommunications Association all opposed the Justice Department.

Herbert E. Marks, counsel to IDCMA, said that each of the holding companies could easily capture a $6 billion market for equipment attached to its own local loops, such as Integrated Services Digital Network (ISDN) equipment.

George R. Dellinger, telecommunications analyst for Washington Analysis Corp., predicted that Greene is likely to accept the recommendation on manufacturing but reject the one on long-distance service.

"Separating the local monopoly from the potentially competitive long-distance market lies at the heart of the consent decree, and Judge Greene may find that little has changed in the past three years to warrant diluting the prohibition in any fashion," Dellinger said.

Even if the court permits the Bell companies to enter the long-distance market, the decision is likely to be appealed by AT&T to the U.S. Supreme Court, a process that could take two years, Dellinger added.

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Waiting at the altar for IBM

Corporations freeze PC purchasing, wait for Big Blue to speak

BY DAVID BRIGHT
CW STAFF

Although it is uncertain exactly what Personal Computer systems IBM may introduce next month, many managers at large corporations have been holding off on micro purchases until they find out.

Since IBM has been steadily losing market share in the PC arena, it is preparing some radical moves to thwart some of the clones and to bring MIS managers back under its thumb, observers said. The offerings could include a low-end PC based on the Intel Corp. 8086 microprocessor, a line of PC ATs based on a 10-MHz Intel 80286 and systems built around the 32-bit 80386. Although there is a good chance that the systems will be based on a new architecture, many managers surveyed by *Computerworld* indicated that they will seriously consider the new IBM architecture unless the machines turn out to be a total disaster.

"[IBM] is extremely important and will be more important in terms of our overall architecture," stated John Langenbahn, vice-president of information resources at Mead Corp. in Dayton, Ohio. In anticipation of the announcements, Mead has been delaying PC purchases, he said.

Northrop Corp.'s Northrop Defense Systems Division in Rolling Meadows, Ill., will stick with IBM "unless they mess up my compatibility too badly," said Ed Macke, manager of personal computer systems. While waiting for more powerful systems from IBM, the division has been buying a few Compaq Computer Corp. Deskpro 386 systems, but only as a stopgap measure, he noted. Macke said he is fearful about what might happen if IBM's new machines turn out to be incompatible with software and add-on boards. He added that he already has enough trouble matching boards between IBM's newer and older PCs.

Eaton Corp., based in Cleveland, has also been adding a few Deskpro 386s but is not planning on abandoning IBM, according to Fred Zickert, manager of the firm's PC support center. "We're going to give IBM a serious look no matter when or what they come up with," he said. Zickert noted that it is a necessity for IBM to drop the price of the AT while speeding it up. Currently, users who do not need a Compaq Deskpro 386 often buy one anyhow because the price is not much more than that of a fully configured AT, he said.

> "WE HAVE no interest in a machine, no matter how fully functioned it is, if it is also incompatible with existing software."
>
> WALT KENNAMER
> ERNST & WHINNEY

In addition to hardware and software compatibility with existing systems and competitive price/performance, managers said they are looking for a more powerful operating system as well as built-in communications functions such as token-ring and LU6.2. Including communications functions would help in the integration of PCs with mainframes and help return control to the MIS manager.

"The problem that most corporations have with PCs right now is getting data from the mainframe and sharing data around the corporation," Mead's Langenbahn noted. "IBM's strength is on the mainframe side. They're going to play up on communications between the mainframe and the PC."

But some managers are skeptical about a change to new architectures and a new performance level. Walt Kennamer, senior manager of the National Computer Audit Group at Ernst & Whinney, the Cleveland accounting firm, said talk of higher performance IBM PCs does not concern him. "The issue is how to train users," he said. "The question is how to make the PC and applications easier to use and learn. We have no interest in a machine, no matter how fully functioned it is, if it is also incompatible with existing software. If we have to retrain our users, it's not what we need."

Kennamer, who is responsible for his firm's 5,000 PCs, said evaluating new micros has become a purely economic decision. While hardware costs are significant and software fees are high, he said, user training is the firm's highest PC-related expense. "You're talking about training costs that are two to three times higher than the cost of hardware and software costs together," he explained.

"Companies have a very large investment in the existing inventory base and have finally become comfortable with the standards that exist right now," agreed Cheryl Currid, manager of sales, systems, planning and information at Coca-Cola Co. Foods Division in Houston. If IBM brings out a superior product that gives the user base a migration path, then people may move quickly to that new standard. Otherwise, IBM may find itself losing even more control in large corporations, she noted.

But according to one microcomputer evaluation manager who has seen some of the new machines, users who are expecting a smooth transition from the old architecture to the new will be in for quite a shock. The evaluation manager said the AT line expected on April 2 represents a radical departure from the current ATs. IBM does not plan on introducing its 80386 machine at this time, he said.

Built around a 10-MHz 80286 and a new bus with no more than four slots, the systems employ surface-mount technology and 3½-in. floppy disk drives to achieve a small 15- by 15-in. footprint, the manager said. He added that he does not expect IBM to offer a 5¼-in. drive option. He noted that a troubling aspect of the systems is their inclusion of a 1.5M-byte floppy disk drive instead of the 720K-byte unit contained in the IBM PC Convertible.

Many observers said they expect a slightly enhanced version of IBM's PC-DOS, but the source claimed that software compatibility may be limited.

While the new bus will not be closed, boards built for the current AT bus will not be usable with the new system in any way, according to the source. IBM considers the bus to be an improvement of the "primitive" AT bus rather than a way of throwing the clones off course.

Improvements reportedly include the self-identification of boards and a decrease in radiation. The system board is expected to contain nonstandard graphics capabilities, which the manager described as an expansion of IBM's Enhanced Graphics Adapter. The system board will not include built-in communications, he claimed.

The new machines are visually attractive and will be priced lower than current AT systems, the source said. AT prices currently begin at $3,395 for a system with 256K bytes of memory and one floppy disk drive.

Senior Editor Patricia Keefe and Correspondent Alan Alper contributed to this report.

Altered systems, data blindside Volkswagen in record-breaking $259M computer fraud

BY CLINTON WILDER
CW STAFF

WOLFSBURG, West Germany — Volkswagen AG last week said it discovered that a corporate foreign exchange loss of as much as $259 million had been fraudulently covered up through the alteration of computer programs and erasure of data tapes.

The case appears to be the biggest reported example of computer fraud in history.

The fraud was apparently perpetrated by a currency trader or traders, either within Volkswagen or with an outside financial firm, who handled Volkswagen corporate funds in 1984.

Volkswagen will include a provision for the estimated amount of the loss in its 1986 financial results.

'Covering up bad moves'

In a radio interview in West Germany, Volkswagen board member Karl Gustaf Ratjen said that the fraud involved computer programs and storage tapes, according to published reports.

"I would speculate that someone made some bad moves in currency trading and, to cover it up and impress the boss, fabricated the computer records so the reports continued to look good," according to Jack Bologna, who is a noted computer crime consultant and professor of management at Siena Heights College in Adrian, Mich.

The person or persons involved would probably have had to rewrite processing software as well as alter output, Bologna said. "In a company of Volkswagen's size, they would have needed sophisticated skills in applications programming and maybe systems programming as well," he said.

Volkswagen said it filed fraud, breach of trust and forgery charges against individuals outside the company but did not rule out the involvement of its own employees.

The case has elements reminiscent of the previous largest computer fraud case. In 1972, investigators discovered that Equity Funding, a Los Angeles insurance firm, hid corporate losses from its auditors by generating $200 million worth of fake insurance policy sales through its data processing department.

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Main Editorial Office
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Industry awaits

CONTINUED FROM PAGE 1

prietary graphics on the motherboard (16 colors and 640- by 480-pixel resolution) and 40M- and 70M-byte hard drives. A user who has seen the system said a base unit is expected to cost $3,335 with one floppy disk drive and 256K bytes of RAM.

- 8086 PC — 3½-in. floppy disk drive, IBM proprietary graphics on the motherboard, built-in video. Performance is said to be close to that of the original PC AT, with pricing expected to fall between $1,000 and $1,500.
- DOS 3.3 — Contains new drivers that are less forgiving than previous versions of DOS in the area of interrupt-processing; will partition bigger drives but still have the 32M-byte limit per drive.

Many IBM observers said they expect IBM to restructure its PC line in the wake of the April announcements. Most sources said IBM will probably eliminate configurations of some models. Although there are significant differences between IBM's current ATs and the future AT, some observers questioned whether the newer model would cannibalize the older machines.

One user said IBM told him the current AT, released 2½ years ago, would be phased out, while another user said the AT model is becoming harder to get.

Many IBM watchers speculate that IBM will incorporate LU6.2 into read-only memory and an IBM Token-Ring chip onto the motherboard. One consultant said he saw a Token-Ring chip in a 386 prototype.

IBM execs offered hints

Speaking at a recent seminar on desktop communications, Robert Carberry, IBM's director of engineering and technology, told attendees that the current crop of PCs does not accommodate communications. He said IBM would alter the internal architecture of its next-generation PCs to better support connectivity. His comments have been echoed publicly by at least two other IBM executives during the last two months.

The industry is also rife with reports of an IBM 80386-based computer. Several sources said they have seen several versions of IBM's 80386-based computer but added that the machine was not stable enough for release.

IBM is smarting over sales lost to Houston-based Compaq Computer Corp.'s Deskpro 386, which began shipping in volume in October 1986, according to analysts.

Joe Cross, an analyst with Future Computing, Inc. in Richardson, Texas, estimated that the high-ticket Deskpro 386 is generating between $3.5 million and $4 million a month in revenue. During a six-month period, the Deskpro 386 has pulled down between $21 million and $24 million in end-user sales, he added.

"That's some indication of the money that IBM is leaving on the table — and that ain't hay," he said.

Wang refutes report that 27 execs left

BY ALAN J. RYAN
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. officials last week said a *Computerworld* story reporting that 27 of its vice-presidents had left the company since January was untrue.

"Twenty-seven vice-presidents is like half our vice-presidents," said Bob Doretti, senior vice-president of communications. He said the correct number of departed vice-presidents is seven.

Spokesman Paul Henning said Wang had 66 vice-presidents as of Jan. 1 and currently has 58. The most recent to leave was Ernie Cornelssen, vice-president of U.S. customer-service organizations. Cornelssen resigned on March 6.

Henning said that none of the vice-presidents, other than those who had left Wang, "have been shifted to anything else. They are still vice-presidents."

Henning said he did not know if some of the eight vice-presidents had been asked to leave the company. "I would assume some of them were involved . . . in the plans and the consolidation effort we announced in January," he said.

Pay cuts to trim budget

Wang said in January that it would attempt to trim $50 million from its budget by June 30 of this year through a 6% pay decrease for all U.S. salaried employees and through a 1,000-man reduction in the company's work force.

Doretti also denied internal rumors circulating last week that Wang plans to make an additional 2,000 cuts from the payroll and that the company's U.S. salaried employees will be asked to take a further pay cut of 3% to 4%.

"That is totally wrong. No cuts. No salary cuts," he said. He added that Fred Wang, chief executive officer of the company, had denied the rumors also. "There was an employee letter that went out publicly denying it."

With Wang's rumor mill working overtime, Doretti said, "You must realize that any time any company has any type of restructuring, reorganization of any kind, you're always going to hear rumors on what is next, who is anticipating what."

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DEC users grumble, accept price hikes

BY NINAMARY
BUBA MAGINNIS

Most Digital Equipment Corp. users polled last week were disappointed with the firm's recent price adjustments but accepted with resignation the prospect of paying higher systems costs.

The far-reaching adjustments slashed dollars off system memory and considerably increased the cost of the high-end VAX line [CW, March 9].

"We just bought an 8700, and I feel relieved we bought it before the price went up," noted Bill Sommerfeld, computer resources manager for Camp Dresser & McKee, Inc, a Boston-based consulting engineering firm.

"I guess I don't quite understand why they're raising those prices," Sommerfeld added. "Since we probably will buy more of those systems in the future, I don't have a positive reaction to it." DEC also lowered the price of its mid-range lineup, replacing the 8200 and 8300, respectively, with the higher performance 8250 and 8350 units. "We tipped the price-per-MIPS curve a little bit," said Bob Flynn, DEC manager of U.S. sales operations, referring to the machines' millions of instructions per second performance. "The entry level is more attractive and the higher end a little bit more expensive on the CPU."

Price hikes reflect system's value

Explaining the $66,000 increase in price for a preconfigured 8700 with 32M bytes of memory, RA81 disk, TU81E tape drive, communications controller and paid-up VMS and Decnet software license (see chart at right), Flynn said that the move reflects the increased value of the 5.8-MIPS CPU.

In contrast, an 8M-byte 8250 with the same peripherals and licensing costs $122,000 and offers 20% greater performance than the old $139,000 8200.

Although DEC extended its one-year warranty to include all hardware, the 8000 series VAX already had a full-year protection built in, DEC's Flynn said.

Customers remain pragmatic

Even with the bad news for high-end VAX customers, large users are pragmatic.

"Obviously, I'm unhappy that the machines I am buying are now more expensive. Does that mean if I need another 8700 down the road that I'm not going to buy one? Probably not," said a vice-president in a major East Coast financial firm.

Before the price hike, the firm purchased an 8700 to add to its high-end 8600 and 8700 Vaxcluster, he added, explaining that DEC officials informed him that memory for an older cluster of several VAX-11/785s and some 8650s would now be maintained for free.

Stanley Rose, manager of technical support for Bankers Trust Co. in New York, looks after two 8700s and more than 48 other VAXs.

Replacement based on price

"We took delivery of several large configurations prior to the price change, and we repriced those based upon new prices," Rose said.

"They were very close — some a little more and some a little less. We tend to buy systems with large numbers of disks and memory. Once you've done that, the price difference becomes much less. The net change was not very great."

DEC's Flynn affirmed this. "In the high end, there's a slight increase," he said. "Certainly in after-market purchases of disk and memory, the customer is getting more value than before. So, overall, we think we made it a lot better for the customer."

Service warranty not worth cost

While DEC now packages an on-site, one-year service warranty for low-end hardware, most users said the price increase does not justify the cost.

"There's a trade-off. I don't think I'm getting anything for free," said a computer engineer for a large pulp and paper mill.

At one site, the paper mill has two 8200s clustered and one Microvax and plans to purchase an 8530 next spring.

DEC price shuffle

Comparative system prices before and after March 4th price restructuring

*Preconfigured VAX Systems**	*Before*	*After*
8200 8250	$158,000	$141,000
8300 8350	$181,000	[illegible]
8500 8530	$330,000	$377,000
8650	$440,000	$317,000
8700	$529,000	$595,000
8800	$721,000	$836,000

* System prices in typical configurations including systems software purchase.

"We'll have to re-evaluate our process," the engineer observed. "We'll probably stay with DEC. You don't have to like it, but the capital is invested. We're locked into it."

The sharp increase in Microvax VMS licenses — from $6,000 to $13,000 for 9 to 16 users and from $8,000 to $18,000 for unlimited users — has low-end users concerned.

"I find it disagreeable. I don't understand why they're doing it. It will certainly affect our decisions in the future when we consider buying Microvaxes," said Bill Dishman, computer systems support manager for the Decatur, Ga.-based Simons Eastern Co.

DEC user John Herbst, systems support manager for the Fort Lauderdale, Fla.-based *News & Sun Sentinel*, complained that the 8600 line is getting the short shrift.

The 8600 and 8650 are the only Unibus 8000 series machines, with the others employing a bus interconnect backplane, according to DEC.

Two weeks ago, DEC officials purposely left the 8600 and 8650 off the company's product positioning chart, claiming the other machines give better price/performance.

"I'm a little concerned. It appears to me that DEC is forcing me into the BI architecture. I'm not saying the BI architecture isn't good. I can run a mix of Unibus and BI in a cluster," Herbst observed.

"I'm a little confused as to what they want users to do and why they want us to do it. Why are they forcing the BI architecture? I like the 8650. It's just one heck of a machine," he continued.

Universities will not fare well

Where cutting costs count, some university users will not fare well with the price changes, said Ruth Milner, systems manager for the physics department at the University of Toronto.

"What usually happens in a university environment is you don't buy all that stuff from DEC," Milner explained.

"Apart from the TK50, you can get very good products at about half the price. DEC has come down considerably on Microvax memory, but they're still several hundred dollars more expensive than competitors," she said.

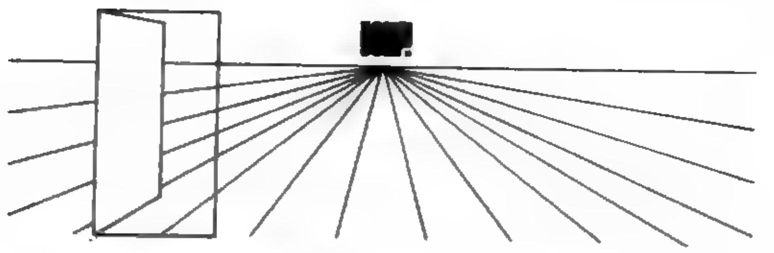
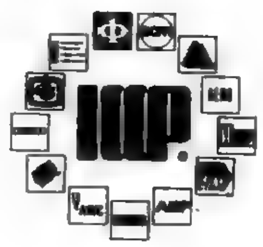
Last week, one third-party competitor — Milpitas, Calif.-based System Industries, Inc. — matched DEC's one-year warranty on DEC-compatible disk and tape subsystems in response to DEC's announcement.

Now for the good news

There is good news for DEC users selling high-end VAXs to other parties, said John DeSouza, international product manager for leasing planning services at Framingham, Mass-based International Data Corp. (IDC).

"The systems that were increased in price should continue to command the same percentage of value in the used marketplace," DeSouza explained.

"So, in effect, they're worth more now because of the higher list price. It's great for users who bought them at the old price, mainly because a used market has yet to be established," the IDC product manager said.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Net management aids on the way

Codex and U.S. West offerings feature graphics, windows

BY ELISABETH HORWITT
and DONNA RAIMONDI
CW STAFF

Targeting opposite ends of a perceived market for user-friendly network management, Codex Corp. last week released a personal computer-based system, and U.S. West is expected to release a mainframe-oriented system soon.

The products provide functions such as windowing, color graphics, Help screens and mouses — many of which are currently lacking in IBM's Netview family. Still in question, however, is whether these tools will become part of network operators' basic tool kits or get labeled as fancy window dressing.

The Help features provided by Codex's 9300 network management system, unveiled last week, target small to medium-size companies. "Many of these companies don't have the budgets to support skilled network technicians," explained Stephen P. Mank, manager of product marketing at Codex.

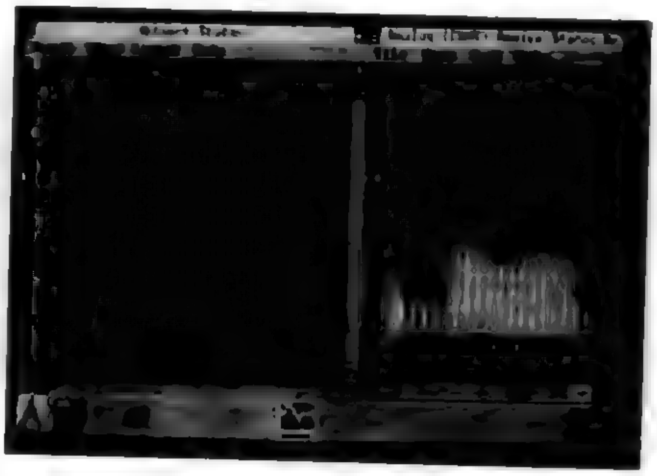
The system's graphics and color-coding presentations provide summary, analysis and filtering of network data for less experienced network managers who cannot extract relevant information from the "spooling screens full of line parameters" that are used by the more technical operators of big companies' complex networks, he added.

Based on an IBM Personal Computer AT or compatible, the initial 9300 systems collect diagnostic information from Codex modems and provide users with ways to view the data with the help of Microsoft Corp.'s Windows, the PC Mouse and color graphics representations.

Depicts data graphically

The U.S. West Graphics Network Monitor, scheduled to be announced in a month, will graphically depict data gathered by the Systems Network Architecture (SNA) network management facilities such as Netview or IBM's Network Communications Control Facility, Network Logical Data Manager and Network Problem Determination Application monitors. If the SNA system does not have these facilities, the monitor exhibits information gathered directly from VTAM, said Stephen Wendfeldt, manager of marketing and business planning for U.S. West Network Systems in Seattle.

U.S. West's product, which will reportedly run partly on the IBM mainframe and partly on an IBM workstation, is targeted at the medium-size or large IBM shop, Wendfeldt added. "This product gives a full-color representation of SNA networks, end-to-end of the network, both software and hardware," he said. The program is expected to be iconographic and intuitive in the sense that it will select relevant data to present. "We use color, alarms, the ability to pan and zoom on any element or combination of elements within the network. The user can move over to an element, point the mouse to it, click on it and have an exploded view of that data," Wendfeldt said.



The Codex system monitors and displays the status of individual network links, including the status of analog and digital lines and modem devices, indicating by color code whether a link is operational, deteriorating or in critical condition. Bar charts present a profile of a line's signal-to-noise ratio, with test segments that fall below the acceptable threshold outlined in red (see diagram above).

The Microsoft Windows program, integrated with the mouse, allows the manager to simultaneously get an overview of network status and focus in on one link, Codex's Mank noted. Help facilities associated with each screen analyze the information provided acting as a training tool for inexperienced managers, he added.

While emphasizing that there is a big market for graphics-based network systems, Frank Dzubeck, president of Washington, D.C., consulting firm Communications Network Architects, Inc., disagreed that such products can take the place of true network expertise. "Artificial intelligence targets lack of expertise in smaller companies because it steps the operator through [the process of analysis]," he said. "If you don't know how, it doesn't matter whether you're given graphics or data."

Puts 'pizazz' in network

Such tools are helpful as the means of presenting network data to "network management one level above network operators," Dzubeck said. "Just like spreadsheets are great for accountants but management needs graphs to get the picture, graphics puts the pizazz into network analysis."

Because it is based on the PC AT, the 9300 has an upward limit of 32 lines, or 400 devices. Companies whose needs expand beyond that limit can plug the 9300 into Codex's higher end 4860 system — but that means losing the 9300's Help facilities, Mank said. Codex plans to test the market for graphics-based network management before committing to a more powerful version of the system, he added.

Scheduled for release by the end of this month are two 9300 models: the Codex 9320, a complete system based on the Hewlett-Packard Co. Vectra, and the 9310 Network Management Kit, which can be used to convert an existing PC AT. Pricing ranges from $11,500 to $17,500. IBM reportedly sounded Codex on the idea of Codex products supporting Netview, but Codex has made no such announcement yet.

The official U.S. West announcement, originally scheduled for this week, has been delayed approximately a month due to some unexpected difficulties with resale contract negotiations, a U.S. West spokesman explained.

MIS

FROM PAGE 1

to extract data from a variety of IBM mainframe applications and have that data translated into PC formats, initially lacked a DB2 connection. That link has now been added. "There is a lot of interest in DB2. People who are doing tools and access technology with DB2 are getting a warm reception from customers that have adopted DB2, at least in some stage," said Alexander Crosett, general manager of Lotus's information center group.

TAC will allow users of a wider variety of machines, including workstations and minicomputers, to extract mainframe data through the use of an open-file format that will be part of the next release. "Anything that can create a sequential file in this format and send it to the mainframe can kick the engine into gear, do the extraction and receive the output," said Merv Adrian, project manager for Shearson Lehman Brothers, Inc. in New York.

"You can create the request with a text processor, with a program in C or Basic or PLI, or whatever, and send it to the mainframe. You could be a Sun Microsystems, Inc. workstation emulating a terminal, a Digital Equipment Corp. VAX, or just about anything you want, as long as you have the connectivity to the mainframe," Adrian said.

Perhaps the boldest advance is the ability to extract data without users stumbling over the difficult syntax of mainframe applications. "Currently, the user has to use the syntax native to the particular product they are talking to, which is okay if they are just talking to one product. But if they are talking to two products, you have to know two sets of syntax," said Mussie Shore, TAC product manager for Lotus.

The next release will allow users to use the 1-2-3 syntax to extract mainframe data. "If the user knows the 1-2-3 data base, they know how to get data from any of the products we support on the mainframe," Shore said.

Users of other micro applications should also find it easier to extract data. "All the parameters that were done using a mainframe interface will be issued from the PC from within whatever product you happen to be working with," Shore added.

What the new TAC will not include, according to sources, is a link to IBM's virtual telecommunications access method (VTAM) and virtual storage access method (VSAM), or a connection to mainframe production-oriented data bases. Lotus is working on these areas but is not expected to have this technology ready for the next release. Links to VTAM, VSAM and production data bases may be as much as a year away, a Lotus source said.

VSAM link popular

"The one [link] that it most widely sought after is a VSAM connection. I have no comment on it, other than it is the most sought after," Shore said.

The link to VTAM, however, is currently under development with the help of technology from Future Software, a Salt Lake City-based mainframe software firm and developer of Future Calc.

"The reason we did the acquisition was that the Future Software folks had done some terrific core-level work and driver work on operating systems technology and file systems. They worked on things like VTAM and VTAM access methods and drivers and analyzed users' interfaces," Crosett said. Lotus is no longer marketing the Future Calc product, Crosett added.

The new link will include enhancements directed at MIS professionals. "There were a host of things we wanted to do for the DP guy, such as limiting the amount of records that a particular user could extract so that you don't run into a situation where a user is attempting to download 10,000 records," Shore said. "We are also enhancing the error logs and logs which help determine the usage of the system and the distribution of use. For example, how many people are going to Information Builders, Inc.'s Focus, how many to SAS Institute, Inc., when are they doing it, how much CPU time is involved in doing it, etc."

The product, which has shipped since September 1986, has encountered a long sales cycle typical of mainframe products. Many users are waiting for enhancements before implementing the technology, a situation that Lotus expected. "Users want us to connect to everything, including the kitchen sink. They've got it all in their shops," Shore said.

MIS market tough

So far, Lotus has found the MIS community to be a tough but worthwhile sell. "It is not an easy market to sell into. Depending on the size of the company and the size of the processor, there can be as many as three different parties involved in the decision: the end-user champion, the information center person who knows the mainframe and the MIS manager," Crosett said.

Feedback and criticism from interested users have strongly contributed to the product revision.

"Always when you come out with a product like this you get smacked around the head and ears, and you learn an awful lot about what else needs to be done. Then it is just a question of time, money and effort to get the required features," Crosett said.

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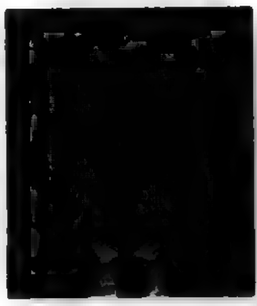

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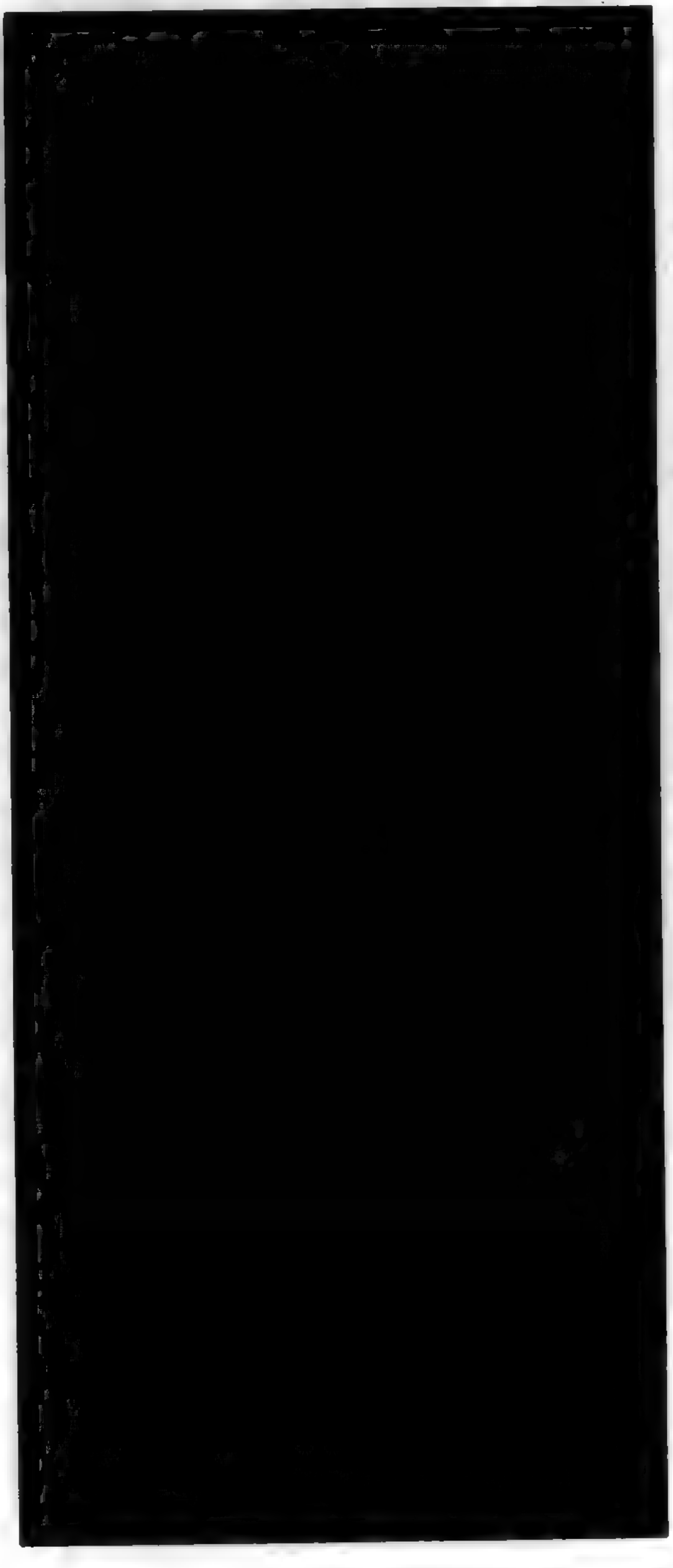

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Network hybrids stillborn; early users say promises can't be met

BY ELISABETH HORWITT
CW STAFF

A new breed of hybrid network offerings still do not live up to vendors' promises, according to users who have evaluated and postponed purchase of such products.

True hybrid networking, which ideally would provide cost-effective, flexible integration of private lines and carrier-based services, will probably not be delivered until the advent of Integrated Services Digital Network (ISDN) — which is still several years away, industry experts say.

"The whole point of hybrid networks is that you can put your own switches in where it's economic and go with public services where it's not," says Ronald West, telecommunications manager with New York law firm Shearman & Sterling.

Turning to hybrid net

The law firm recently considered hybrid networking as a way to turn one of its headquarters buildings in New York into a hub supporting two T1 connections: one going to another Shearman & Sterling site several blocks away, and the other hooking up to the nearest New York Telephone Co. central office via the local exchange carrier's dedicated T1 service, Flexpath (see diagram at right).

The law firm thought it would realize significant cost savings by using two interconnected T1 links instead of dozens of individual dial-up line connections between its two headquarter sites and New York Telephone's facilities. West discovered that by using the Flexpath T1 connection only between the main headquarters and the local exchange carrier, the firm would save 50% of the cost of using individual lines.

Once the Flexpath channel reached New York Telephone's site, Shearman & Sterling wanted the local exchange carrier to demultiplex the 1.5M bit/sec. bandwidth into 64K bit/sec. subchannels and route them to various sites within the greater New York area. The firm wanted to allocate 10 lines to New York Telephone's direct-dial network, 10 to dedicated connections and four to AT&T's interexchange WATS service, West explains.

Mix-and-match idea nixed

However, New York Telephone currently does not allow users to mix and match the types of services that are accessed by a single T1 line. Therefore, Shearman & Sterling would have to designate one T1 line for dial-up calls, another for dedicated lines and a third for access to AT&T WATS. As this would eliminate most cost savings that the law firm might have gained by the setup, Shearman & Sterling abandoned the idea, West explains.

"We're not serving as well as we'd like customers who want to mix and match services, but whose requirements do not justify T1 links," admits Robert Block, New York Telephone associate director of product management. The carrier still routes everything in T1 blocks; ISDN will make it possible to route individual 64K bit/sec. channels to different services, but not until 1988 or 1989, he adds.

About half of the 22 divested Bell operating companies provide T1 demultiplexing services similar to New York Telephone's, but mixing and matching dedicated and public, local-exchange and interexchange tariffs on the 64K bit/sec. direct-system output (DSO) level would take major upgrades to the companies' existing switching systems, according to Thomas Nolle, president of Haddonfield, N.J., consulting firm CIMI.

'Geography against them'

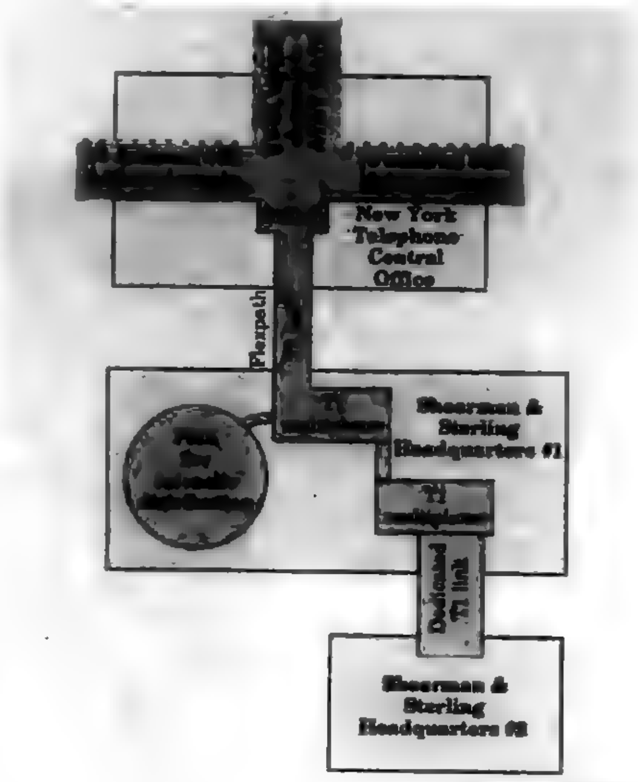
"And geography is against them, because they don't have enough customers with multiple sites in one region that can cost-justify providing a particular enhanced service," Nolle says.

The looming advent of ISDN is one barrier to the local carriers' implementation of a proprietary DSO bandwidth allocation system that would become obsolete as soon as the new standard arrives, Nolle points out. AT&T also is rumored to be waiting to introduce more dynamic bandwidth allocation services until it can ensure that they are ISDN-compatible.

The two major obstacles to widespread hybrid networking are user education and carrier-to-customer-premise equipment incompatibilities, according to John Darpino, president of Woodbury, N.J., value-added data communications systems reseller John Darpino Associates, Inc.

Shearman & Sterling's vision of a hybrid network

Headquarters #1 acts as hub connecting Headquarters #2 with other sites in the region, as well as with AT&T interexchange WATS service.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Flexpath
Shearman & Sterling Headquarters #1
T1
Dedicated T1 link
Shearman & Sterling Headquarters #2

CW CHART: SUSAN ALDAM

Hybrid networking is already playing a major role in the network planning of approximately 10 company representatives interviewed by Darpino. Many of Darpino's clients are "cognizant of emerging carrier services and want to leave open the possibility of taking advantage of them," he says.

Like Shearman & Sterling, Chase Manhattan Corp. is not currently interested in hybrid networking — primarily because carrier services do not provide the same flexibility and functionality as private T1 networking, according to Walter Romanowski, second vice-president of telecommunications.

"We want to do our own dynamic channel switching, diagnostics and backup and only use AT&T central offices to pass through dedicated lines," Romanowski explains. "Everyone I've talked to says it takes 20 to 30 minutes to reallocate bandwidth using AT&T's Customer Controlled Reconfiguration service."

Several high-end T1 switch vendors offer dynamic reconfiguration of bandwidth, as well as flexible reconfiguration of subchannels down to the 2.4K bit/sec. level, while AT&T does not. When the carrier brings out such tariffs, Chase will "definitely look at AT&T's network services, although we could already be fully installed by then," Romanowski notes.

Keeping hybrid door open

To keep the door open for future hybridization with carrier services, Chase Manhattan is only considering T1 switches that support D4 framing protocols. These determine how transmissions are packaged and routed by AT&T's Digital Access and Cross-Connect System (DACS) central office system.

Timeplex, Inc., Network Equipment Technologies Co., Cohesive Network Corp., Infotron Systems Corp., Avanti Communications Corp. and Integrated Telecom Corp. are among the vendors that have announced compatibility with D4 framing protocols.

However, D4 compatibility is not enough to guarantee the kind of hybridization Romanowski envisions, in which Chase Manhattan users could use the T1 switch vendor's network management system to troubleshoot and reconfigure channels on both the public and private sides. "We want to be able to use our T1 box to route 64K bit/sec. channels out of an AT&T central office," Romanowski says. He adds he is not sure it is reasonable to expect "all the T1 vendors to use the same protocols, since it means throwing out all of their proprietary software."

D4 primarily an alternative

With the self-proclaimed exceptions of Avanti and Integrated Telecom, the majority of T1 vendors offer a D4-compatible interface as an alternative to, not an intrinsic part of, their T1 networking systems.

For example, an optional D4-compatible interface on Timeplex's Link/2 T1 switch allows users to interface with AT&T central office-based services at the 64K bit/sec. level, according to Timeplex product manager Joseph Mocerino. The trade-off, however, is that this interface precludes use of Timeplex's native protocols, which support such features as subrate digital multiplexing, remote diagnostics and data networking.

Network management is also "a bit of a problem," according to Mocerino, since DACS-based services do not provide the same functionality as Timeplex's switch, and the Link/2 D4 mode does not allow for managing AT&T-based network links.

Timeplex is currently working on interfaces with other T1 vendors' supervisory systems — but not with AT&T's, Mocerino says.

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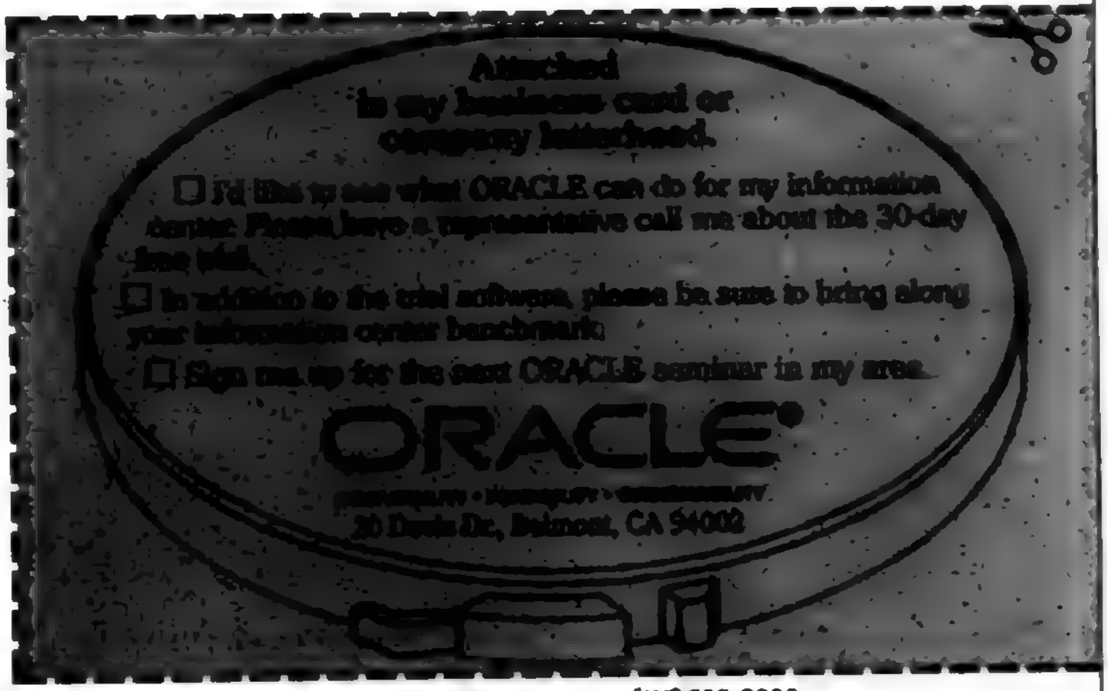

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VM keys IBM publishing strategy

Will link PC-DOS, 9370, workstations; Windows won out over Topview

BY JEAN S. BOZMAN
CW STAFF

LOS ANGELES — IBM's VM operating system will be the glue that binds the company's PC-DOS desktop publishing systems to its Unix-based RT Personal Computer engineering workstations, an IBM executive said at the Seybold Seminar on publishing, held here last week.

The company's publishing strategy, which IBM has described in measured doses over the last two weeks, uses the 9370 as the hub and PCs and RT PCs as separate publishing workstations.

"We will not be building separate, independent publishing products," said Merry Quackenbush, director of IBM's Media and Publishing Systems Group, which will market IBM's forthcoming publishing products. "We will build on the IBM 9370, which will give us a wide range of host solutions, and we will build on standard PC technology as a superb base for publishing applications."

IBM is developing additional utilities that will run on the 9370 under VM to tie together PC and Unix publishing documents. VM currently supports guest operating systems, including Unix, and will be enhanced to support specific RT applications. "VM's Unix utilities will be augmented," Quackenbush said, "to allow RT Unix applications to be supported." From there, combined documents can be sent upstream to an IBM 3090 mainframe for high-speed laser printing at a centralized corporate printing center.

In the next two months, the first batch of PC-DOS solutions should appear, Quackenbush said. IBM previously has said it will support Microsoft Corp.'s Windows, Adobe System, Inc.'s Postscript page description language and PC-DOS.

Topview deemed inadequate

The PC systems will run applications written under the Windows environment, rather than IBM's own Topview windowing system. Topview does not provide adequate graphics support for publishing applications, Quackenbush said. However, she added that IBM is not abandoning Topview, which it will still use in less graphics-intensive applications.

"Topview does not fit in the graphics environment, and we all know that graphics is essential to publishing," Quackenbush said. "So we were forced to move to another standard."

IBM's desire to follow industry standards also led it to endorse the Postscript page description language over an internally produced alternative, Jeff Mason, director of IBM's Boulder, Colo.-based Publishing Systems Independent Business Unit, told the recent Corporate Electronics Publishing Systems conference in Chicago.

IBM's RT — the company's only Unix workstation — is primarily used as a computer-aided design and manufacturing engine but also runs the Interleaf, Inc. publishing package, which can combine text with graphics and prepare a document for laser printing.

PC applications will not be able to directly communicate with those on the RT, according to Quackenbush. Rather, large enterprises will rely on VM-based mainframes to graft together high-resolution, vectorized drawings from RTs with text produced on either a PC or a mainframe terminal under VM, she continued.

The VM links will prove important to IBM's overall publishing strategy, Quackenbush said, since IBM believes about 40% of the $6 billion generated from electronic publishing solutions in 1990 will come from large manufacturing corporations that will have both RTs and PCs in place.

Cart pushing horse?

Some conference attendees said the industry is forcing IBM to move to certain popular publishing standards — not the other way around. IBM had to ensure that third-party systems developers would be comfortable supplying solutions for IBM's PC platform. This stance will allow IBM to leverage its existing base of PCs, numbering in the hundreds of thousands, into publishing workstations through the simple addition of specialized color displays, software and function cards, the attendees added.

Quackenbush partially confirmed the analysts' theory. "Our intent is to have an open architecture to welcome third-party products, but it is also our intent to provide proprietary products for the PC," she said. "The announcement of IBM publishing standards allows for a wider range of applications development."

Quackenbush also elaborated on the company's decision to launch publishing solutions on the PC rather than the RT. "PC-DOS already has strong customer acceptance, and our objective will be to protect the investments our customers have already made in IBM."

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3317-8711

Desktop publishing wave misses MIS

BY PEGGY WATT
and JEAN S. BOZMAN
CW STAFF

LOS ANGELES — While heralding a second wave of desktop publishing technology, most systems suppliers who addressed an industry seminar here last week declined to address MIS concerns for integrated systems.

Future products, many of them scheduled to be announced this year, will feature higher-speed processors, such as the Intel Corp. 80386 and Motorola, Inc. 68020. Speakers at the Seybold Seminar said the products will also include advanced graphics processors to relieve the CPU of cumbersome computational tasks, color monitors and high-resolution screens, as well as more capable printers.

One example of such design is the Apple Computer, Inc. Macintosh II workstation, unveiled March 2. "The Mac II is a response to user demands for high-resolution graphics, Unix and MS-DOS applications, an open architecture and expandability," said Larry Tesler, vice-president of advanced technology.

But while speakers from Xerox Corp., Hewlett-Packard Co. and others spoke of features, speeds and windowing capabilities, few addressed integration concerns.

"Everybody was talking about their own technology," said Howard Woolf, manager of Digital Equipment Corp.'s Publishing Systems group. "But we must help the customers solve their companywide problems."

Two companies that addressed integrated corporatewide systems were IBM and Interleaf, Inc. An IBM representative discussed plans to tie Personal Computer and workstation systems to its VM mainframe architecture (see story page 12). Interleaf, a leading vendor of workstation publishing software, announced plans to provide integrated workstation and PC-based publishing systems with large systems software the company plans to make available for IBM mainframes and DEC VAXs (see story below).

Overall systems in hand

But many users in attendance seemed not to be thinking of overall systems solutions. "We really have total control over our in-house publishing systems," said one manager of a nationwide retailing firm. Her group rarely interfaces with corporate MIS and would like to avoid centralized oversight of their systems.

And yet, such control is virtually inevitable, particularly in the IBM and DEC enterprisewide corporate publishing solutions. Until recently, in-house publishing has involved either high-end, dedicated systems or use of a PC-based system with a laser printer.

"Publishing is an application that is forcing the issue of control over who controls the data," said Tony Bove, industry analyst and editor of the "Bove and Rhodes Inside Report on Desktop Publishing."

'Must structure data'

Some of the users were concerned about the need to build links to other host-based systems. "We are really going to need to structure our data to make it available to others in the company," said one systems planning specialist from a New York firm. "And the minute you structure your data, you're into information management."

Until now, few networking solutions existed. But DEC has unveiled an enterprisewide networking scheme to link in-house publishing applications and IBM is planning its series of 1987 host-oriented products.

Other vendors, such as Apple, are planning to provide gateways to these corporate networks but do not plan to provide such extensive publishing architectures themselves.

Others avoided the issue, focusing instead on specific features. Roger Archibald, product marketing manager for the HP Laserjet printer, spoke of the company's page-description languages. In addition to the widespread use of its Printer Control Language for directing printer output, HP wants to support the Imagen Corp. Document Description Language. HP's endorsement is a minority choice amid widespread acceptance of Adobe Systems, Inc.'s Postscript, which recently gained IBM's endorsement.

And Xerox is formalizing a color-support software language that would allow for true-color reproduction on a variety of output devices. Postscript developer Adobe is also refining its technology. "We hope during this year, or early next year, to see hardware devices to support color image output," said John Warnock, president of Adobe.

Interleaf plans unified system

BY ROSEMARY HAMILTON
CW STAFF

LOS ANGELES — Interleaf, Inc. announced ambitious plans here last week to provide an integrated, corporatewide electronic publishing system by offering software for mainframes and personal computers.

The products, most of which are scheduled for release late this year, would greatly expand the vendor's product line, which is now based on 32-bit workstations from Sun Microsystems, Inc., Apollo Computer, Inc. and Digital Equipment Corp. The vendor also provides its Technical Publishing Software (TPS) on the IBM RT Personal Computer.

"We want to give MIS directors more control over what is now a fragmented publishing operation," Interleaf President David Boucher said.

Boucher provided few details, however, on how a user will integrate the publishing operation. If a user were to install the full Interleaf lineup, it could be running on at least three different operating systems. But Boucher stressed his intent for Interleaf to work with the customer as a systems integrator. "The idea is to work with the user rather than just present them with a package," he said.

Boucher said he expects to launch such an effort with the new mainframe software at a few pilot sites this summer. Interleaf plans to port its software to both the IBM MVS and DEC VMS environment, and the firm is currently investigating the possibility of porting it to the IBM VM operating system, Boucher said. It also plans to work with users to integrate the Interleaf software with a customer's data base management system, although Boucher would not specify what data base management systems this would include.

Boucher could not provide installation fees, but said the price range for the software on an IBM MVS system would be between $50,000 and $100,000, depending on the configuration.

In addition to the mainframe software, Interleaf announced two personal computer-based systems. A PC Textstation will be offered as a component of either a mainframe- or workstation-based system. It is designed as a writer's tool and will provide users with the capability to write and edit text. It does not provide graphics or page layout capabilities. The software will be priced in the $200 to $600 range and will be available in the third quarter, Boucher said.

Another personal computer-based tool that has not yet been priced but is expected to be available in the third quarter is the Interleaf Viewstation. This reportedly will provide users with a read-only capability of documentation.

Also included in last week's announcement is the next release of the Interleaf's TPS. Release 4.0 will be available in the fourth quarter of this year. Users of Release 3.0, introduced in January, can upgrade free of charge. Release 4.0 will contain the features necessary to interface with mainframes, the vendor said. It will run on the workstation-based systems as well. The price of TPS for workstations will remain at $15,000.

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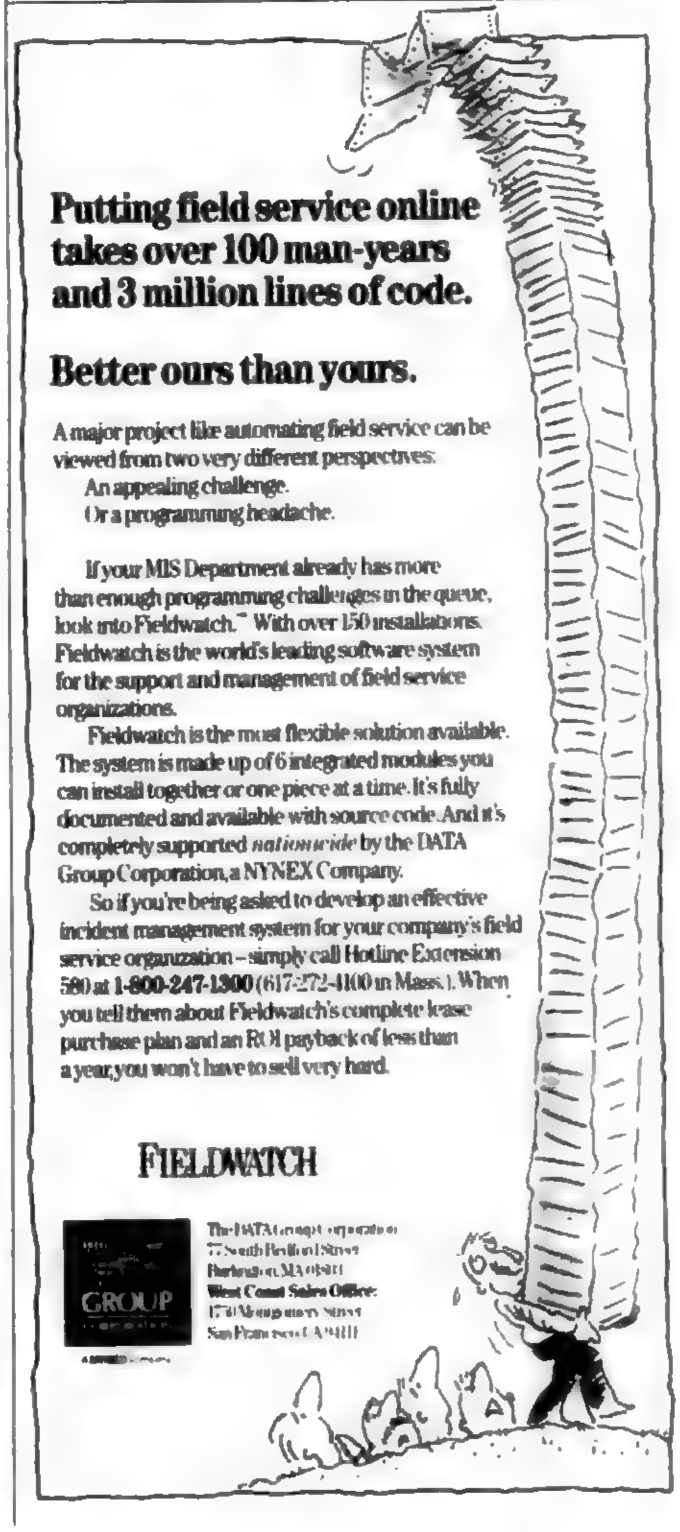

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Mixed bag seen for high-tech growth

Analysts say minis, PCs to sprout while mainframe sales, MIS spending struggle

BY ALAN J. RYAN
CW STAFF

While this will be a slow year overall for growth in the computer industry, vendors that are product- and cycle-driven will be more successful than their less ambitious competitors.

That is the prediction of industry analysts from Framingham, Mass.-based market research firm International Data Corp. (IDC) at the firm's 22nd Annual Information Industry Briefing Session, being held around the country this month.

In his outlook on systems spending, David Moschella, IDC vice-president of systems research, said his survey of 750 data processing operations in the U.S. shows that MIS user spending will climb only 4% to 6% this year, while sales of mainframes will remain flat. Minicomputer sales may increase by as much as 10%, and personal computer sales will climb at a rate of 7% to 11%, he predicted.

Moschella said that micro unit growth will be spurred by inexpensive IBM Personal Computer compatibles and will outdistance other computer markets. However, he added, sales of units based on Intel Corp.'s 80386 processor will account for only 4% of this year's PC shipments, both because those units are focused on narrow markets and because of the lack of software written for the 80386.

Users not buying IBM

In the mainframe market, sales of IBM 3090s have declined, Moschella claimed, because many users feel they already have enough capacity, others face budgetary constraints, some are buying smaller systems and still others are enhancing their existing equipment.

Problems for the 3090, he said, are a slowdown in millions of instructions per second requirements, a lack of differentiation between the 3090 and the IBM 3080 family and the impact of used equipment.

Meanwhile, according to analyst Francis Gens, vice-president of IDC's technology management research, Digital Equipment Corp. is expected to continue to successfully tap trends that IBM finds troublesome.

DEC's beneficial transitions

Analyst Bob Randolph, director of IDC's DEC advisory service, said DEC has made some beneficial transitions in its sales approach and its organization — including separating retailers from OEMs and indirect channels.

Other DEC assets, Randolph said, include the company's use of an internal network for communications, which reduces lead times in product development and launches. He also cited DEC's acceptance of software as an important part of its product.

But these benefits could potentially be overridden by DEC's huge product line, Randolph said, adding that eventually DEC could have too many people trying to embrace too many markets. Randolph noted that the benefits could also be a problem for the company's sales force as sales agents try to keep track of information on the many compatible products.

William Zachmann, IDC's vice-president of research, predicted that although DEC is facing some long-term challenges, including renewed competition from IBM's 9370 and RT PC, the company will enjoy continued success this year.

"DEC's momentum is not only very strong but probably growing," Zachmann said.

IBM mends weak points

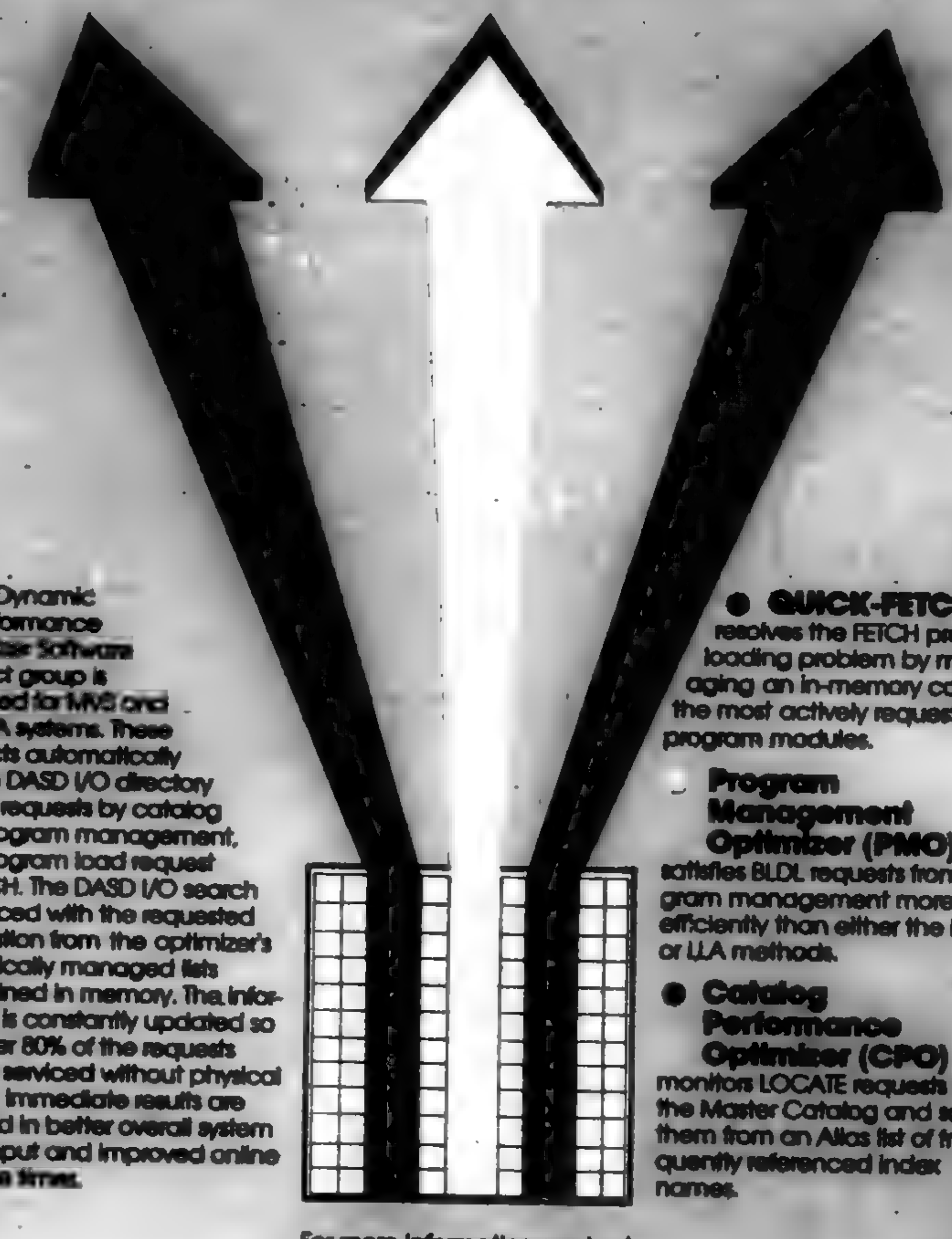
But IBM is also on the road to recovery. According to Gens, Big Blue will mend its weak points by 1989 and will likely give up margin to retain and gain market share.

When IDC's Moschella made his predictions, he said vendor success will be driven by important products, with IBM and DEC leading the way. He said DEC's VAX architecture may stand almost side by side with IBM's 9370 in a few years in number of installed users.

Moschella noted that from 1982 to 1986, VAX hardware sales grew by 20% while 9370 sales grew by just 6%.

While looking at other non-IBM mainframe vendors, Moschella said that Unisys Corp. — the firm formed by the merged Sperry Corp. and Burroughs Corp. — is moving quickly but still faces challenges, adding that there is opportunity for plug-compatible manufacturers; Cray Research, Inc. is not a real challenger, he asserted. Moschella also said that while the Honeywell, Inc./Compagnie des Machines Bull/NEC Corp. venture is a sound move, there are organizational challenges the group faces.

Specialization will continue and will prove to be an important way for many vendors to go, Moschella said. He added that there will be an ongoing shift to smaller systems and important migration to linking systems.



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Korean PC clone vendors gearing up

BY OLES GADACZ
SPECIAL TO CW

SEOUL, South Korea — Look for lower prices on IBM Personal Computer, PC XT and AT clones coming out of South Korea this year.

Annual microcomputer output here has doubled each year for the past three years, and with production likely to hit one million units this year, microcomputer manufacturers are achieving greater economies of scale, which will almost certainly translate into lower U.S. retail prices.

"The retail price will drop to $1,000 for a standard IBM PC compatible with two floppy disk drives and a monochrome monitor," predicted Microsoft SA President Y. H. Jeon, who keeps a watchful eye on local licensing of Microsoft Corp.'s MS-DOS.

An Intel Korea official predicted Korea will break into three new product areas this year: laptop PCs; 300-or-1,200 and 1,200-or-2,400 bit/sec. modems, the latter having a target retail price of $200 — Anam Electric already has such modems under pilot production; and local-area networks (LAN) for IBM PC environments. He admitted the LANs are the long shot among the three.

The Korean PC story of the year may be Goldstar Semiconductor's PC 386, which debuted at last November's Comdex/Fall '86 in Las Vegas and is based on Intel Corp.'s 80386.

Pyung-Jun Min, executive director of Goldstar, said shipments of the product are slated to begin in May to an unidentified U.S.-based OEM buyer. He would not disclose the retail price.

Local vendor Oriental Precision is experiencing delays with its 80386-based product, but company officials said they expect shipments of the OP-COM 386 model to begin this summer. No other local companies have yet announced 80386-based machines.

Daewoo Telecom Co. has made strides with its Model D, producing 13,000 PC- and XT-compatible units moothly for Leading Edge Products, Inc.'s Canton, Mass.-based hardware division, but the duo has delayed introduction of an AT machine. One industry source said product specifications are still under discussion between the two partners. Daewoo officials would not comment.

Meanwhile, Daewoo Electronics Corp. has a leg up on its sister company, Thousand Oaks, Calif.-based Cordata, and is shipping AT-compatible products there. Based on the 80286 micrprocessor, the Cordata AT has a clock speed of 8 MHz and 640K bytes of random-access memory.

Hyundai Electronics Industries Co. started this year with production of the Super 16T, which features an Intel 8088-2, an 8-MHz microprocessor and an 8087-2 math coprocessor as an option.

According to Ho-Dong Kim, Hyundai Electronics export manager, the company will ship a total of 300,000 PCs this year. Hyundai's largest client to date has been the Tempe, Ariz.-based Blue Chip Electronics, Inc., which has taken delivery of the Super 16, the forerunner of the Super 16T. Kim said Hyundai Electronics will begin shipping an AT-class PC in May and that Blue Chip has expressed an interest in picking up the product.

Gadacz is a special correspondent for the CW International News Service.

Microsoft, Sun join forces in Windows cleanup

BY DAVID BRIGHT
CW STAFF

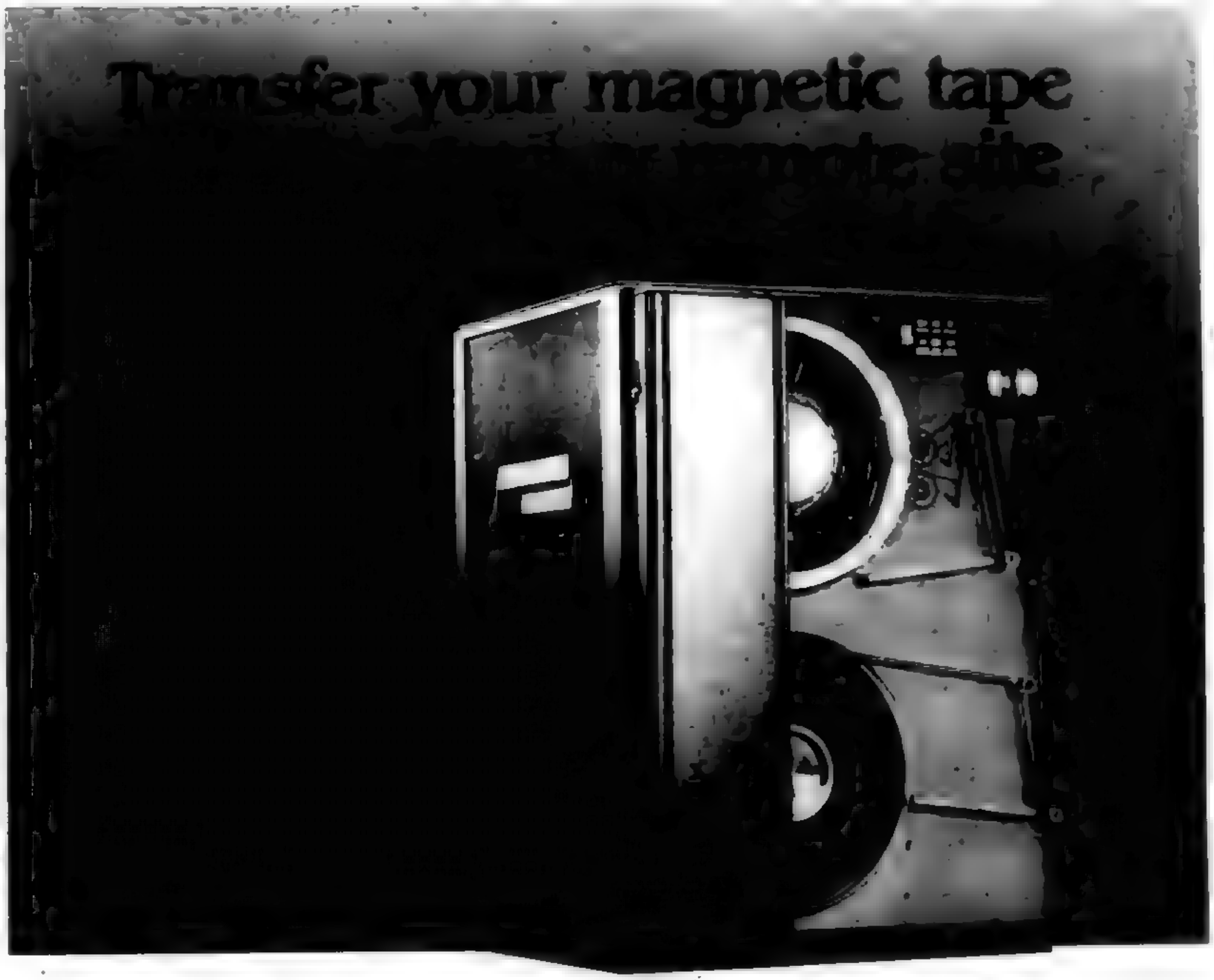
REDMOND, Wash. — With an eye toward improving its Windows operating environment, Microsoft Corp. announced last week that it has agreed to a technology exchange with technical workstation vendor Sun Microsystems, Inc.

Under the agreement, Microsoft will license Sun's Network Extensible Window System — which supports Adobe Systems, Inc.'s Postscript page description language — and the two companies will share information on technical developments and new-product plans.

Windows director of product management Tandy Trower stressed that the agreement does not concern a specific product offering. Instead, the goal is for the two firms to help one another with some common problems they have in providing windowing software for workstations.

"This agreement essentially gives us access to share some ideas, technology and ways of doing things that will allow us to improve our present products as well as our future products," he said.

Trower added that as microcomputers become more powerful with the use of Intel Corp.'s 80286 and 80386 microprocessors, Microsoft should benefit from Sun's experience with high-end workstations.



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EDITORIAL

DEC's triple play

It didn't take Digital Equipment Corp. long to discover the benefits of account control.

DEC's announcement two weeks ago of a major revamp of its high-end price structure and new members of its closed-architecture VAXBI line demonstrates that the company is ready to use its expanding customer base to wring out a few more bottom-line dollars. Officials heralded the early March announcement as a rebalancing of prices. They also said the new low-end machines would give buyers more incentive to consider the DEC alternative.

Both statements are true. A closer look at the revisions, however, suggests a three-part strategy that may ultimately cost many users more.

For starters, DEC has baited the hook with markedly improved price/performance on the low end of the VAXBI line. The preconfigured 8250 and 8350 systems offer 20% better performance than their predecessors, the 8200 and 8300, for 7% to 10% less money. That's a good deal, especially for the many IBM customers who are considering a trial installation of DEC hardware at the department level.

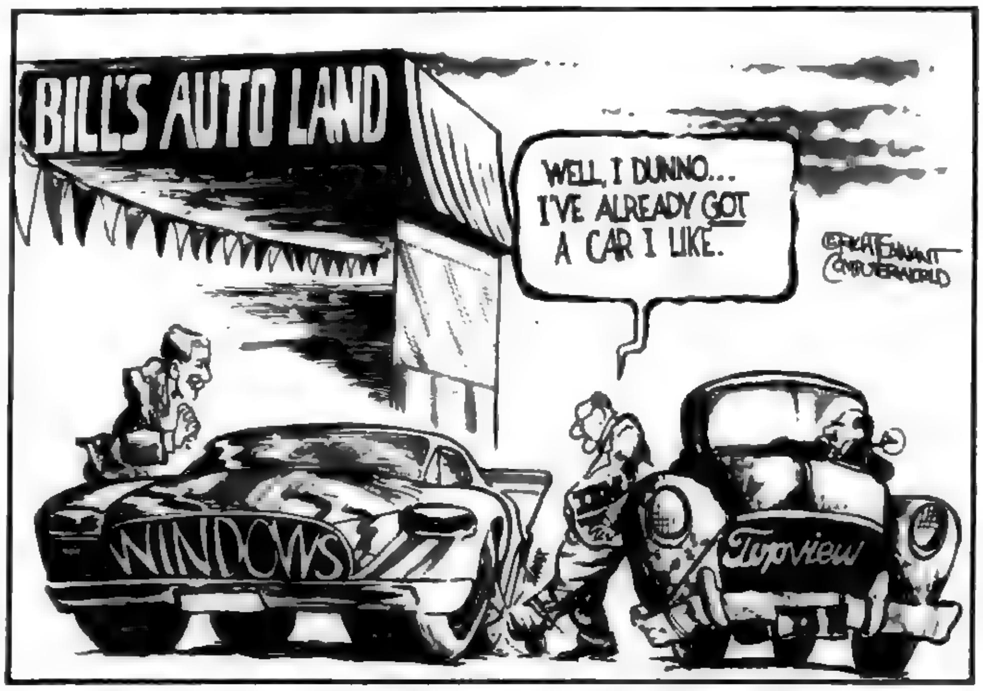
This is where DEC can begin to exert account control. DEC customers who plan to upgrade will now pay more than ever for doing so in the form of increased prices on high-end VAXs and expanded operating systems licenses. The cost of a preconfigured VAX 8800 cluster system was hiked about $115,000 and the cost of large VMS operating system licenses for Microvaxes more than doubled.

Part three of DEC's strategy is aimed at the third-party market for peripherals and memory, in which firms like Emulex Corp., System Industries, Inc. and Clearpoint, Inc. have built tidy businesses around compatible products that they sell to DEC at a significant discount. At the same time, third-party maintenance firms like TRW, Inc. and Control Data Corp. have established lower cost alternatives to DEC's pricey service contracts.

IN AN ASSAULT ON THOSE PARTIES, DEC halved prices for Microvax and VAXBI memory and reduced the price of its RA81 disk drive. What's more, all DEC hardware now comes with an added bonus: nine months of free service.

Price cuts and built-in service are good news for customers. But independent firms will now find it increasingly difficult to compete. Already hobbled by DEC lawsuits and the closed VAXBI architecture, the third parties may decide they are better off moving to other markets. That will mean fewer choices for customers.

DEC can't be faulted for taking the price actions it did. It is a profit-making company beginning to enjoy the fruits of success. However, it would also be wrong to conclude that DEC wants to continue its role as a low-cost supplier of IBM-alternative hardware. The company's growth during the last 18 months has put it in a position to exercise control of its key accounts. Users should brace themselves for the possibility of further price hikes as DEC's grip intensifies.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LETTERS TO THE EDITOR

Gambling on UPS

The article, "How interruptible is your computer system?" [CW, Jan. 26], left something to be desired in the introductory paragraphs in which the managers' choice about purchasing uninterruptible power supply (UPS) was described as a calculated gamble.

In my business of providing contract services in information systems security we perform quantified risk analyses that give enough information to take that, and similar choices, out of the gamble category. These analyses detail assets and their values, which include the business values produced by the continuing operation of the information systems, define the threats for a location and which assets would be affected, estimate probabilities of occurrence and derive loss potentials. Safeguards, such as a disaster recovery plan and/or an UPS, can reduce the loss exposure and, as long as the cost of the prevention is less than the loss potential, management will generally buy it. These are techniques that have been in use in the casualty insurance field for many years. Knowing how to apply them to information systems is the challenge.

The analyses take the decision out of the casino and make it more like other business decisions that are based on reasonable probabilities and financial considerations. A firsthand bad experience usually makes this point more effectively. There are regulations in certain business segments that require such protection, and stockholders are becoming more knowledgeable about such issues.

Edwin B. Heinlein
Heinlein Associates, Inc.
San Rafael, Calif.

Programming hats

In his response to J. Robert Riggs' article, "Twelve DP myths that just won't die," Steven Gove seems to have a hard time recognising the validity of Riggs' arguments [CW, Feb. 2]. To begin with, Gove disputes the view that systems design can be separated from programming. "Systems design can no more be separated from programming than architecture can be separated from engineering," he writes. I think Riggs meant to imply that the design should be completed prior to coding. After all, the architect and engineer are roughly analogous to the analyst and designer, both of whom complete their job prior to the beginning of construction. The building contractor makes no design decisions and must follow the specification, like the program coder. Gove complains, "If the design specifications are so detailed that writing a program from them is rote clerical work, then the programming has already been done." Well, yes. To pursue the analogy, those building specifications had better be explicit and complete if the building is to last.

Secondly, Riggs says, "MIS professionals seem to have an irresistible urge to begin coding before systems design is complete." Gove writes, "It is impossible to have a complete systems design before doing any coding." Why not? No one said that there couldn't be adjustments and modifications based on user input as the system was implemented.

I think if we concentrate on development activities rather than job titles, we might come to an agreement. In order to ascertain the functional requirements of a system, large or small, we perform analysis. Once we have the requirements, we can begin to devise an implementation that will fulfill those requirements, and this is called design. Design is done on a general or systems level as well as at a detailed or program level. Once this design has been created and evaluated with respect to the original requirements, the design can be implemented or coded and, of course, tested. A programmer may be called upon to perform tasks in any or all of these phases. This is fine, as long as he remembers which "hat" he is wearing.

Tom W. Dobrydney
Senior Staff Instructor
Yourdon Washington, D.C.
McLean, Va.

This week in history

March 14, 1977
The Department of Commerce's National Bureau of Standards and the Securities and Exchange Commission announce an experimental project to monitor the impact of their regulations on the ability of certain businesses to get capital funding.

March 15, 1982
Angered by the computerized collection of parking ticket fines, 400 Boston protestors, led by a local radio personality, dump copies of parking tickets into the garbage. The demonstrators say the computer continues to accuse drivers even after their fines have been paid.

Chasing the bleeding edge of technology

HARVEY NEWQUIST

Does it bother you to read about shake-ups in a company, only to hear the spokesman say there's American Way to supersede gaining a competitive edge.
mits that, well, maybe things aren't quite so merry.

It bothers me when the one company in the U.S. designed specifically to develop the world's leading-edge technologies seems to have this problem. I refer, of course, to the Microelectronics and Computer Technology Corp., or MCC.

MCC was conceived by Control Data Corp.'s then-chairman William Norris. He believed that by creating a facility for pooling the best minds from the best companies, the U.S. could maintain its technological superiority.

Twenty companies founded MCC in 1983. They chose as their leader Bobby Ray Inman — a retired admiral, director of the National Security Agency and former deputy director of the Central Intelligence Agency.

The initial entry fee was $125,000, but that amount was bumped up to $1 million in short order. The first companies to invest were Advanced Micro Devices, Allied-Signal, BMC Software, Bell Communications, Boeing Computer Service, Control Data, Digital Equipment, Eastman Kodak, Gould, Harris, Honeywell, Lockheed, Martin Marietta Data Systems, Mostek, Motorola, National Advanced Systems, NCR, RCA, Rockwell International, Sperry and 3M.

MCC started by focusing on four technological areas: advanced computer architecture and artificial intelligence, semiconductor packaging, computer-aided design and very large-scale integration, and software productivity. Member companies chose areas to participate in and then sent money and men to Austin, Texas. In return, MCC would license the technology developed back to the companies that had been working on it.

Things seemed to go pretty well for America's Great Technological Hope. Reports boasted of great advancements, especially a design and expert system named Leonardo, after the artist who allegedly painted the "Mona Lisa" as a self-portrait.

A storm was headed toward the admiral's ship, however. United Technologies sold its Mostek subsidiary to a French firm, which invalidated its participation in the all-U.S. MCC.

Then the admiral himself decided it was time to turn the helm over to someone else. He wanted to get involved with the business of actually bringing electronics technology to market. Last September, he announced his resignation from MCC.

Parts of the ship were already taking on water. Citing financial troubles, BMC withdrew at the close of 1986. Gould pulled out, apparently due to internal reorganization. The consortium quickly cut its admission price from $1 million to $250,000.

Then the hull started to crack. In two days in January, Allied-Signal, Unisys and Lockheed dropped out. The resignations would all have occurred in one day, but Lockheed's notification was delayed in the mail.

Hewlett-Packard purchased BMC's shares, and Westinghouse signed up, picking up some of the slack caused by the desertions. Company spokesmen claim this flux is "no big deal" and that the problem will be rectified by year's end. I remember the semiconductor industry saying the same thing in 1985.

The fact is companies are leaving MCC, and few others are beating down the door to get in. The exodus hurts, especially when it involves Unisys, one of only three companies involved in all four areas of MCC research, thereby contributing many millions to the budget.

The difficulty comes from putting competitive companies into the same environment and expecting truth, justice and The American Way to supersede gaining a competitive edge.

To try to get everything back on an even keel, MCC just hired Grant Dove to run the company, effective in July. Currently, Dove is an executive vice-president at Texas Instruments and between now and July will have a break-in period before he assumes the role of chief executive officer.

You don't pursue the bleeding edge of technology without running into egos, personal and corporate, among other barriers.

MCC's plight can be summarized by a comment from an engineer working there. I asked him how things were progressing. "Not too bad," he said. "I think that XYZ is holding back some of the best information on parts of their project so they can use the good stuff themselves.

"Besides, we're doing the same thing to them."

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

The rights to machine behavior

Attainable computer responses vs. strictly protected encoding

READER'S PLATFORM

DAVID CAREW

A sound and well-established tenet of our copyright law is that an idea may not be protected by copyright. The words used to express the idea are protected; the idea itself is not.

The copyright law is now being used to protect computer software. While this approach itself may be far from ideal, it is clear we are committed to it, at least for the time being. We have, by case law and legislation, extended our copyright concepts to cover computer software. Given this extension, there is an exact analog to the principle that ideas must be free, which clearly and unequivocally must be applied to software.

The principle is this: The machine behavior produced by a software program is not subject to copyright protection; the encoding that produces the behavior is. The essential difference between a human's writing, which is copyrightable, and computer software, also copyrightable, is that the former's basic purpose is to communicate ideas, while the software's purpose is to produce particular machine responses. Software-driven machine response has long since become subtle and complicated enough to be regarded as behavior, at least by ordinary mortals not engaged in philosophical hairsplitting. A programmer's job is to elicit complex behavior from a mere machine.

Not allowing authors to express in their own words an idea previously expressed under copyright would result in absurdities and interlocking claims and counterclaims that would ultimately be harmful to everyone. This traditional argument weighs the good of all against a potential short-term advantage that might theoretically be due the originator of an idea.

The traditional argument further holds that virtually all original ideas are actually a synthesis and extension of previous ideas, applied in a novel way or to a different circumstance. For this process of synthesis, and improvement to flourish, ideas must be freely adaptable, while the commercial value of any particular expression of ideas must be protected.

Synthesis and extension

In a directly analogous way, new and useful computer behavior is often the result of synthesis and extension of what went before: Lotus Development Corp.'s 1-2-3 is an extension of the previous Visicalc, synthesized with some fundamental data base and graphics behaviors. The Apple Computer, Inc. Macintosh's friendliness, windowing and point-and-click mouse are admittedly derived from earlier, basic research by computer scientists, mostly at Xerox Corp.'s Palo Alto Research Center.

For this progress to continue, any attainable computer behavior must be freely available, while the encoding that produces and embodies such behavior must be stringently protected. Whether this encoding is in source or object form, human- or machine-readable, firmware or disk-based might be regarded as a detail not relevant to the basic protection.

Having benefited greatly by freely adapting the behavior of previous software, it is ironic to see companies like Lotus and Apple now suing other, smaller companies not because their code has been copied but because the behavior of their software has been, allegedly, too closely duplicated.

The present confused infancy of software copyright law is allowing such cases to be heard and sometimes won. Down that path lies the stagnation and ruin of an activity that is growing ever more important to the health and well-being of our economy.

In the course of human affairs, no one can have an exclusive right to an idea. In the software arena, no one should be allowed the exclusive right to particular machine behavior.

This analogy may be clear and natural to the computer professional; it seems emphatically unclear to the judges and legislators of this land.

Carew is a systems analyst for Ciber, Inc., a software house and consulting firm in Colorado Springs, Colo.

The pitter-patter of electronic footprints

PETER BARTOLIK

Civil libertarians have long decried the attention of government agencies to the "intelligence" value of certain computer technologies. Yet, once again, a presidential administration has demonstrated — inadvertently — that technology is a great weapon for the preservation of the Constitution.

After Richard Nixon's historic joust with the wonders of audio recordings, who would have ever guessed that government dirty tricksters would again fall into essentially the same trap? Lt. Col. Oliver North, it seems, was so enamored of the White House's electronic-mail system that the National Security Council aide left a magnetic trail that proved crucial in unraveling much of the complicated and well-camouflaged Iran arms scandal.

Messages sent by North and others over an IBM Professional Office System provided, according to the much-publicized Tower Commission Report, "a first-hand, contemporaneous account of events" [CW, March 2]. As any good computer systems operation must do, the White House Computer Agency dutifully performed archiving of electronic-mail traffic.

The downfall of the Watergate and "Irangate" miscreants provides adequate proof that technology is a valuable asset in the protection of the basic checks and balances crafted 200 years ago. This year we celebrate the bicentennial of the U.S. Constitution and its authors, who could never have dreamed of the shape of government today or its potential for mischief. It is an absolute marvel that the document remains resilient in an era when just about any communication anywhere can be electronically intercepted.

It is the special protections of the Constitution that provide agents of democracy with access to the tools used by those who, wittingly or not, seek to work outside of its strictures.

Once I was one of those who feared the Big Brother potential of technology. I find those fears waning. Government may have computer matching, electronic surveillance and who knows what other capabilities; yet, Watergate and the Iran scandal show that technology can do at least as much good as it can do harm.

When those who abuse power persist in leaving electronic footprints, a little nervousness about the potential of government information systems seems a small price to pay.

Bartolik is *Computerworld*'s news director.

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William H. Inmon

Denormalize for efficiency

One of the foundations of relational theory is the normalization of data. In a nutshell, normalizing data causes data elements to be arranged so that all elements in a group depend for their existence on the key of the group.

Indeed, normalization of data — when executed properly — results in many worthwhile benefits. But there is at least one major drawback to the normalization of data, and that drawback is poor system performance.

Normalization of data leads to data base designs in which there are many independent collections of data. For anything but small "toy" data bases, these data collections are usually stored in separate physical locations. As long as processing requires access to only one collection of data, normalization of data does not affect performance.

But when processing requires that two or more collections of physically separate data be accessed, then the physical separation of the data requires that I/0 be done — a process that otherwise would not have to be done had the data not been normalized. And when unnecessary I/O is done, system performance suffers. It is noteworthy that both on-line and batch

Continued on page 20

Government promotes Posix

Agencies support adoption of Unix standard to foster portability

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The federal government, accounting for about one quarter of the Unix processor market, is using its clout to push for adoption of the emerging Posix standard.

The effort, led by the National Bureau of Scandards (NBS), is another sign of the government's increasing influence on the Unix marketplace, both as a major buyer of Unix systems and as a standards setter, according to market analysts and government officials. The Posix standard is intended to make applications portable across the various Unix-derived operating systems.

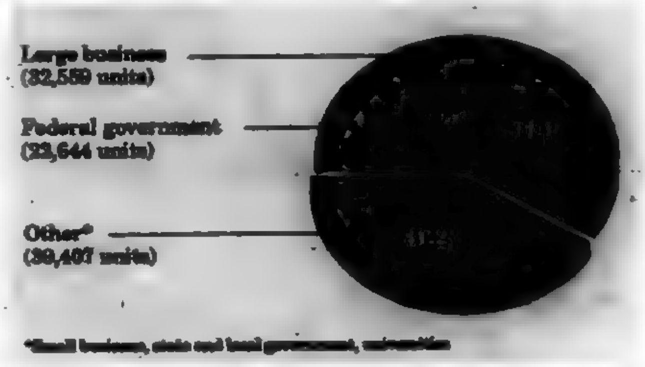
The government's clout is "one of the reasons we think Posix will probably be successful," according to Richard Kuhn, a computer scientist with the NBS Institute for Computer Sciences and Technology.

"The government needs to specify an operating system in a vendor-independent way, and all of the vendors are probably going to wind up supporting Posix in order to deal with the federal government," he explained.

Posix, or the standard for Portable Operating Systems for Computer Environments, is being developed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE), with assistance from the NBS. So far, AT&T, IBM, Digital Equipment

Continued on page 22

Unix-based systems
U.S. shipments in 1985



*Small business, state and local government, universities

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART

IBM bolsters System/38 Mapics II

BY ROSEMARY HAMILTON
CW STAFF

RYE BROOK, N.Y. — IBM boosted the functionality of its Manufacturing Accounting and Production Information Control System (Mapics II) for its System/38 minicomputer with an announcement last week of three application packages.

The System/38 Mapics II offering is now on a par with System/36 Mapics II, IBM spokesmen said.

Included is a purchasing module, a lot-location management package for the general inventory management module and an inventory management package for the process industry.

Tracking orders

The purchasing module, set to be available in December at a one-time charge of $12,500, must be used in conjunction with the inventory management module or the recently introduced Inventory Management for Process module. It allows users to create purchase orders and keep track of an order until it is closed out, IBM said.

The Location/Lot Management package can be purchased for $5,700 for use with the inventory management module. Users can track where inventory items are stored in a warehouse and use that data for the overall management of inventory, the vendor said.

The Inventory Management for Process module is based on the inventory management module and includes the features of Location/Lot Management. It allows process manufacturers to keep track of the quantity and location of material used. The module is scheduled to be available at the end of this month for $23,000.

Mainframe link lifts design tool

BY CHARLES BABCOCK
CW STAFF

CAMBRIDGE, Mass. — Index Technology Corp. has announced it is distributing a link between Excelerator, its software analysis and design product, and a virtual disk on a mainframe.

The link allows an Excelerator user, working at a personal computer, to store and share data on IBM mainframes running the MVS operating system, said Chris Grejtak, vice-president of marketing.

The link, called the Virtual Diskette Access Method, was developed by Phaser Systems, Inc. of San Francisco. The design and analysis data stored on the virtual disk can be accessed by a personal computer as if it were stored on the PC diskette, Grejtak explained.

Users develop and revise systems diagrams and validate design data with Excelerator, and any changes are automatically updated on the mainframe's virtual disks.

The link backs up individual project dictionaries and files to the mainframe.

The Virtual Diskette Access Method link is available for $9,000. Excelerator is available at $8,400.

Inside

- Federal agencies turn to Unix for administrative applications. Page 22.
- Group 1 Software announces software for plant loading. Page 26.

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Denormalize

FROM PAGE 19

system performance are adversely affected by a high degree of normalized data.

As a consequence, the data base designer often has to trade off the aesthetics of data normalization against the reality of system performance.

There are several design techniques that can be used to denormalize data to enhance performance. A simple, normalized data base is shown in Figure 1.

Figure 1

PART	DESC	UM	QOH	PART/SUPP		SUPPLIER	ADDRESS	NAME	PHONE
01258-Q	ball bearing	box	606	0001	Jones Supp	ACE Hdware	123 Main	E John	110-998
01258-QX	bearing mount	uni	99	0001	Smith	Apple Supp	456 Broad	N Dean	099-872
01270	base plate	uni	1907	0004	ACE	Artle	90 14th St.	G Frey	[illegible]
01270-R	gasket	box	605	0004	Jones Supp	Anton	12 Grand	C Lamp	[illegible]
•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•

Normalized data structures.

Consider the I/O required to connect a part with the appropriate supplier using the normalized data structures shown in Figure 1. I/O must be done to locate the part data.

Then more I/O is done to scan the part and supplier cross-reference data, enter the part number cross-reference and locate the supplier of the part. More I/O is done to access supplier data — based on the key of the supplier that has been obtained from the cross-reference data base.

Now consider a simple design practice that denormalizes data, as shown by Figure 2.

In that illustration, the key of a supplier is directly contained in part data. As such, the part data is denormalized because the existence of a supplier does not depend on the existence of any given part. The amount of I/O required now to go to a supplier from a part (at least the primary supplier for a part) is minimal. Only the access of the part data requires I/O.

This direct relationship between part and supplier is accomplished much more efficiently than if the data were normalized.

Of course, only one supplier can be obtained per part, but depending on the application, that may be sufficient.

If the programmer wishes to obtain more than the primary supplier, additional I/O will be incurred as the cross-reference and the supplier data base is accessed.

Improved performance

A second option — for the improvement of performance available to the designer — is the placement of the key of multiple suppliers in the part record, as shown by Figure 3.

In this case, the key of multiple suppliers per part (up to three suppliers in the example) are carried. Now the programmer can access as many suppliers as desired (that is, as many as are carried in the parts record) without having to access the cross-reference data base.

The I/O that carries the programmer to the parts data also carries the programmer to the keys of the supplier as well.

But suppose more than just

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the key of the supplier is required. Suppose the programmer wishes to see the address and phone number of the primary supplier. Either the design in Figure 2 or Figure 3 will allow the programmer to bypass the cross-reference data base, but extra I/0 must be done to access the supplier data base to get at the name and address.

A third option for denormalization is shown by Figure 4.

In Figure 4, supplier data other than key is carried in the parts record. In this case, name, address, phone number and so on can be accessed in the same I/O that is required to access the part record for the primary supplier.

There are some obvious drawbacks to the forms of denormalization discussed here. One drawback is in update processing. When the values in the supplier data base change and the data has been denormalized, data values must be changed in multiple places, thus incurring extra I/O for update. When data is not changed in multiple places and ought to have been, discrepancies in data values occur. Normalization then favors efficiency of update processing at the expense of access-only processing.

Disadvantages mount

But there are other drawbacks to denormalized data. More storage is required. The complexity of processing can rise exponentially. And so the disadvantages mount. But the payoff for the denormalization of data is reduced — potentially significantly reduced — in the I/O required for the access of data.

The designer should not blindly denormalize data without good reason. The designer should balance normalization of data with performance considerations in concert with the application and system needs. As a rule, data should be entirely normalized as the design is being conceptualized, then denormalized in response to the performance requirements of the system.

The introduction of redundancy of data into a system design and the consequent denormalization of data should be done deliberately.

The following guidelines are at least a start in the balancing of the trade-off between normalization and performance.

- Data should be normalized, if at all possible.
- If data must be denormalized, the first approach should be that singular key values should be spread over multiple occurrences of data.
- When denormalization of singular key values will not suffice, multiple key values should be spread over multiple occurrences of data.
- When denormalization of multiple key values will not suffice, non-key data should be spread over multiple occurrences of data.

In the case where non-key data is denormalized, two design practices need to be followed: Key data should always be carried with non-key data, even when key data may not be needed by the application, and a "system of record" needs to be established so that detailed, primitive data elements have a single source.

With a system of record, at least the discrepancies in data values can be reconciled when they occur.

Inmon is a senior principal with American Management Systems in Lakewood, Colo., and an author on the subject of data base design.

Figure 2

PART	DESC	UM	QOH	SUPPLIER
01258-Q	ball bearing	box	608	ACE Hardware
01258-QX	bearing mount	unit	90	Jones Supp
01270	base plate	unit	1907	ACE Hardware
01270-R	gasket	box	605	ACE Hardware
•	•	•	•	•
•	•	•	•	•

The primary supplier for a part is added to part number data.

Figure 3

PART	DESC	UM	QOH	SUPP1	SUPP2	SUPP3
01258-Q	ball bearing	box	608	ACE Hard	Jones Supp	—
01258-QX	bearing mount	unit	90	Jones Supp	—	—
01270	base plate	unit	1907	ACE Hard	Jones Supp	Anton
01270-R	gasket	box	605	ACE Hard	Jones Supp	Smith
•	•	•	•	•	•	•
•	•	•	•	•	•	•

Up to three suppliers for a part are added to the part number data.

Figure 4

PART	DESC	UM	QOH	SUPPLIER	ADDRESS	NAME	PHONE
01258-Q	ball bearing	box	608	ACE Hardware	123 Main	E John	110-9980
01258-QX	bearing mount	unit	90	Jones Supply	13 17th St.	G Harrison	889-7760
01270	base plate	unit	907	ACE Hardware	123 Main	E John	110-9980
01270-R	gasket	box	605	ACE Hardware	123 Main	E John	110-9980
•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•

Supplier related data other than foreign key information is added to part number data.

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Government

FROM PAGE 19

Corp. and other vendors have announced their support for Posix, which is still in an embryonic stage.

Posix defines a standard operating system interface and applications environment to support applications portability at the source-code level.

Applications that meet the Posix standard can be distributed in source code form and will recompile and run under any Unix system that conforms to the standard.

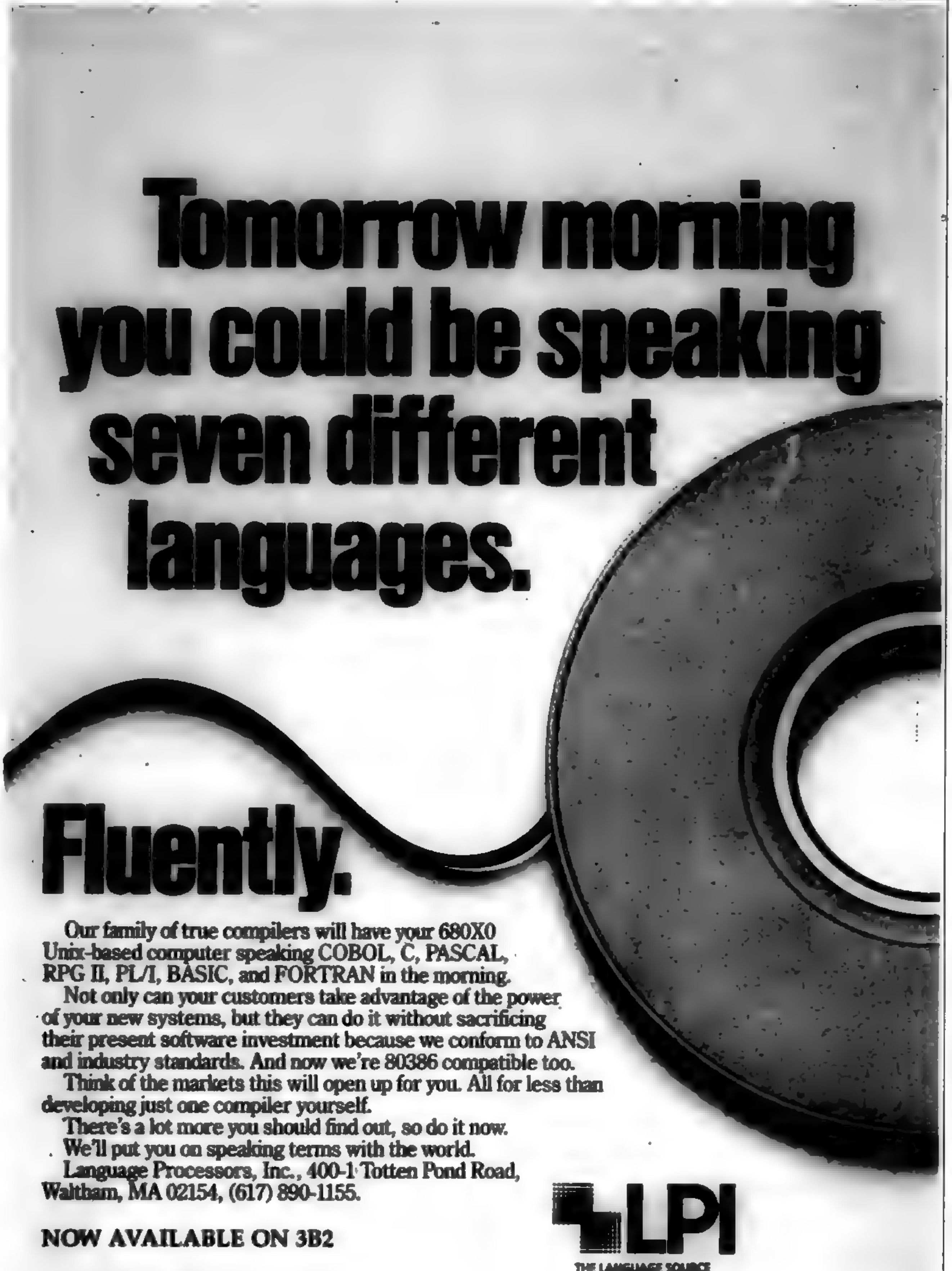
Once Posix becomes an IEEE full-use standard at the end of this year, the NBS is expected to make it a federal information processing standard — for use in procurement documents — six to 12 months later.

Kuhn explained that the primary reason federal agencies turn to Unix is that they want applications portability. The government is under special pressure because its contracting rules require open competition, so the government cannot specify a single hardware or operating system vendor.

The federal government purchased nearly 24,000 Unix-based processors worth $805 million, or roughly one quarter of the U.S. Unix market, in 1985, according to a forthcoming Unix study by International Data Corp. (IDC), a Framingham, Mass.-based market research firm.

IDC estimated that 70% of all government requests for contract bids include Unix as a requirement, although several government officials said that estimate is somewhat high.

"This trend has provided a lot of the incentive for proprietary operating system vendors such as IBM, DEC and, most recently, Wang Laboratories, Inc., to offer Unix implementations," IDC's "Unix Perspective" newsletter reported.



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IRS, Army enroll Unix

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The quest for portability and vendor independence has led organizations such as the Internal Revenue Service, the Federal Judicial Center and the U.S. Army to adopt Unix as their standard operating system for certain data processing operations, analysts and agency officials say.

Federal agencies are turning to Unix not only for scientific and engineering work but also for general business and administrative applications. The IRS chose Unix as its standard for small to medium-size systems because it wanted hardware portability and applications portability, explains Eugene J. Barbato, chief of the user assistance branch.

He says the Unix systems are in 100 major field offices handling administrative tasks such as inventory control.

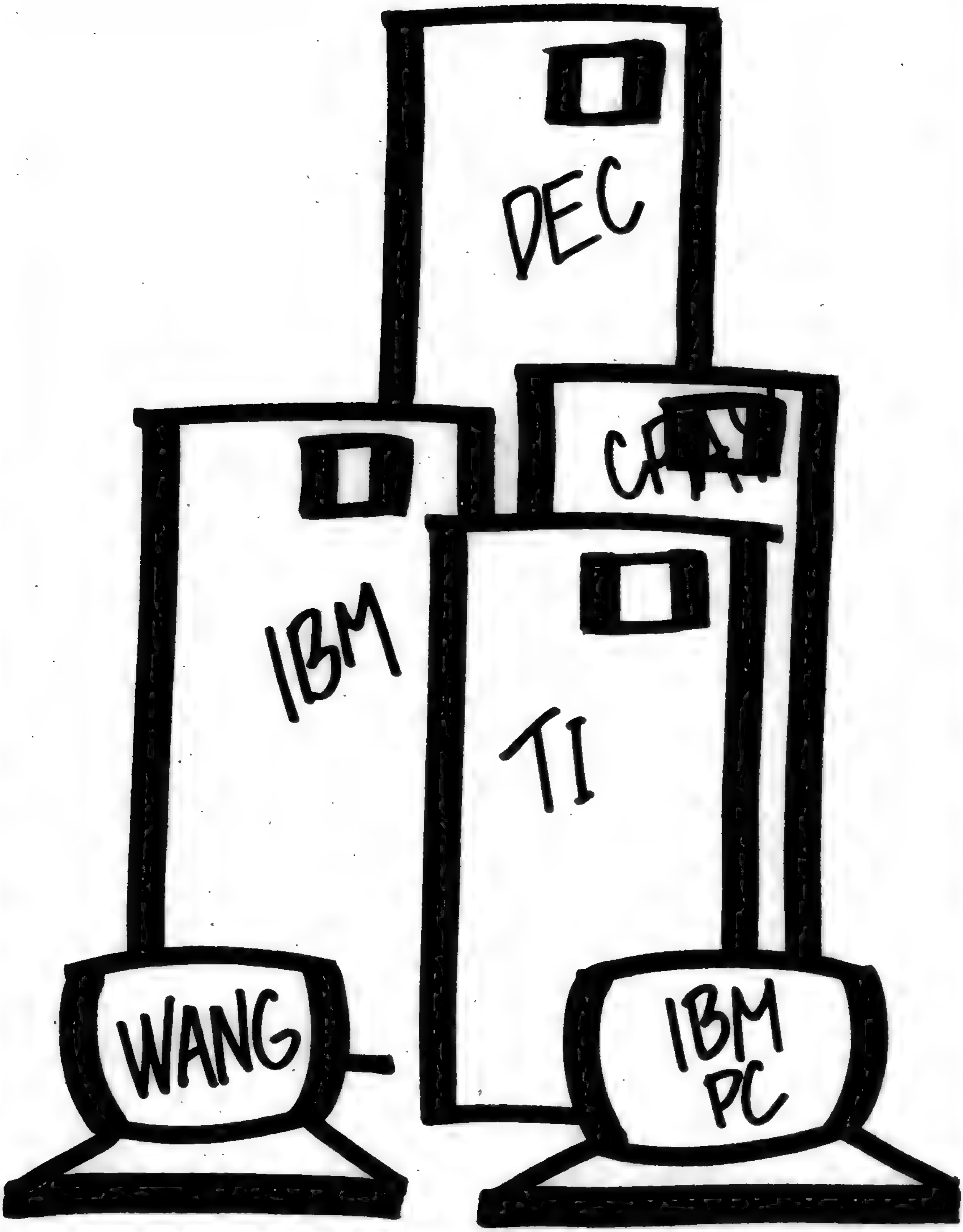
The IRS has up to 430 Zilog, Inc. System 8000 supermicros running Informix Software, Inc.'s data base management system and "a lot of C code" written by the IRS for specific applications, Barbato notes.

Similarly, the Federal Judicial Center has standardized on Unix for the administrative and case-management systems at federal courts throughout the country [CW, Nov. 11, 1985].

Under a contract won by the former Sperry Corp., now Unisys Corp., the courts use Arete Systems Corp. minicomputers, Unify Corp.'s DBMS and C code on top of it for the applications, says Robert Borochoff, a research computer scientist at the Federal Judicial Center.

Analysts say there is strong interest in Unix among the military departments, but there also are concerns about the operating system's notorious lack of security features [CW, Jan. 26].

One vendor that has addressed the security problem is Gould, Inc.'s Computer Systems Division, based in Ft. Lauderdale, Fla., whose UTX is the first Unix system to obtain certification by the government's National Computer Security Center.



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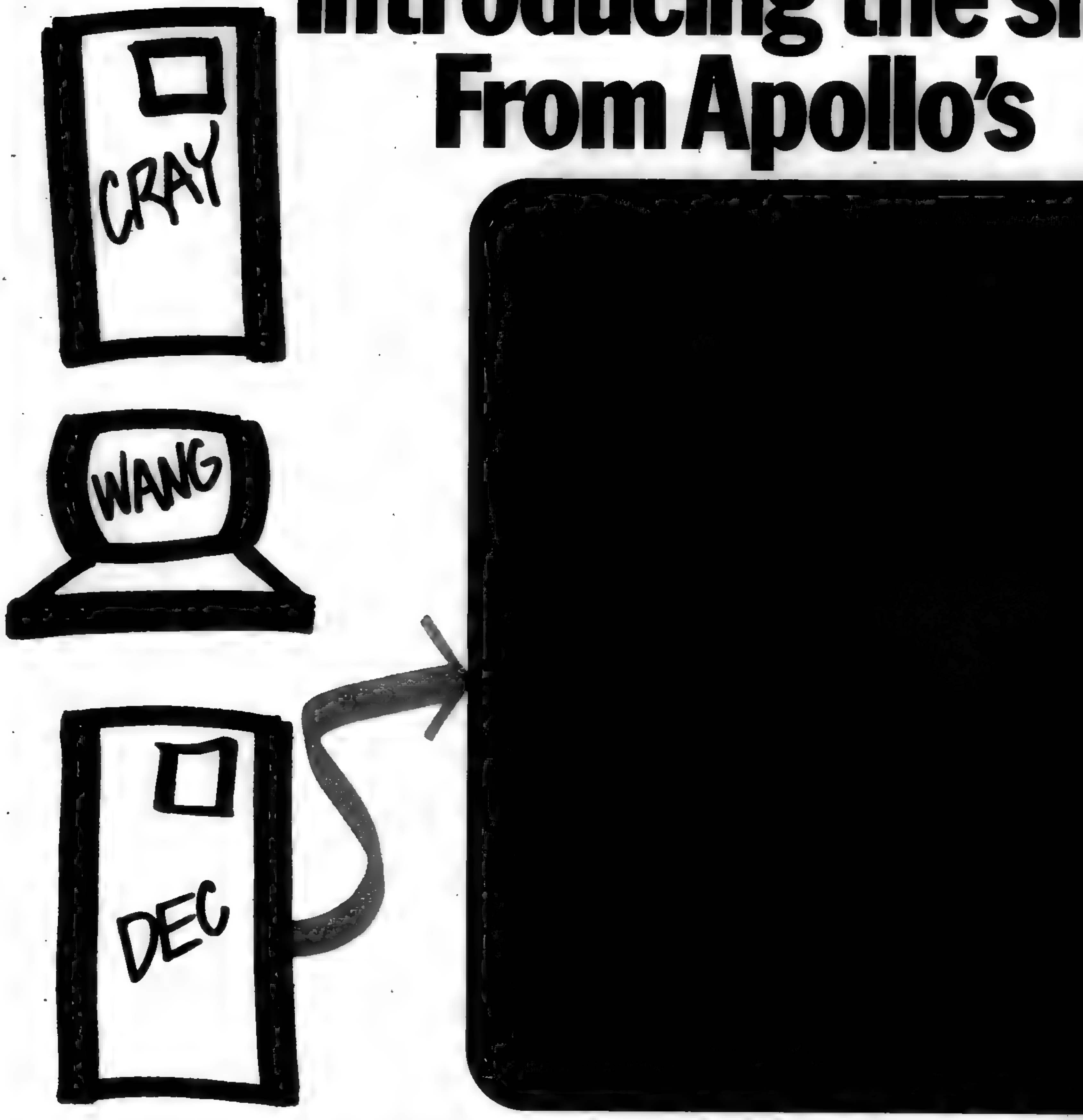

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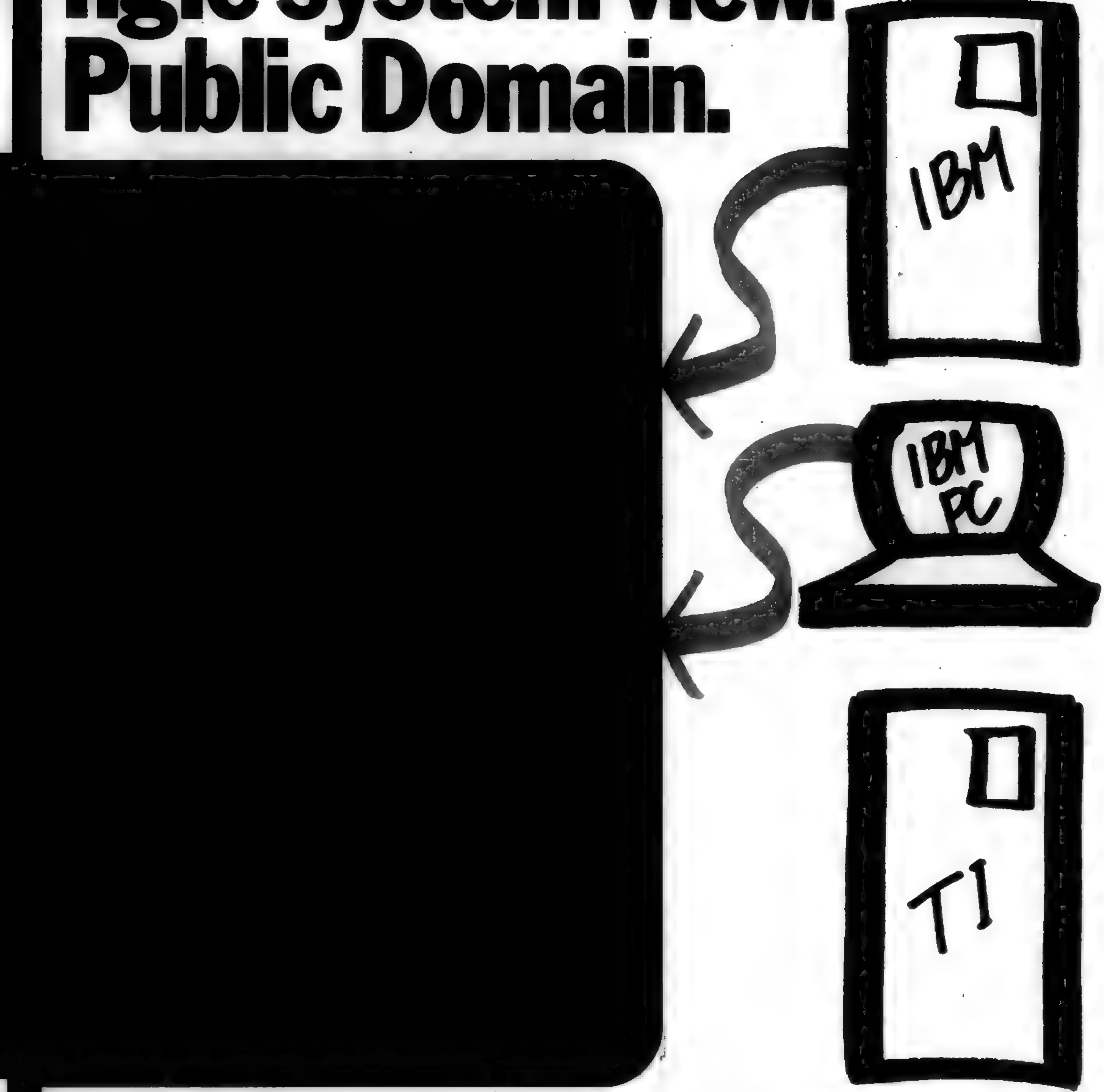

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NEW PRODUCTS

Systems software

Synergy Health Systems, Inc. has announced the **Advanced Claims Processing Systems** (ACPS), on-line software for health benefits processing.

The software is said to automate claims administration, processing and verification. It also gathers data for benefits analysis. In addition, users are said to be able to change health plan parameters. ACPS is protected by a multilevel password security system to prevent unauthorized access.

In addition to processing claims, ACPS is said to provide a real-time data base showing where benefit dollars are going. It can also compile a series of management reports.

ACPS runs on Hewlett-Packard Co. 3000 computers. It costs $150,000.

Synergy Health Systems, #201, 16775 Addison, Dallas, Texas 75248.

Applications packages

Group 1 Software, Inc. has announced **software for plant loading**.

The software is said to allow a mailer to bypass local bulk-mail centers. Mail will be transported by the U.S. Postal Service to a sectional center facility, auxiliary sectional facility or destination bulk center, depending on mail qualifications. The software analyzes and qualifies a mail file to plan for the most optimal postal delivery destinations. Truck codes are assigned to each qualifying mail piece.

The software, which runs on IBM mainframes and compatibles, is priced at $12,500.

Group 1 Software, 5185 MacArthur Blvd. N.W., Washington, D.C. 20016.

Cozzi Research has announced **Partner**, a software product for the IBM System/38 said to provide pop-up windows as the user interface.

Partner is said to provide office accessories such as a calendar, appointment calendar, notepad, full-function calculator, personal file address book, group jobs window and pop-up context sensitive Help.

It runs in the background and, according to the vendor, it can be customized on a global or user basis.

Partner is priced at $895.

Cozzi Research, Suite 304, Building E, 800 Roosevelt Road, Glen Ellyn, Ill. 60137.

Languages

Thoroughbred Software has announced a porting of its **Thoroughbred Basic** to both the Fortune Systems Corp. 32:16 and 68020 Fortune Formula Unix-based computer systems.

Four versions of the product were announced: a port to the Formula machine under For:Pro, Fortune's version of the Unix operating system; a port to the Formula machine under Unix; a port to the 32:16 under For:Pro; and a port to the 32:16 under Unix.

Prices range from $895 to $2,495, depending on the number of system users.

Thoroughbred Software, P.O. Box 1035, 102 Old Camplain Road, Somerville, N.J. 08876.

Utilities

Sterling Software, Inc.'s Dylakor Division has announced an optional feature for its **Dyl-Interface DB2** data management system.

The optional feature is said to allow users to change information within DB2 files. Dyl-Interface DB2 is said to transparently link IBM's DB2 relational data base with Dylakor's information management systems Dyl-270, Dyl-280 and Dyl-280 II. It supports the complete relational structured query language syntax, the vendor said.

The product runs under MVS and MVS/XA under IBM's TSO. It operates on IBM 370, 3000 and 4300 series mainframes and plug compatibles.

The full version of the product is priced at $8,690. The retrieval-only version costs $6,380.

Sterling Software's Dylakor Division, P.O. Box 2210, Chatsworth, Calif. 91313.

Oak Software has announced **Procedure X**, a software space-manager tool designed to manage files, libraries and folders on the IBM System/36 or 34 disk.

Procedure X automatically analyzes the files, libraries and folders. It ensures that nothing takes up more room on the disk than necessary.

The Procedure X tool is priced at $99.

Oak Software, 2nd Floor, 435 N. Gulf Blvd., Indian Rocks Beach, Fla. 33535.

Adventureware, Inc. has announced **4th Write**, an automated documentation and maintenance tool for use with Focus, the fourth-generation language from Information Builders, Inc.

According to the vendor, 4th Write produces hard copy by stripping essential data from the user's Focus Masters and Focexecs, including optional comments from the source code. It then creates a Focus data base. Documentation reports are produced from the data base.

4th Write is available for CMS environments. It costs $6,000.

Adventureware, 3434 Huntertown Road, Allison Park, Pa. 15101.

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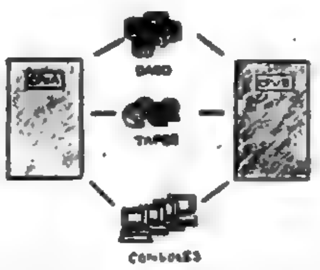

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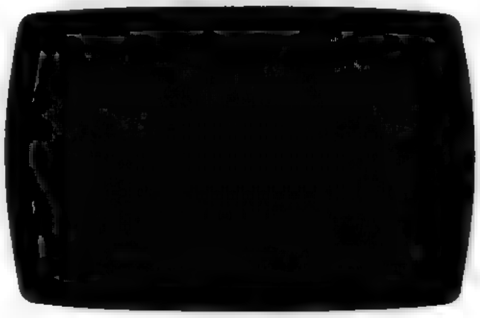

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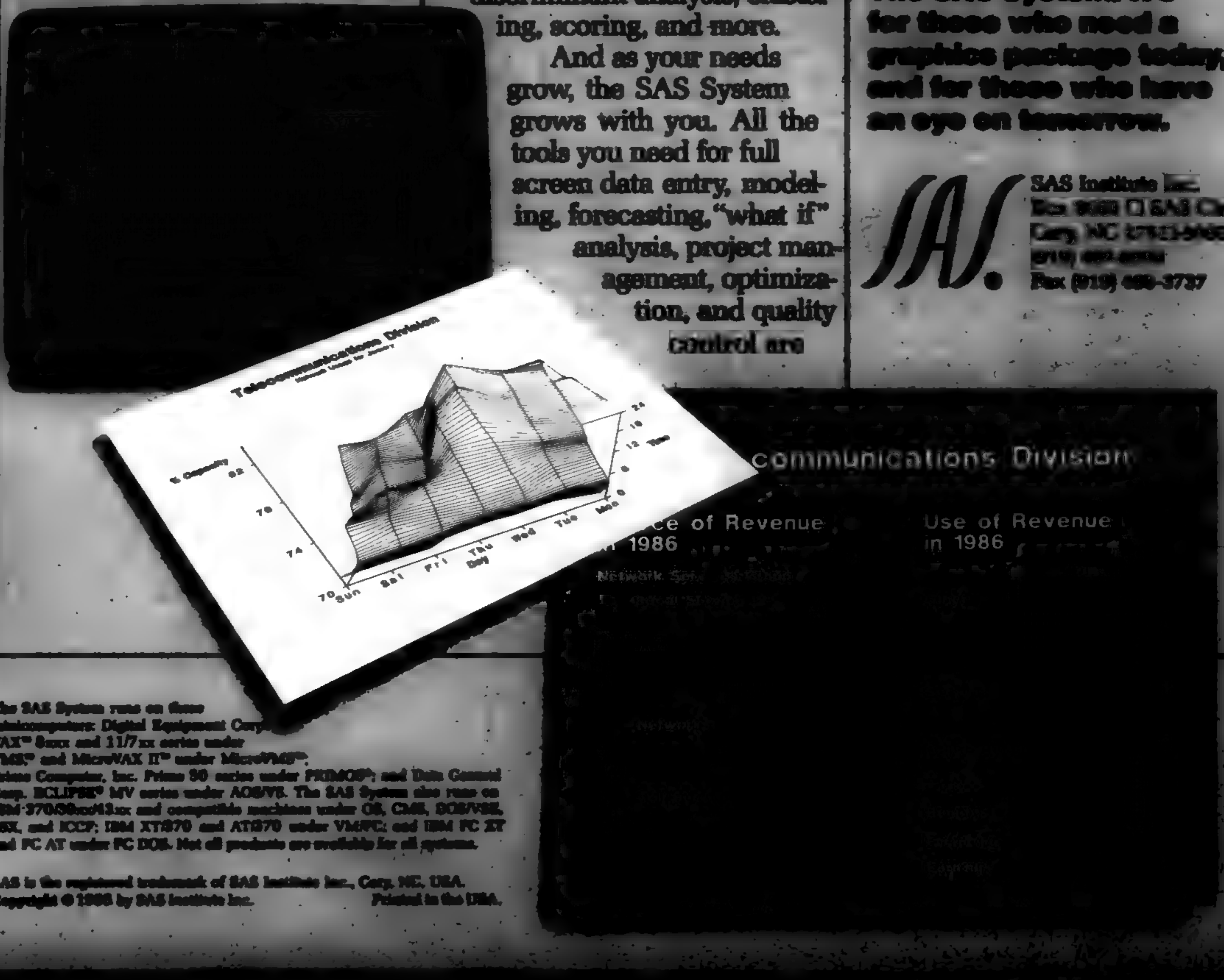

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MICROCOMPUTING

SMALL TALK

William Zachmann

Toshiba heats portable pot

The market for truly portable personal computers is a pot that is now starting to boil, and one type of machine is getting especially hot.

There are currently four generic classes of portables, including those with small CRT screens that long dominated the high end of the market. At the low end, there are the limited-display, diskless products such as the Tandy Corp. Model 100. In between, increasingly capable battery-operated floppy disk-based systems have sparked faster market growth.

But perhaps the hottest category consists of IBM Personal Computer AT-compatible hard-disk systems with flat panel displays relying on external power supplies. The Toshiba America, Inc. 3100 is already a winner in this category. Its list price recently reduced to $4,199, the 3100 delivers a reliable, solid value in a 15-lb, brief case-size package.

The basic system is built around an 8-MHz Intel Corp. 80286-2 microprocessor. It comes with 640K bytes of ran-

Continued on page 34

Voice system's worth debated

BY ALAN J. RYAN
CW STAFF

YORKTOWN HEIGHTS, N.Y. — IBM scientists recently demonstrated the company's experimental, 20,000-word vocabulary speech-recognition system, but analysts were divided on the usefulness of such a product.

Less than a year ago, IBM demonstrated its Personal Computer-based, 5,000-word experimental system [CW, April 21, 1986]. Prior to that, a room filled with computer equipment was required for the 5,000-word system.

The latest desktop system includes 97% of all the words a speaker is likely to use in business, the vendor said. The product's overall accuracy rate, which includes words not listed in the 20,000-word vocabulary, is approximately 95%, which translates into one mistake for every 20 words, according to the vendor.

Accuracy "is still a very active area of research" for this product, an IBM spokesman said. He added that the accuracy rate would be higher for words listed in the system's vocabulary.

The system, which will be tested in IBM offices, works when words are uttered into a microphone with a brief pause between each word. Shortly after the word is spoken, it appears on the computer screen, the vendor claimed.

According to William Zachmann, vice-president of corporate research at International Data Corp. (IDC), a Framingham, Mass.-based research firm, most people would like to have a computer that takes dictation. But, to do that, "you would really need continuous voice recognition. To say one word at a time is a very inconvenient way of doing that," he said.

"It's an impressive leap forward for that whole industry," said Charles Newton, president of Newton-Evans Research Co. in Ellicott City, Md. He said the technology, developed at IBM's T. J. Watson Research Center, would be useful for "highly trained operators and dispatchers, a major part of whose function is data entry.

"I think, for handicapped workers or for work where you need hands free," the system would be a boon, Newton said. He added that the system could be ideal for inventory control.

Because it is speaker-dependent, the system requires a preliminary 20-minute session in which the user trains the computer by reading a document. The information collected is used to characterize 200 sound patterns in the user's voice.

Words spoken are matched against a data base of 25 million words in collections of phrases commonly used in office correspondence. The number of word candidates is reduced by determining which words are most likely to follow the two previous words in business usage.

IBM said the unit's contextual ability enables it to distinguish between words that sound alike but are different, such as "know" and "no" or "to," "two" and "too." Punctuation can be added verbally or manually.

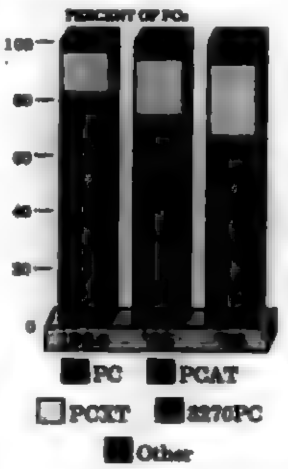
The system is based on the IBM PC and uses two high-speed subsystems, each containing a digital signal-processor chip. The first subsystem transforms a speaker's words into a string of labels, which encodes the speech. The second matches those code labels against labels of words in the system's vocabulary.

"It still has the problem of being slow and cumbersome," IDC's Zachmann said. The technology is very unlikely to have an effect on the industry until continuous voice recognition is realized, he added.

Data View

IBM Personal Computers

Distribution of models installed from 1984 to 1986



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Macintosh makes an end run

BY PETER BARTOLIK
CW STAFF

COMMENTARY

It seems that the Apple Computer, Inc. Macintosh line has suddenly sparked the creation of a new cult of believers among the third-party microcomputer products community. A host of vendors are sprouting products to be used on "the computer for the rest of us," as one of the many heralded ad campaigns used to say.

Even Lotus Development Corp. readied a "new" package — the more cynical in the industry would call it a revamped Jazz — for the new breed of Macintosh.

The user community, once urged to disregard Apple's unique system as little more than a toy, is now faced with a barrage of industry hype that the Macintosh offers true business solutions. "Have I missed something?" the corporate buyer asks himself.

Continued on page 33

Inside

- CD-ROM users reveal applications goals. Page 32.
- Phoenix Technologies releases tool to enhance MS-DOS performance. Page 32.
- Zenith reduces portable desktop PC prices. Page 35.

Hockey team crosses line with micros

Chicago Black Hawks ice Ticketron, choose PCs to automate ticket sales

BY DOUGLAS BARNEY
CW STAFF

CHICAGO — The Chicago Black Hawks hockey team is scoring big with microcomputers that automate season ticket sales.

For years, the Black Hawks used the Ticketron 2000 and 2001 systems to manage ticket sales and print tickets. But the Control Data Corp. Cyber 18-based system cost $40,000 a year to lease. In addition, the system did not provide enough flexibility, a penalty the Hawks could not afford to take.

"I didn't want to live within the limitations that somebody else has set," said John Stroth, ticket manager for Chicago Stadium Corp.

At first, Stroth took a shot at developing his own personal computer-based ticketing system using Ashton-Tate's Dbase II. He said he soon realized that he did not have the time to complete the task and contacted a third party to write the application in Ryan-McFarland Corp.'s RM Cobol.

Some $30,000 later, the software was installed on a system that uses an IBM Personal Computer AT as a file server and another AT and five IBM PCs as nodes. The machines are linked with a local-area network running Novell, Inc.'s Advanced Netware software.

Although the total cost of the current system was more than $40,000, Stroth said he expects a substantial savings over the Ticketron system. "By the time you talk two years, we are way ahead of the game," Stroth said.

Besides the cost savings, the Black Hawks needed a robust system to handle the growth in season ticket sales. "The Hawks got very hot, and the business went from 4,000 or 5,000 season tickets to 14,000 out of 17,000 possible seats."

In addition to the custom package, the Black Hawks went back to a professional printer and arranged to have the printers made computer-compatible with the Black Hawks' machine. "We generate a tape that we send to the ticket printer that tells him which tickets to print," Stroth explained. The custom system includes many features specified by Stroth, which include detailed seating charts that enable customers to see the placement of their seats. But Stroth will not stop there.

> THE Black Hawks needed a robust system to handle the growth in season ticket sales.

"What I envision for the future — when laser disks get cheap enough and we have the time to invest in taking the pictures — is to be able to call up a picture of the arena from any seat," Stroth said. This capability, though possible with existing technology, is probably a few years away because of the current high costs of laser storage and image processing technology, he explained.

Also on tap is the ability for the ticket office to communicate directly with a PC at the stadium. "We just acquired a couple of modems and will put a PC at the arena itself with a modem. Then I can dial up this network and get information. For example, if somebody lost their ticket, I can pinpoint their seat location," Stroth said.

Users planning for CD-ROM applications

BY PEGGY WATT
CW STAFF

SEATTLE — Potential users of compact disk/read-only memory (CD-ROM) technology interviewed at a recent Microsoft Corp. seminar had clear applications goals in mind for the new technology.

A representative of the U.S. Bureau of the Census said the staff hopes to implement CD-ROM technology to distribute results of the 1990 census. "Our uses are perfect for CD-ROM. It may finally bring the paperless office," said James Clark, technical director at the census office in Washington, D.C. He said the department is currently testing CD-ROM versions of several data bases.

Also testing CD-ROM technology is Nynex Corp.'s Information Resources division, which is using it to store directories of frequent callers, as well as for its own access by operators, said Douglas Cummings, manager of business development.

CD players are already in place in most of the 22 libraries in the Columbia University system in New York, according to Lilita Gusts, business library director. She said she was looking for on-line references and upcoming technology. "The resources that will be the biggest hits in the library are the ones that have the actual information on the disk," she said. "Then you can download it and walk away. Who wants to download citations, then go back and look up the sources?"

In addition to users, many of the 1,100 attendees were developers checking the progress and potential of optical media. "We're here kicking tires," said Mike Acheson, optical media project manager and one of several Apple Computer, Inc. employees who led seminars.

Those early users and their choices of applications will help set CD-ROM design standards, said Tom Clarkson, chairman of Graphics Software Systems, Inc. in Beaverton, Ore. "The way CD-ROM is used will determine the software interface," he said. But each pioneer developer seems to design a unique search-and-retrieve method in an industry where standards have been debated from the beginning.

Diverse interfaces are appropriate when they are designed for different audiences, said optical storage industry analyst John Gale, president of Information Workstation Group in Alexandria, Va. "You want the search engine to be appropriate to the type of data you have," he said.

Users will finally set the standards, said Robert Carr, chief scientist at Ashton-Tate. "Mike MIS isn't going to retrain 5,000 corporate users on a new querying front end that's different from the one they already use. He just won't buy the product and will get the reference data elsewhere," Carr said.

Aid ups MS-DOS power on 80386

BY DAVID BRIGHT
CW STAFF

NORWOOD, Mass. — A systems software product that reportedly optimizes the performance of existing Microsoft Corp. MS-DOS applications on Intel Corp. 80386-based machines was recently introduced by Phoenix Technologies Ltd. The tool is slated to be sold to systems manufacturers starting this month.

Called Control/386, the software is said to boost the performance of applications running on an 80386-based system, increase a system's compatibility with Intel 8088- and 80286-based machines and add new features to an 80386-based machine.

Regardless of any new operating systems that may be introduced, MS-DOS 3.X is going to be around for a long time, pointed out Jonathan Joseph, product line manager for compatibility software for Phoenix. Control/386 was designed with that reality in mind.

"We see that there is a real need for a product that addresses 386 hardware as it can be built now and operating systems that are available now," he said. He added that the program is not a replacement to MS-DOS, and that the performance increases will vary according to the type of application.

System performance is increased through 32-bit emulation of both the Lotus/Intel/Microsoft Expanded Memory Specification (EMS) and the Enhanced EMS, the company said. In addition, the program is said to improve the performance of disk-intensive applications by allocating some of a machine's 32-bit memory for caching. The performance of a machine's IBM BIOS and IBM Enhanced Graphics Adapter performance is also increased, according to Phoenix.

The program enables users to run timing-dependent, copy-protected applications on an 80386-based machine, the vendor said. Joseph said he expects 80386-based machines using Control/386 to be introduced at Comdex/Spring '87 in June.

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PC data base targets ease-of-use buyers

BY DOUGLAS BARNEY
CW STAFF

DENVER — An icon-based, menu-driven data base package from Precision Software Ltd., slated to be announced later this month, is part of the large crowd of products aimed at IBM Personal Computer and compatible users interested in an easy-to-use data base.

Superbase Personal achieves its ease of use by running under graphics environment manager (GEM), a graphics-based operating environment from Digital Research, Inc., Precision Software claimed. Along the bottom of the screen, Superbase displays icons similiar to the buttons on a videocassette recorder. With these icons, the user can scroll through data and pause, fast-forward or rewind.

'Entry-level system with power'

"It is an entry-level system with all the power of the top-line data bases but without the complexity," John Tramner, Precision Software managing director, said. Progressive Peripherals & Software, Inc., located here, is expected to distribute the product in the U.S.

File and record capacities are limited by the amount of disk storage a user has, the firm said. In addition, the number of open files and fields per record are limited by the user's system configuration.

The package can also import, store and retrieve images and graphics from other applications, including Digital Research's GEM Draw. According to Tramner, this capability will allow users to build a picture data base.

By fall, the firm said it expects to announce Superbase Professional, a package that includes a programming language and is aimed at the more sophisticated user. The Professional version will also include limited word processing capability and form letter and multifile form-generation capabilities, Precision Software said.

The programming language is essentially a simplified version of Basic with added commands specific to data base operations, Tramner said. Additional functions built in to the language include optional line numbers and procedure labels.

Superbase Personal is slated to sell for $150 with the GEM operating environment and for $100 without GEM. The package runs on IBM PCs and compatibles and requires GEM and a mouse. Superbase Personal users will be able to upgrade to Superbase Professional at a reduced price, although the price of Superbase Professional has not been set.

Macintosh

CONTINUED FROM PAGE 31

The answer is no. Despite Apple's final accommodation to some third-party tinkering within the confines of its machines, there has been no technological breakthrough. Rather, the breakthrough has come with the realization that dependance on the Microsoft Corp. MS-DOS standard has created what Wall Street analysts term "exposure." Having committed themselves to live under the umbrella of Microsoft and IBM, third-party software and add-on vendors now face at least a year of dismal growth prospects waiting for the industry's leading partners to get their act together.

With Microsoft's continual delays of an MS-DOS for Intel Corp. 80286 microprocessors, there is little new opportunity in the IBM-compatible arena. While tool kits for the advanced MS-DOS may be delivered in six months, they will include only an unfinished version of the operating system. Bringing out new products based on that operating system will take at least a year and will be hampered by the need to adjust to Microsoft's revisions.

The dreaded FUD factor

Then there is the oft-proclaimed FUD factor. There is such fear, uncertainty and doubt about IBM's intentions that third-party developers are starting to wonder if things will be so easy in future. As clones cut into IBM at the low-end, common sense dictates that IBM will turn some little tricks to make its Personal Computers unique, adding value with certain communications and graphics functions built-in that clone makers cannot easily duplicate. That raises the prospect that third-party developers will have to craft two versions of their products: one for the IBM family and the other for clones.

With a delay of at least a year before the next MS-DOS becomes commercially viable, and faced with the prospect of dealing with an unaccommodating IBM, former devotees of one industry standard need to hedge their bets. They need continued growth in the coming year and protection from the whims of IBM.

So there is Apple: Slowly, Apple has sold a reported one million Macintosh units, though of varying models, and has gained inroads into America's corporations, albeit mainly in ones and twos. But the machines are out there, and gaining a piece of that one-million-and-growing market makes a lot more sense than sitting on one's hands waiting for Microsoft to deliver and IBM to show its colors.

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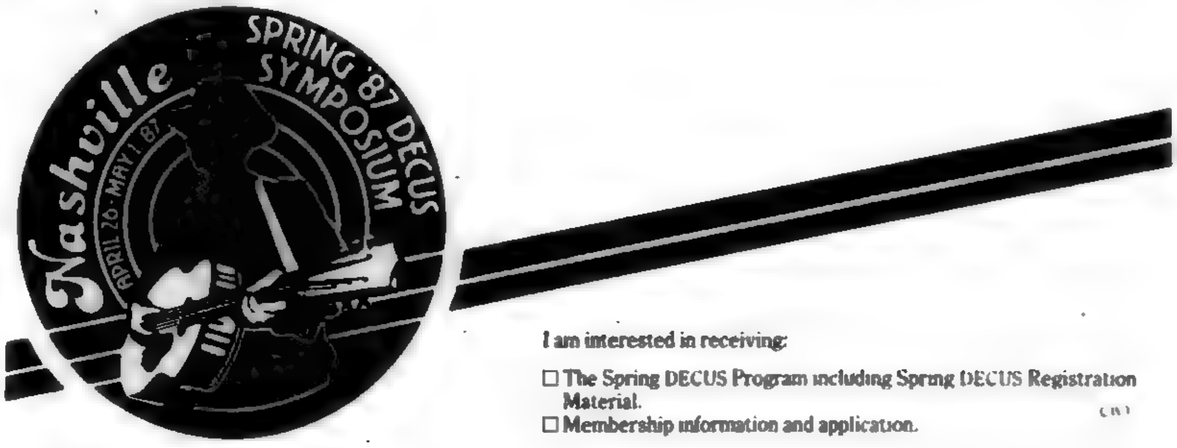

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Toshiba

CONTINUED FROM PAGE 31

dom-access memory, which can be expanded up to 2.6M bytes. A 10M-byte internal hard disk and a single 720K-byte 3½-in. hard-shell floppy disk drive are also included. The display is a crisp gas-plasma screen with 640- by 400-pixel monochrome graphics and standard 25 by 80 text capabilities.

Serial and parallel ports, as well as a built-in red-green-blue adapter offering IBM Color Graphics Adapter (CGA) compatibility are standard features. Connectors are also provided for an external disk drive and an expansion chassis using the standard 8-bit IBM PC XT bus.

The nicely designed 81-key keyboard packs full-size sculptured keys with all the standard functionality of the original PC AT keyboard in a 12.2- by 3.1- by 14.2-in. package. In addition to Caps Lock, Num Lock and Scroll Lock lights, the 3100 also has LED indicators for processor speed selection, external CRT selection and disk-in-use lights.

Switchable displays

Keystroke combinations let the user switch between the built-in gas plasma display and an external color display as well as between processor speeds. Optional accessories include an external 5¼-in. floppy disk drive, a 2M-byte memory card, an expansion unit with five PC XT-compatible slots and an internal Hayes Microcomputer Products, Inc.-compatible 1,200 bit/sec. modem.

Copies of Borland International's Superkey and Sidekick on 3½-in. disks are also bundled with the system. Microsoft Corp.'s MS-DOS is included as well.

An additional MS-DOS command, Chad, is useful in maximizing software compatibility with the 3100's gas-plasma display. Installed as a memory-resident utility when first invoked, Chad is subsequently called up by pressing the Sys Req key.

This step brings up a text window on the screen that indicates the way that color foreground or background character formats are being shown on the gas-plasma monochrome display. Color character on color background and color character on black background may be displayed as normal, reverse, intensified normal or intensified reverse characters on the gas-plasma display.

With the appropriate selection from among these options, most software written for the IBM CGA can work on the 3100's gas-plasma monochrome display. In graphics mode, the CGA three-color palette with 640 by 200 pixel resolution is represented on the 3100's plasma display by three different intensity, or orange scale, levels. Software with appropriate drivers can use the increased resolution of the 640- by 400-pixel monochrome graphics mode.

Like other hard-disk portables, the 3100 requires an external power supply, so it cannot be used on an airplane.

Powerful enough to support serious work, the 3100 can also be used to build real applications, for example for traveling sales and service personnel. With the optional built-in modem, the 3100 provides a platform around which an organization could build a sophisticated system for handling things like order entry, credit checking and call reporting. With data base and spreadsheet software, the 3100 could also be a useful and powerful tool for off-site contract negotiations, accounting audits and similar applications.

Recently, even more powerful portable systems have been announced by other vendors. Compared with the premium prices they carry, however, the Toshiba 3100 starts to look like a real bargain. The 3100's capabilities will be more than enough for most users.

The Toshiba 3100 offers yet another testimony to the benefits users can reap from the intense competition among vendors vying to offer more value within what has become an industry-standard architecture.

Zachmann is vice-president of research at International Data Corp.

Tool ups Mac printing quality

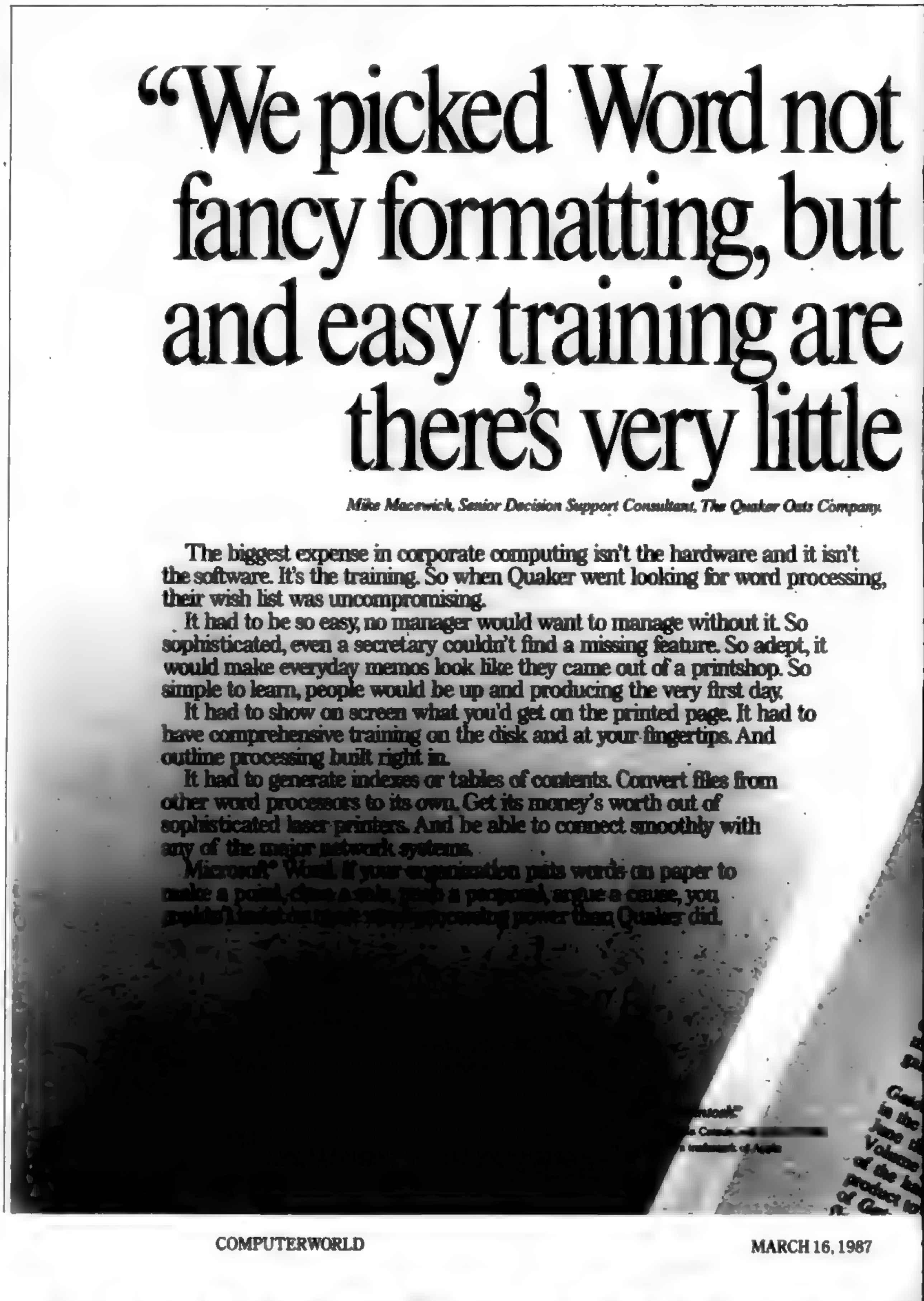
READING, Mass. — A software package said to bring professional quality typesetting to the Apple Computer, Inc. Macintosh was announced by Addison-Wesley Publishing Co.

Called Textures, the $495 package is based on the Tex typesetting language, a computerized typesetting and controlled page-layout industry standard with more than 250,000 users, according to Addison-Wesley officials.

Addison-Wesley is not positioning Textures as a desktop publishing package. Rather, it is designed for the typesetting of long, structured documents numbering thousands of pages, such as scientific papers with mathematic formulas and scientific notation, said Henry Suwinsky, software marketing manager.

The package is very sophisticated, according to Suwinsky, and is not particularly easy to use. "It is not like Aldus Corp.'s Pagemaker, for example, which you can learn in a very short period of time. What is unique about the product is that it will take an entire document and optimize the entire document as a whole."

A hard disk drive is recommended for Textures. Addison-Wesley said it expects to begin shipping the package in May.



"We picked Word not fancy formatting, but and easy training are there's very little

Mike Macewich, Senior Decision Support Consultant, The Quaker Oats Company.

The biggest expense in corporate computing isn't the hardware and it isn't the software. It's the training. So when Quaker went looking for word processing, their wish list was uncompromising.

It had to be so easy, no manager would want to manage without it. So sophisticated, even a secretary couldn't find a missing feature. So adept, it would make everyday memos look like they came out of a printshop. So simple to learn, people would be up and producing the very first day.

It had to show on screen what you'd get on the printed page. It had to have comprehensive training on the disk and at your fingertips. And outline processing built right in.

It had to generate indexes or tables of contents. Convert files from other word processors to its own. Get its money's worth out of sophisticated laser printers. And be able to connect smoothly with any of the major network systems.

Microsoft® Word. If your organization puts words on paper to make a point, close a sale, push a proposal, argue a cause, you couldn't insist on more word processing power than Quaker did.

NEW PRODUCTS

Systems

Zenith Data Systems has reduced the prices of four of its **portable desktop personal computers.**

The dual-drive Z-148 PC is now priced at $1,299. The 20M-byte hard-disk version now costs $1,899. The Z-148 series features 256K bytes of random-access memory (RAM) and switchable operating speeds of 4.77 and 8 MHz.

The 40M-byte hard-disk version of the IBM Personal Computer-compatible Z-248 PC featuring 512K bytes of RAM, an IBM Enhanced Graphics Adapter video card and an 8-MHz clock speed, now costs $4,999. The Z-171 portable PC now costs $1,999. It features a 9-in. diagonal screen and two 5¼-in. floppy disk drives.

Zenith, 1000 Milwaukee Ave., Glenview, Ill. 60025.

Wyse Technology has dropped the price of the 40M-byte **Wysepc 286.**

The Wysepc 286 features a 10-MHz processor, a 6-MHz compatibility mode, a range of display options and compatibility with the IBM Personal Computer AT. It includes 640K bytes of random-access memory, eight full-size expansion slots, a real-time clock calendar with battery backup and an RS-232 serial and parallel port.

The Wysepc 286 is now priced at $3,699.

Wyse Technology, 3571 N. First St., San Jose, Calif. 95134.

Software applications packages

MCBA, Inc. has ported its **accounting, distribution and manufacturing software** to the Santa Cruz Operation (SCO) Xenix System V operating system.

The packages available are Accounts Payable, Accounts Receivable, Bill of Material Processor, Customer Order Processing, General Ledger, Inventory Management, Master Scheduling, Material Requirements Planning, Purchase Order and Receiving, Payroll and Report Writer.

The prices for the software under SCO Xenix System V range from $1,000 to $7,000 for source-code licenses, the vendor said.

MCBA, 425 W. Broadway, Glendale, Calif. 91204.

Action Instruments, Inc. has announced **Version 3.0** of its **IC-DOS**, a Unix-compatible, real-time multitasking operating system.

IC-DOS features the ability to run 48 concurrent tasks on one personal computer; a real-time scheduler; capability for distributed filing for networking and distributed processing; and the ability to transfer information between windows.

The system can be installed along with Microsoft Corp. MS-DOS on a hard disk. IC-DOS contains utilities for sharing information with MS-DOS.

IC-DOS costs $695.

Action Instruments, 8601 Aero Drive, San Diego, Calif. 92123.

The MacNeal-Schwendler Corp. has introduced **MSC/Pal for the Macintosh**, an engineering analysis package for Apple Computer, Inc.'s Macintosh.

MSC/Pal is said to perform static and dynamic finite-element analysis. It uses pull-down menus and dialogue boxes. The program's element library includes beams, quadrilateral and triangular plates and plane-stress and plane-strain membranes. Another feature is interactive graphics capabilities.

MSC/Pal for the 512K-byte Macintosh costs $995. For machines with 1M byte of memory, it costs $1,495.

MacNeal-Schwendler, 815 Colorado Blvd., Los Angeles, Calif. 90041.

Sterling Castle Software has introduced **PC Manager**, a random-access memory-resident software program.

PC Manager is said to initiate feedback on managerial performance and remind the user of appointments, goals and things to do while other programs are running. The frequency of the Remind feature can be adjusted by the user, according to the vendor.

Other features include a calendar screen, a goal screen, a password-protected information and people screen and a notes screen. Also included is a calculator.

PC Manager is priced at $99. It runs on IBM Personal Computers.

Sterling Castle, Suite 174, 702 Washington St., Marina Del Rey, Calif. 90292.

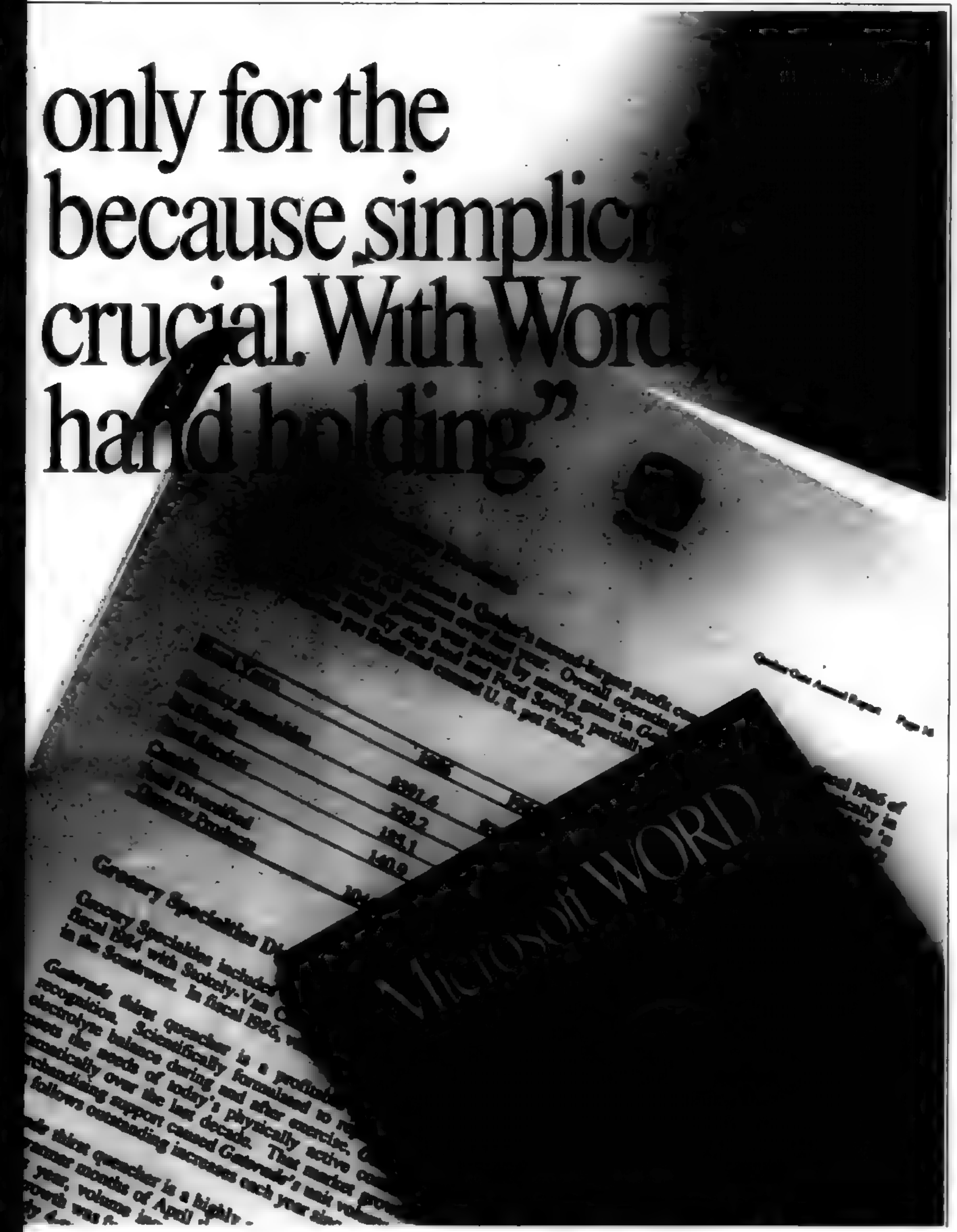
Ryerson Polytechnical Institute has announced **Sumquest**, software for IBM Personal Computers and compatibles.

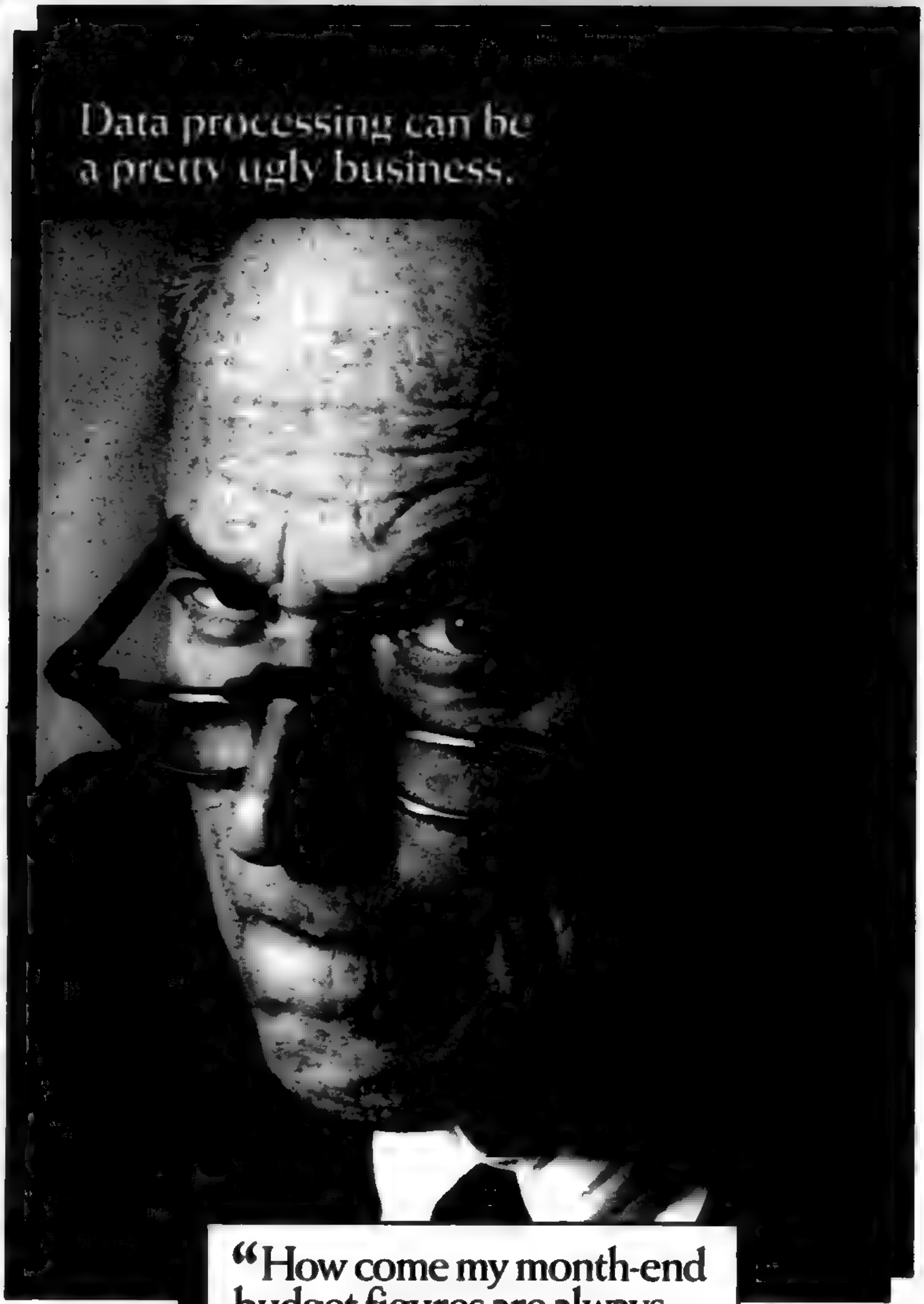
Sumquest is said to allows users to conduct in-house surveys for marketing research. Users can design the questionnaire, collect responses and analyze the output.

The software comes with a survey guidebook that describes types of questions to ask, when to use phone, mail or personal interviews, whom to survey, how many people to survey and how to analyze output.

Sumquest costs $695.

Ryerson Polytechnical Institute, 350 Victoria St., Toronto, Ont., Canada, M5B 2K3.





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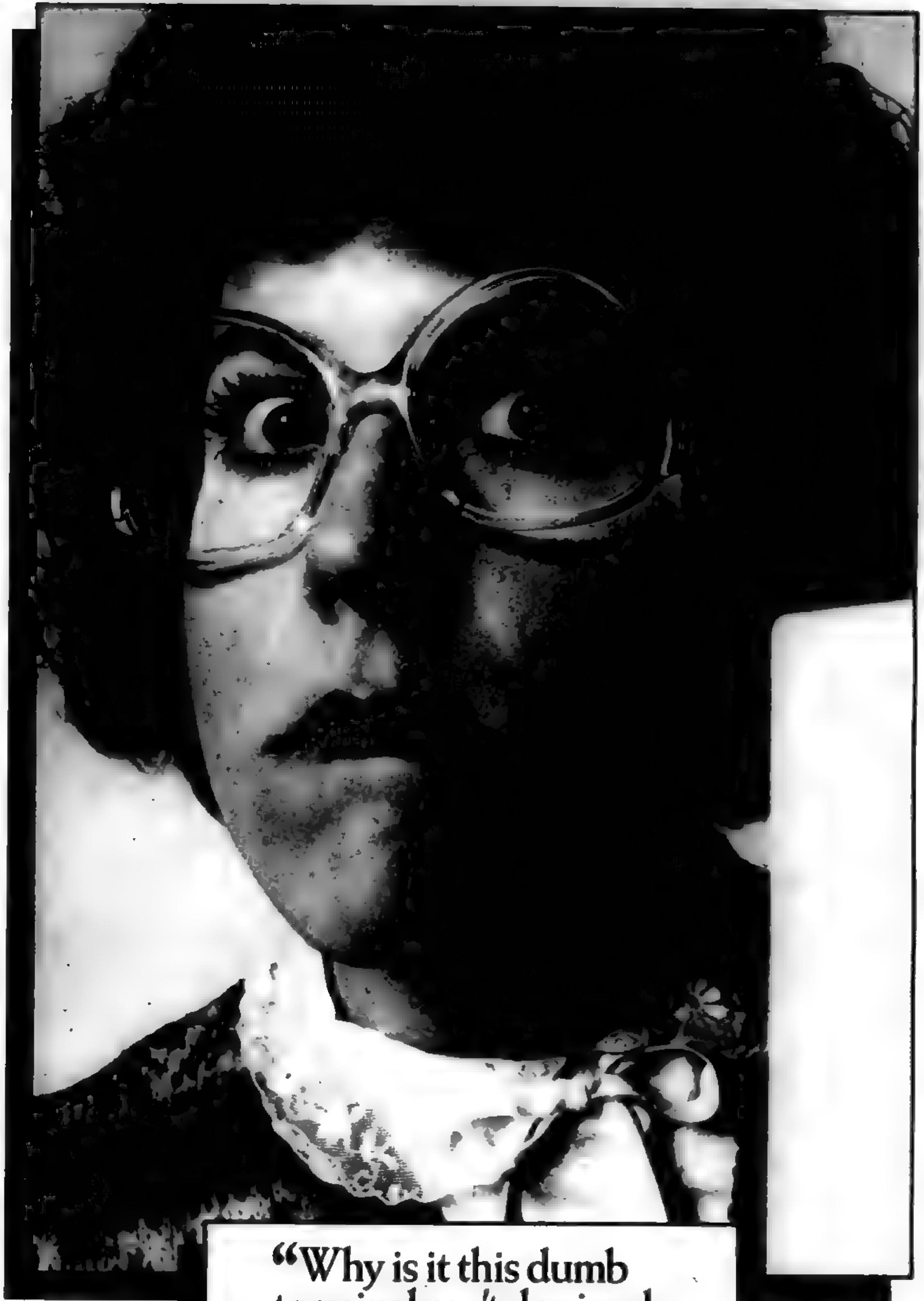
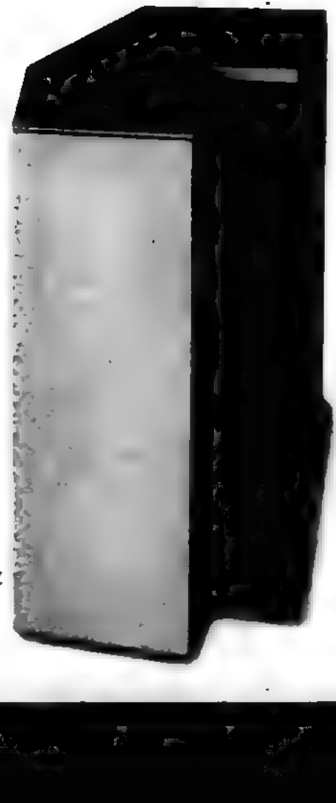


"Why is it this dumb
terminal can't do simple
wordprocessing?"



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For branch managers who can't get enough of your mainframe, it provides a localized database without cutting the cord to your 3270 system.

And for those users that can't seem to get the work out, it turns your Courier 9000 Series terminals or other work stations into productivity powerhouses — capable of spreadsheets, word processing, networking and an unlimited number of customized local functions.

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Software languages

Generale de Services Informatiques (GSI) has announced its **GSI Pascal Debugger** for the IBM Personal Computer and compatibles.

The GSI Pascal Debugger is composed of a turbo-compatible compiler written in Borland International's Turbo-Pascal and a source debugger written in Pascal and assembler language. The compiler generates a P-Code with symbol and address tables that the debugger uses to process a program.

Features include a full-screen editor, built-in Help screen, calculator, file manager and windows. Capabilities include displaying program source during execution, a tracing option with automatic stop, assignment and display of local and global variables and constants and display of tree structures.

The GSI Pascal Debugger is priced at $49.95.

Generale de Services Informatiques, 1380 Old Freeport Road, Pittsburgh, Pa. 15238.

Software utilities

Insyte Development has announced **1-Tools-3**, a package of utilities programs designed for use with work sheets.

The package includes a menu maker program that allows the user to generate custom access menus to work sheet programs and all other utility programs; a file manager program that includes support for subdirectories; a preview report generator designed to allow users to preview a page in what-you-see-is-what-you-get graphical format on the screen before outputting to the printer; and a form maker companion product to the preview report generator that allows the user to generate custom forms.

1-Tools-3 costs $69.95.

Insyte Development, Suite 137, 9842 Hilbert St., San Diego, Calif. 92131.

Lattice, Inc. has announced its **Lattice Dbc III Plus** library of C functions.

The network-ready, multiuser package is said to enable C programmers to simultaneously create, access and update files that are compatible with Ashton-Tate's Dbase III Plus.

The library allows C programmers to replace Dbase III Plus operations with C language programs, the vendor said.

Functions are said to allow a file or record to be locked automatically or manually and to test whether a file or record is locked or free. They also reportedly prevent accidentally locking a file or record that is already locked.

Lattice Dbc III Plus costs $750.

Lattice, P.O. Box 3072, Glen Ellyn, Ill. 60138.

Software enhancements

Data Access Corp. has enhanced its **Dataflex** applications development data base to include an automated utility called Db-Read.

Db-Read is said to transfer data from Ashton-Tate's Dbase II, III and III Plus .DBF files into Dataflex .DAT files. The program can read a submitted data file, determine which .DBF format the data is stored in, create an equivalent Dataflex entry program and move the data into a Dataflex format file. The resulting entry program is multiuser in all supported environments, regardless of whether the original Dbase program was or not, according to the vendor.

A Dataflex development license is priced from $750 for an 8-bit, single-user system to $1,250 for a 16-bit, multiuser system.

Data Access, 8525 S.W. 129th Terr., Miami, Fla. 33156.

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New York NY 10019-4323

One of the most significant developments in IBM ASCII terminals is the one you may never use.

Macropac International has unveiled an enhanced version of its **101 Macros for Lotus 1-2-3.**

The new version is said to provide all 101 macros written in both the 1A language and separately in the 2.0 and 2.01 languages of Lotus Development Corp.'s 1-2-3.

Among the macros included are a word processing macro that adds word wrap to 1-2-3, a macro to create graphics slide shows and a pop-up notepad, calendar and calculator with scientific functions and memory. Additional macros allow users to insert page breaks, switch the default to an alternate drive, toggle between the macro area and the spreadsheet, hide rows for printout and display any date as the day of the week, month, day and year.

The program is priced at $69.95.

Macropac International, Suite 168, 19855 Stevens Creek Blvd., Cupertino, Calif. 95014.

Jandel Scientific, Inc. has announced **Sigma-Plot Version 3.0**, an enhanced version of its scientific graphing program for Microsoft Corp. MS-DOS-based personal computers.

The software was designed to produce scientific data plots. It can produce scatterplots, line graphs, bar charts and histograms. Features of Version 3.0 include polynomial curve fitting, cubic spline interpolation, Greek alphabet, mathematical symbols and advanced page composition features.

Sigma-Plot Version 3.0 accepts keyboard input, DIF files and most ASCII files. It supports Hewlett-Packard Co. and other pen plotters as well as the HP Laserjet+.

Sigma-Plot Version 3.0 costs $350.

Jandel Scientific, 2656 Bridgeway, Sausalito, Calif. 94965.

DPX, Inc. has announced a multiuser version of its **Rode/PC** data entry system.

The Rode/PC multiuser version is said to allow users to replace key-to-disk minicomputers with networked personal computers. The product combines the stand-alone processing power of personal computers and the communications capabilities of local-area networks to provide functions of traditional minicomputer-based data entry systems.

The multiuser version of Rode/PC requires a PC network compatible with IBM's Netbios standard such as the IBM Token-Ring network.

The cost for five workstations is $3,250.

DPX, 20823 Stevens Creek Blvd., Cupertino, Calif. 95014.

Laboratory Technologies Corp. has announced **Version 4.0** of its **Labtech Notebook**, a personal computer-based data acquisition package.

Labtech Notebook now supports a variety of mathematical, statistical and signal processing functions including real-time Fast Fourier Transforms and FIR filters.

Other new features include intelligent data collection with pretriggering and the ability to trigger using analog values compared against thresholds.

A replay channel has been added to the software making it possible to acquire data from the disk file in real-time at the same time data is being acquired from the instrumentation.

Labtech Notebook is priced at $895.

Laboratory Technologies, 255 Ballardvale St., Wilmington, Mass. 01887.

Data storage

DS Technologies, Inc. has announced **DS Backup+**, hard-disk backup for personal computers with virtual links to mainframes.

Continued on page 40

Announcing an IBM first: the three-year ASCII terminal warranty.

Here's how it works.

Should you have a problem with any of the three elements* of an IBM ASCII terminal purchased after June 15, 1986, just take the problem element to any IBM Service Exchange Center or IBM authorized remarketer.

They'll exchange the non-working element for one that works. So you'll be on your way with a minimum of downtime.

How will you know which element isn't working properly? Our built-in diagnostics let you know quickly.

Of course, all this may well be academic. For given the reliability that's built into every IBM ASCII terminal, the three-year limited warranty is one feature you'll probably never need.

IBM's unique plug-in emulation cartridges.

Emulation	3161	3162	3163	3164
ADDS Viewpoint	X	X		
DEC VT220/100/52		X		
DEC VT100/52			X	
DEC VT220 w/Hot Key/ 3708		X		
Hazeltine 1500	X	X		
Lear Siegler ADM-3A	X	X		
Lear Siegler ADM-5	X	X		
TeleVideo 910, 910+, 912, 920, 925, 925E	X	X		
TeleVideo 950			X	
WYSE 50/50+		X		
IBM 3101	X	X	X	X
Enhanced IBM 3708 Attachment	X			

Introducing the 132-column IBM 3162.

But our three year warranty isn't the only significant development in IBM ASCII terminals.

There's our new full-function 3162.

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What's more, not only is the IBM 3162 switchable between 132 and 80 columns, it shows 28 rows of data. Which enables it to display even more information.

The 3162 comes with a compact, yet fully-functional, 102-key keyboard. Or a space-saving 84-key keyboard.

But, of course, size isn't everything. Read on.

New developments in emulation.

Our exclusive plug-in Emulation Cartridges allow all our ASCII terminals to operate in the most widely-used data streams. (Including the DEC VT 220 and WYSE 50+.) So that instead of changing terminals, you merely change cartridges.

And, in addition to their changeable personalities, all IBM ASCII terminals share another trait. The ability to operate in their own function-rich native mode.

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Our superb ergonomics, for one thing. And our quantity discounts, for another.

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This limited warranty applies only to ASCII terminal models 3161, 3162, 3163 and 3164 purchased in the U.S. and Puerto Rico.

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DS Backup+ is said to back up and restore single files or directories, multiple directories or entire hard disk drives. According to the vendor, the product can back up any DOS device, including Bernoulli boxes.

Features include data compression, directory and file scrolling and critical safety.

Compatible host systems with virtual links include IBM 4300 series, 3080 series and System/36 and 38.

Other compatible host systems include those from Digital Equipment Corp., Hewlett-Packard Co., Data General Corp. and Texas Instruments, Inc.

DS Backup+ costs $79.95.

DS Technologies, 1275 West Roosevelt Road, W. Chicago, Ill. 60185.

Printers/Plotters/Peripherals

Televideo Systems, Inc. has announced the **Televideo PC Station**, an alternative to personal computers for workstations on multiuser systems.

The PC station is said to offer personal computer-compatible screens and keyboards. It is also compatible with the vendor's 925/905 terminal with both 80- and 132-col. displays.

Features include an IBM Personal Computer AT-style keyboard, a 14-in. monitor and PC-compatible parallel and RS-232C serial ports. The PC Station is also said to offer simultaneous, key-selectable, dual-host capability with the flexibility to handle 80-col. micro applications and 132-col. mainframe applications through its ASCII code compatibility.

The Televideo PC Station costs $629.

Televideo Systems, P.O. Box 3568, 1170 Morse Ave., Sunnyvale, Calif. 94088.

Toshiba America, Inc. has introduced the **P351C Model 2**, an enhanced version of its 3-in-One printer.

The 24-pin color printer is said to print at 300 char./sec. in draft mode and 250 char./sec. in the condensed printing mode. Letter-quality mode print speed is 100 char./sec. Other features include a bottom-feed provision; Qume Sprint 11, IBM Graphics Printer and IBM Color Printer emulations; three resident type fonts; and the capability to accept a variety of type fonts from optional disks or cartridges.

The P351C Model 2 is priced at $1,749.

Toshiba America, 2441 Michelle Drive, Tustin, Calif. 92680.

Electrohome Ltd. has announced the **ECM 1900** family of 19-in. Variscan color monitors.

All monitors in the ECM 1900 family feature automatic horizontal- and vertical-frequency adjustments, allowing the monitor to interface to a personal computer using a variety of add-on color cards and software.

The monitors provide a noninterlaced resolution of 1,024 by 512 pixels and an interlace resolution of 1,024 by 800 pixels. The red-green-blue monitors accept both TTL and analog inputs.

The ECM 1900 monitors cost $3,195 each.

Electrohome, 809 Wellington St. N., Kitchener, Ont., Canada N2G 4J6.

Board-level devices

Ahead Systems, Inc. has announced **EGA2001**, an automatic mode switching universal enhanced graphics adapter (EGA) card.

The card is said to feature 640- by 480-pixel resolution. It is compatible with the IBM EGA, the IBM Color Graphics Adapter, the IBM Monochrome Display Adapter and the Hercules Computer Technology, Inc. Graphics Card.

The EGA2001 can also run Hercules programs on EGA and Multisync monitors. It can dislay 132-col. text by 25 or 44 rows on monochrome, EGA and Multisync monitors for Digital Equipment Corp. VT100 terminal emulation, word processing and spreadsheet programs.

The EGA2001 is priced at $369.

Ahead Systems, Suite B105, 1977 O'Toole Ave., San Jose, Calif. 95131.

Monolithic Systems Corp. has introduced **Justram**, a memory expansion module for the IBM Personal Computer AT.

Justram is said to provide up to 8M bytes of additional memory in a single slot. The board meets the Lotus/Intel/Microsoft Expanded Memory Specification and may be used as conventional, expanded or extended memory. It operates at 12 MHz with wait states or 8 MHz with zero-wait states.

The full 8M-byte memory module consists of a motherboard with 4M bytes and a mezzanine random-access memory-array board with the second 4M bytes.

The 8M-byte module costs $2,690.

Monolithic Systems, 84 Inverness Circle E., Englewood, Colo. 80112.

A-O Electronics, Inc. has introduced **X-Lock 50**, a personal computer security system said to prohibit unauthorized computer use.

The X-Lock 50 consists of an internal half-card and a software diskette. In addition to limiting access to the personal computer to approved personnel, it features data encryption using the Data Encryption Standard algorithm. The system accommodates up to 180 user accounts, each consisting of the user's name and a one- to 16-char. password.

The X-Lock 50 is priced at $275.

A-O Electronics, 2137 Flintstone Drive, Tucker, Ga. 30084.

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Elisabeth Horwitt

Co-location: everyone wins

Hats off to Mountain Bell for being the first divested Bell operating company to take the co-location plunge. The U.S. West-held operating company has agreed to let Telenet Communications Corp. relocate its Phoenix, Ariz., switching site to a nearby Mountain Bell central office.

At first glance, co-location appears to benefit the enhanced-service provider far more than the local-exchange carrier. Mountain Bell earns some cash by leasing its facilities to Telenet, but Telenet gains easier and less costly access to Mountain Bell's basic telecommunications services — and thus to the local carrier's customer base.

This is the main reason most of the regional Bell holding companies have reacted negatively to the co-location idea, according to Telenet Vice-President of Regulatory Affairs Phil Walker. He says the Federal Communications Commission has not gone far enough with Comparably Efficient Interconnection —

Continued on page 42

AT&T gets high marks

BY JEAN S. BOZMAN
CW STAFF

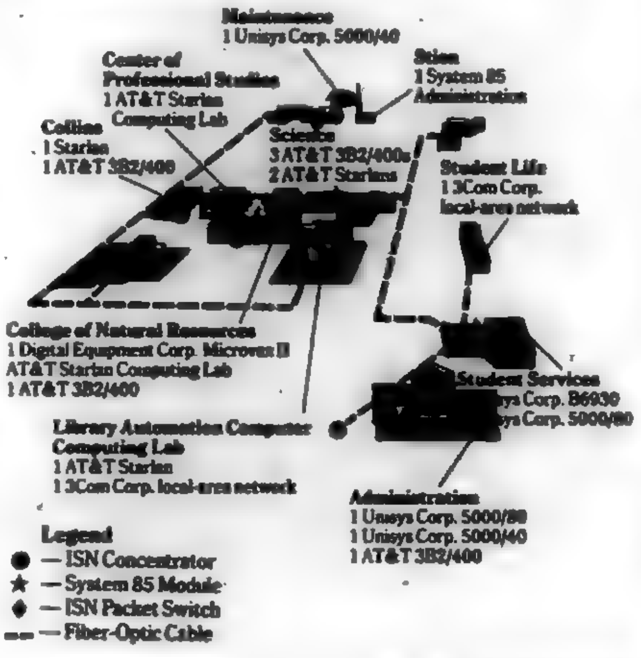
The University of Wisconsin — Stevens Point was one of the first organizations to use AT&T's Information Systems Network (ISN) intelligent switch as a multivendor networking tool. The University needed to connect systems that had been purchased by academic departments and administrative offices to get different jobs done. Among those who bid against AT&T were the IBM-Rolm Corp. partnership, Northern Telecom, Inc. and Wang Laboratories, Inc.'s Intecom division.

The university's MIS department needed a system that would allow students to send data from IBM Personal Computers or AT&T PCs in their dormitories to computers throughout the campus, located in central Wisconsin. This meant tying the PCs to a wide range of computer hosts, including a pair of IBM System/36s, several AT&T 3B2s, four Unisys Corp.

Continued on page 46

University of Wisconsin — Stevens Point

AT&T's ISN network links campus computers



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CW CHART SUSAN ALDAM

Users, vendors link to seek distribution

BY NINAMARY BUBA MAGINNIS
CW STAFF

BOSTON — Large end-user companies and academic organizations have joined forces with vendors to seek distributed processing solutions. General Electric Co., Westinghouse Electric Corp. and the Software Productivity Consortium are among the charter members of the recently formed Network Computing Forum's executive committee.

Spearheaded by Chelmsford, Mass.-based Apollo Computer, Inc., the forum is chartered to work toward a distributed processing solution, according to John Robotham, the forum's managing director. The initial membership includes some 29 organizations, including computer vendors Apollo, Alliant Computer Systems Corp. and Apple Computer, Inc.; network vendor 3Com Corp.; Rockwell International Corp.; San Diego Supercomputer Center; MIT Project Athena; Texas Instruments, Inc.; and software company Oracle Corp.

The forum has extended membership invitations to several major hardware vendors, including Hewlett-Packard Co., IBM and Digital Equipment Corp. No response has been received as yet.

GE has adopted a wait-and-see attitude about the forum's potential to deliver usable distributed processing solutions, according to Herbert Most of GE's Corporation Information Technology Group. "I feel it's worthwhile for GE to be involved until we know more about what it is they're going to do," he noted.

The company will reconsider its involvement if the forum turns out to be duplicating the efforts of standards bodies or other user-and-vendor consortiums, he added.

The forum could potentially address the needs of companies like GE that have an extensive multivendor installed computer base. Distributed processing would enable users to view a multicomputer, multivendor network as one large computer, according to forum leader Robotham, who is also Apollo's strategic projects manager.

In the distributed environment, application software would be written in modules. Depending on the task, modules would be sent to the CPU best suited for the job. Ideally, the dividing up an application among various CPUs would be transparent to end users.

"We're really just at the

Continued on page 46

Inside

- **Server designed for TCP/IP-based LANs. Page 45.**
- **Cabletron rolls out Ethernet transceiver. Page 47.**

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Co-location

FROM PAGE 41

a ruling that is supposed to ensure that enhanced service providers like Telenet have the same access to local basic services as the local exchange carriers themselves.

The Comparably Efficient Interconnection ruling "encourages but doesn't require" the operating companies to allow co-location, Walker states. Moreover, enhanced service providers located off premises must still pick up the tab for getting customer transmissions from the nearest local carrier facility to their own sites, Walker says. "So we end up paying a much higher price for basic services than the operating companies do," he adds.

Some regional holding companies will probably grant co-location privileges on a case-by-case basis — besides U.S. West, at least one other regional holding company reportedly is contemplating a limited trial of co-location with a service provider.

However, the regional holding companies are unlikely to support co-location as a blanket policy. Thus far, Mountain Bell has entered co-location agreements with only two companies: Telenet and G. E. Telemessager, an information provider that is already leasing space from the local carrier. "When we receive such a proposal, we'll check to see whether there is available space and whether it makes good business sense," says Blair Johnson, a Mountain Bell spokesman.

This is definitely not a "come one, come all" invitation. One remaining question is, How many carriers' switches will fit in one central office before Mountain Bell begins to feel crowded?

No limit?

Henry Levine, a partner with Washington, D.C., law firm Morrison & Foerster, insists that there is no limit to the number of co-located enhanced providers a central office can support — especially because co-location is able to extend to facilities a few blocks away with a high-speed pipe, such as a fiber-optic cable, connecting the two sites.

But even if they technically can always make room for one more, the divested Bell operating companies could justifiably argue that they have the right to choose their own tenants.

Mountain Bell Account Consultant Ronald McNamee says that his company may be less willing to share its space with major carriers U.S. Sprint Communications Co. and MCI Communications Corp., which could easily become competitors if U.S. District Court Judge Harold H. Greene approves the Department of Justice's recent recommendation to allow the local exchange carriers into interexchange and enhanced-service arenas.

"They're customers now, but if the Department of Justice's recommendations go through, we'd have competitors in the basement," McNamee points out.

Telenet, according to Walker, is hoping that Greene will indirectly pressure the local exchange carriers to embrace co-location. The service provider wants Greene to redefine the Comparably Efficient Interconnect plan to include "true equal access" and "identical costs" and then make compliance with the ruling a prerequisite for the local exchange carriers' entrance to interexchange and information service markets.

This "carrot" would "give the operating companies greater incentive for supporting co-location as the most efficient way to meet Comparably Efficient Interconnect requirements," Walker explains.

But until this happens, the divested Bell operating companies' central offices will be hot property, with telecommunications service vendors queuing up for those central offices that accept applicants. And unless the FCC puts its foot down, the lucky few who are granted square footage in a central location should be able to offer users significant cost savings over competitors who are left out in the cold.

Horwitt is Computerworld's senior editor, networking.

SCIENCE/SCOPE®

A searchlight nearly as bright as the sun helps police capture suspects at night. The Nightsun® searchlight is the most powerful ever developed for lightweight helicopters. With enough illumination to read a newspaper at 1,500 feet, it provides more than 30 times the power of previously used searchlights. Whereas traditional searchlights focus their light at the center of a beam, the Nightsun light equalizes its light across a 100-foot circle. Even fringe areas are fully lit, so that darkness no longer provides cover to vandals, burglars, auto thieves, and drug traffickers. Spectrolab, a Hughes Aircraft Company subsidiary, has produced Nightsun systems for over 300 helicopters in 80 percent of U.S. police agencies.

An infrared viewer found potential trouble spots in a large pharmaceutical plant during a five-day survey of a 57-building complex. Hughes' Probeye® infrared viewer scanned 5,000 areas of potential trouble and pinpointed 60 hot spots, most of which were in the electrical systems and motors. For example, the Probeye unit showed a heat buildup of 120°C at three cartridge-type fuses. Also, a 75°C rise was discovered at another electrical connection. The fuse could have failed during a production run, resulting in costly downtime. The Probeye viewer sees heat the way a camera sees light, converting it instantly into an image seen through the eyepiece.

Laser targeting systems for military aircraft can now be tested safely on the flight line. Until now, testing lasers on the flight line has been prohibited by safety regulations since the high levels of radiated energy involved could be hazardous to the eyes. Alternatives are to conduct laser tests on a remote range or to remove a laser pod from an aircraft and take it to a shop for dismantling. The latter procedure could take up to nine hours and deprives a fighting unit of a valuable electro-optic sensing pod in the event of an emergency. The new portable Laser and FLIR Test Set (LAFTS), designed and built by Hughes for the U.S. Air Force, can be carried to the flight line and easily attached to a sensor pod. The total time to mount, conduct all tests, and dismount the tester from the aircraft takes less than 15 minutes. LAFTS fully tests the laser and forward looking infrared (FLIR) systems and verifies proper alignment between them. TV performance testing/alignment capability is also available. The system can also be applied to test electro-optic sensors on helicopters, armored vehicles, and ships.

A flight engineering simulator will help develop new military aircraft and systems as well as improve existing ones. The system will be operated by General Dynamics, which produces the F-16 fighter for the U.S. Air Force. The simulator will help serve as proof that design concepts are feasible and allow comparisons to be made without risk of substantial capital investment. It will use technology from F/A-18 training systems developed for the U.S. Navy and Marine Corps. Hughes will supply an image generation and display system, plus operator control and equipment monitoring hardware. The simulator will include 40-foot domes, each housing General Dynamics cockpits and avionics systems.

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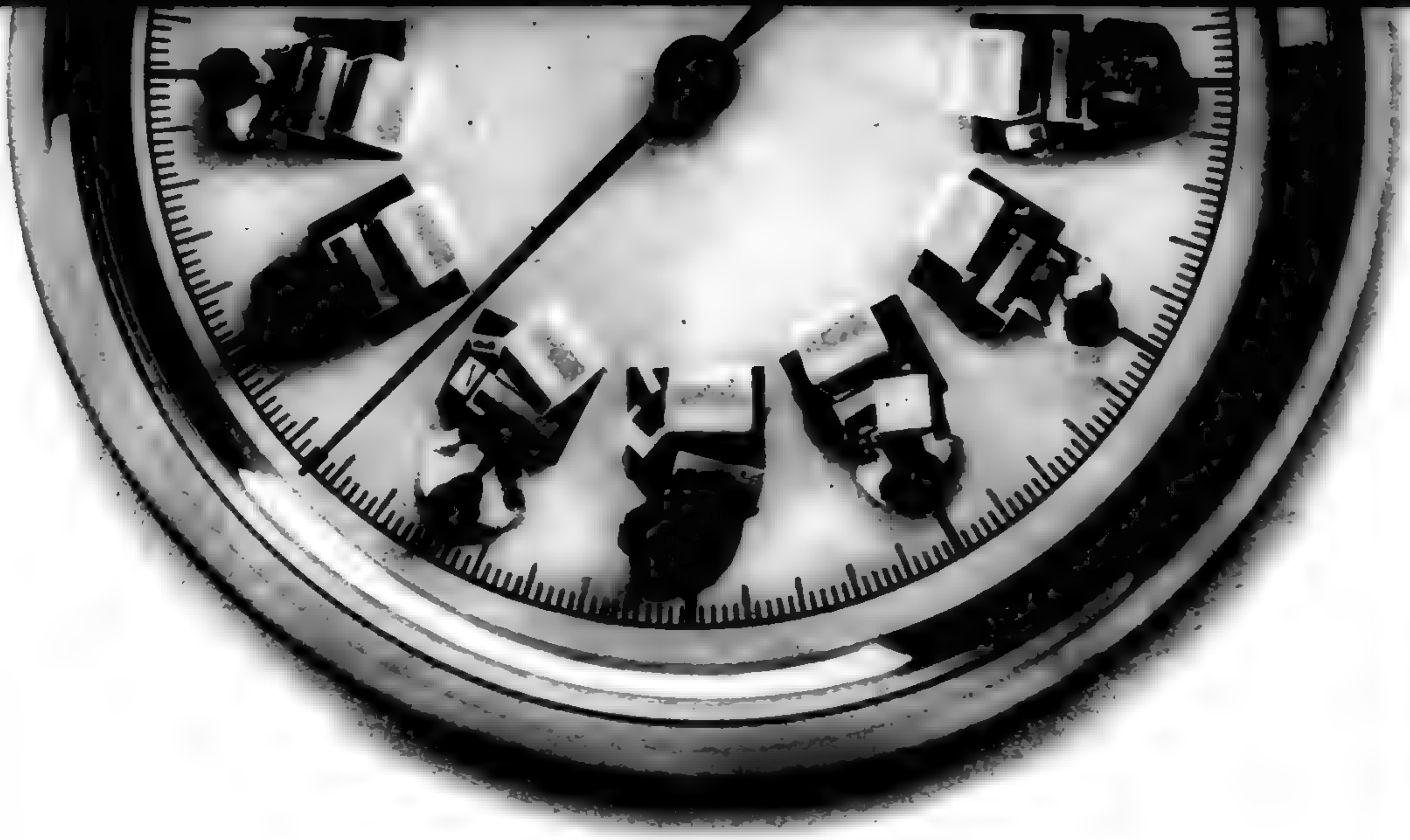

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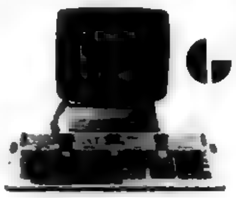

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Bell Atlantic proposes enhanced service

BY ELISABETH HORWITT
CW STAFF

ARLINGTON, Va. — Bell Atlantic Corp. has become the first of the regional Bell holding companies to file a plan with the Federal Communications Commission for offering an enhanced telecommunications service under the Comparably Efficient Interconnection Compliance Plan.

The enhanced service would provide message storage facilities to dial-up information services that supply callers with recorded information on the weather, local entertainment and other topics. The messages would be stored on the central office facilities and accessed over the public switched lines of Bell Atlantic operating companies.

The new service would mean that "information providers no longer have to invest in costly equipment," thus "substantially reducing the barriers to market entry," said John W. Seazholtz, vice-president of technology planning and marketing for Bell Atlantic.

Intended as the first in a series of enhanced offerings, Bell Atlantic's proposed service should give the company — and other regional Bell holding companies — a better idea of how to gain FCC approval for entry into the enhanced services market. The Comparably Efficient Interconnection plan, which is the major requirement to be met, dictates that a regional Bell holding company's regulated business cannot give preferential treatment to an enhanced service.

Bell Atlantic's compliance plan states: "No special interfaces, signaling, abbreviated dialing or other functionalities will be provided to Bell Atlantic's enhanced service or to other vendors through this offering."

A second set of requirements to be met by Bell Atlantic is the FCC's Joint Cost Order, published on Feb. 6, which is intended to ensure that the regional Bell holding companies do not subsidize enhanced services with revenue from the regulated side of their businesses.

Third, Bell Atlantic has stated that it will not provide its enhanced service with customer record information from the regulated side of its business, if customers request that this information be withheld.

Finally, U.S. District Court Judge Harold H. Greene must approve the Department of Justice's recommendation that the Bell holding companies be allowed to enter the information services market. Bell Atlantic is "hopeful that this will take place and, meanwhile, we'd like to get the ball rolling," spokesman Ken Pitt said.

Net manager bridges gap

BY PATRICIA KEEFE
CW STAFF

MOUNTAIN VIEW, Calif. — Bridge Communications, Inc. has introduced NCS/AT, which it claims is the first high-performance Microsoft Corp. Xenix-based network management server designed for local-area networks (LAN) based on Transmission Control Protocol/Internet Protocol (TCP/IP).

Bridge is offering the initial release of NCS/AT under TCP/IP because it said it sees high demand in that arena. "Many commercial users have learned that as the only fully standardized LAN protocol set available today, TCP/IP is the only way to achieve true interoperability between multivendor systems," Bridge President William Carrico said. Bridge said it will market a version of NCS/AT based on Xerox Corp.'s Xerox Network Systems protocol later this year.

The NCS/AT Network Control Server allows centralized control and monitoring of computer resources attached to a TCP/IP-based Ethernet (IEEE 802.3) or Bridge 5M bit/sec. broadband LAN.

Designed for medium- to large-size TCP/IP LANs, the NCS/AT supports up to 128 Bridge communications and/or gateway server units. It is based on Compaq Computer Corp.'s IBM Personal Computer AT-compatible Deskpro 286 with a 40M-byte hard disk drive.

Manipulating data to do network accounting, diagnose faults and predict performance bottlenecks becomes critical as network size increases, Carrico added. "A simple graph of peak-load hours can show the network manager how to manage network usage more effectively, or a log showing unusually frequent refused accesses to a given host may indicate that another server should be added to the LAN," he said.

The NCS/AT stores up to 2,048 logical names and configuration information down to the port level for each network-attached server. A central file of up to 512 user-defined command macros lets the user execute complex command sequences, according to the vendor.

Available this month in both Ethernet and broadband versions, the NCS/AT is priced at $12,900. For users with installed PC ATs, Bridge also offers an NCS/AT upgrade kit for $5,000.

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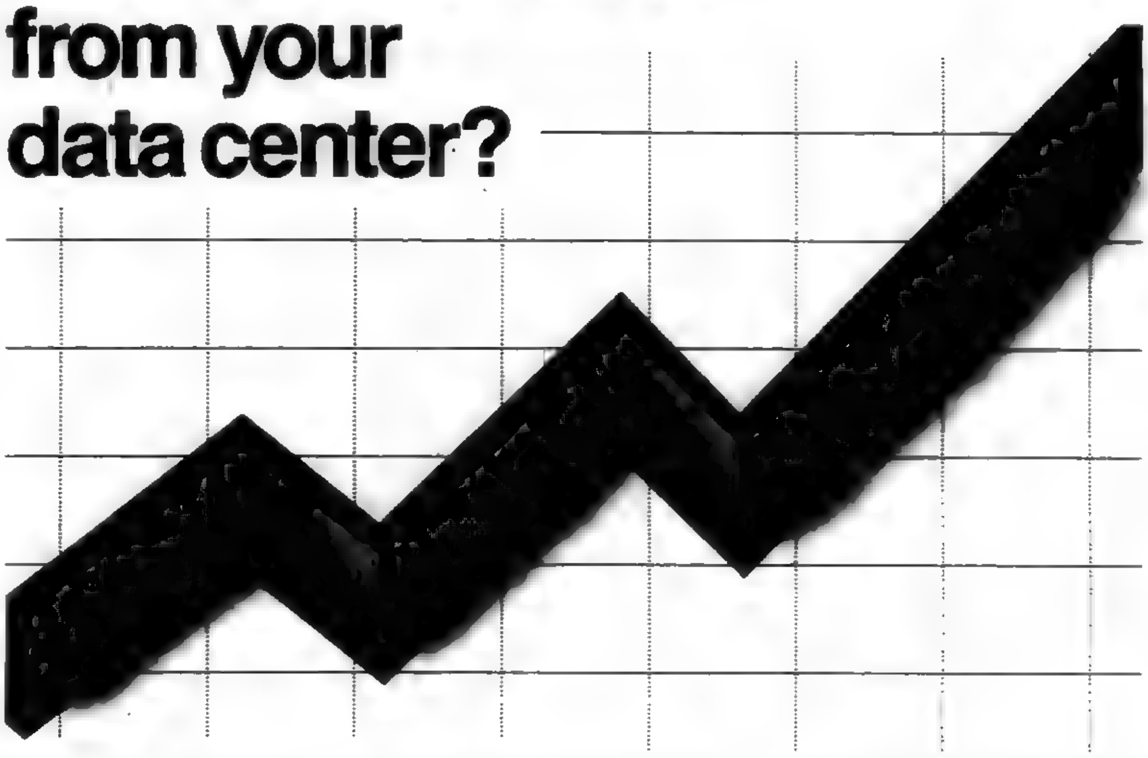

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AT&T

FROM PAGE 41

5000s — originally produced by Sperry Corp. — and a Unisys B-6930, originally made by Burroughs Corp.

The university acquired ISN as part of a $1.3 million purchase of AT&T telecommunications equipment, including a System/85 voice network for 3,600 telephones. The initial ISN cost was about $25,000, including support for 50 connections.

Both the ISN and the System/85 private branch exchange (PBX) are located in the same large telephone closet underneath the school's science building, but each has a very different task. Twisted-pair wires enter the telephone room from campus workstations, micros and telephones and are directed to either the PBX or the ISN switch. A single strand of four telephone wires is literally divided in half, with two wires going into the ISN and two going to the System/85.

"ISN's getting a free ride on the campus telephone system," says Steve Patrick, director of the university's administrative systems. But MIS must add about $500 for the cost of connecting each terminal or PC to the ISN network, he adds.

Data enters the ISN switch at 9.6K to 19.2K bit/sec. The ISN can handle total throughput of up to 8.6M bit/sec.; the fiber-optic cable between campus buildings, more than 8M bit/sec. The resulting network allows more than 200 university staffers and hundreds of students access to the voice/data system from thousands of telephone jacks all over the campus. They can also send files from 110 IBM PCs and compatibles that are scattered around three computing labs on campus. Students who elect to install a PC in their dormitory rooms can send in assignments electronically from 10 dorms or from three classroom computer labs. Within a building, AT&T's Starlan, a twisted-pair 1M bit/sec. local-area network, connects PCs and terminals to the ISN concentrators. AT&T 3B2s act as Starlan file servers, Patrick says.

The ISN system will give educators new computing options, too. University officials now plan to link with a Data General Corp. library index system that is running on an IBM 4381 in Madison, Wis., located about 110 miles away. Also, an ISN remote concentrator will be installed in Madison and connected to Stevens Point over a leased line. More links are envisioned between Stevens Point and other University of Wisconsin campuses.

It is now practical for end users to select whatever computer on the network that has the application, processing power or data they need. "We feel we can serve all our users best by giving them an appropriate computer for their task," says Bruce Staal, chairman of the university's mathematics and computing department.

A single end-user environment is being constructed so that users can dial up a remote 3B to get word processing applications, a remote Digital Equipment Corp. Microvax II to get Statistical Package for Social Sciences programs or one of four Unisys 5000 computers that support the Oracle Corp. data base.

As a result of the early ISN installation, the campus has become a showplace for AT&T networking technology. AT&T brings prominent commercial customers to the site to show how ISN and Starlan work together — and to demonstrate some early-support products that are not generally available. One such example is a new piece of terminal emulation software for Starlan.

Forum

FROM PAGE 41

threshold of network computing right now. The good news is lots of pieces are already available," Robotham observed.

The forum will take advantage of industry-standard tools, concepts and protocols such as X-windows, a multiwindowing standard formulated by MIT's DEC- and IBM-funded Project Athena; batch queuing from the National Aeronautics and Space Administration's Ames Research Center; and the network computing tools Apollo recently announced.

"The forum will be complementary with other standards' forums rather than competitive," Robotham noted. "I don't want to set unrealistic goals for the forum. We're looking for a practical-minded focus."

One of the forum's initial goals is to select appropriate tools that can potentially address network computing problem areas, Robotham said.

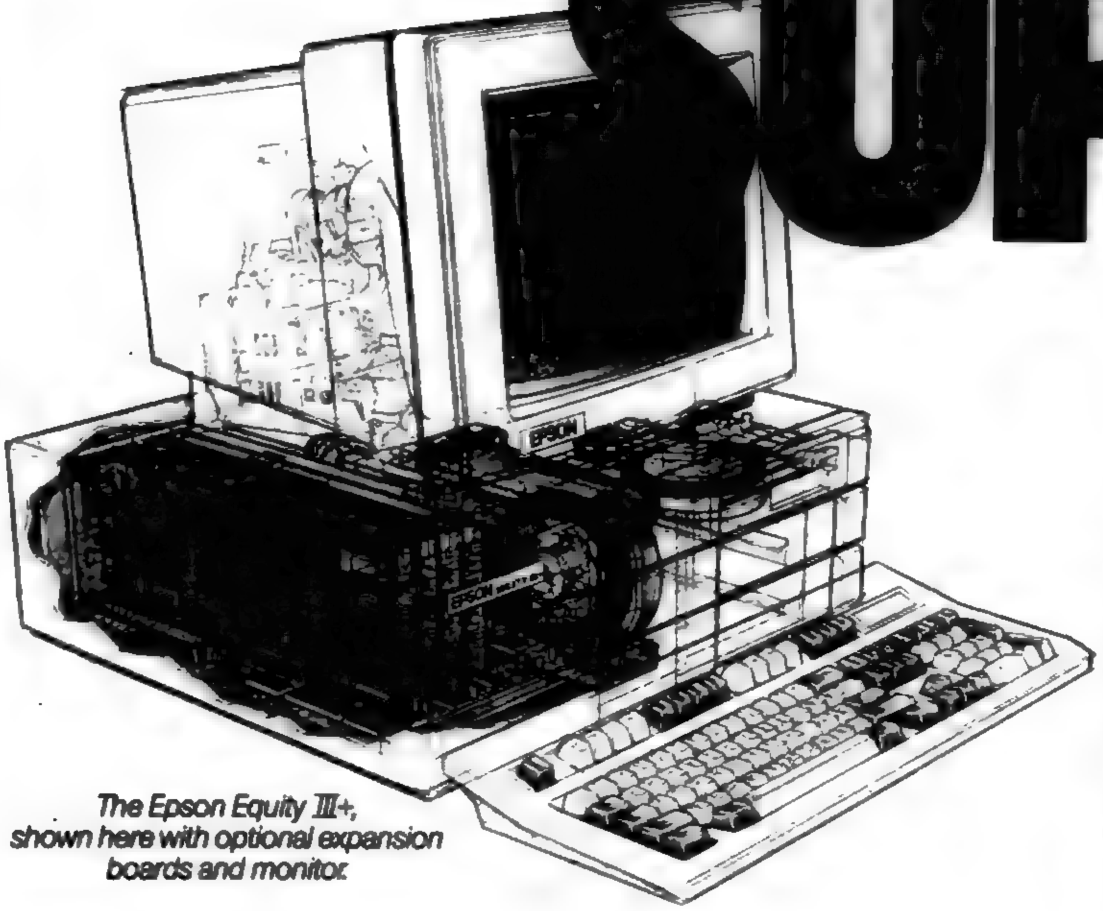
Hardware vendors will have to commit to the set of common tools. Software application suppliers can then restructure applications to take advantage of them, he explained.

Franklin Moss, vice-president of software development at Stellar Computer, Inc., said writing distributed applications is difficult. "The technique used to distribute one application is very different than what you would use in another distributed application," Moss observed. Sometimes resources are not used effectively because the system can waste bandwidth communicating application pieces to different nodes when it is more cost-effective to run on one node, he said.

GE's own experience in solving distributed processing dilemmas has been unsuccessful, Most said, adding that his firm now wants to buy a distributed processing solution as opposed to devising its own.

Westinghouse wants workstation users in California to access the two Cray Research, Inc. Cray-1 supercomputers in Pittsburgh, according to H. L. Layman, a Westinghouse consultant for engineering computing planning. Perhaps the forum can help bring about distributed processing that is transparent to end users, he said. The Network Computing Forum will meet twice this year, in June and in the late fall. An executive committee will discuss policy issues while a technical review committee reviews plausible solutions.

SUPER



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NEW PRODUCTS

Local-area network hardware

Cabletron Systems, Inc. has announced its **MT-800 Ethernet Multiport transceiver**, which incorporates the firm's Lanview built-in diagnostic system.

The unit also incorporates a multiport capability consisting of eight ports for connection to Ethernet/IEEE 802.3 host units. Each port implements transmit, receive and collision functions. A port is provided for connection to an external transceiver.

The MT-800 costs $975 per unit.

Cabletron Systems, P.O. Box 6257, Cabletron Industrial Park, 10 Main St., E. Rochester, N.H. 03867.

Lantel Corp. has introduced its broadband radio-frequency voice network, called the **Lantel 810 Intelligent Broadband Intercom** system.

The system is said to be a networked voice application for two-way broadband cable networks. It uses a distributed-intelligence architecture for intranetwork voice services over networks using a 192.25-MHz translation offset.

A minimum network configuration consists of three 810 stations and a network translator such as the Lantel 192 CRU. Station extension numbers are held in memory.

The Lantel 810 costs $1,080.

Lantel, 3100 Northwoods Place, Norcross, Ga. 30071.

Local-area network software

Think Technologies, Inc. has announced a personal computer version of its **Inbox** pop-up desktop communications applications software as well as a version of Inbox for Apple Computer, Inc.'s Macintosh.

With Inbox, users on a network can create, send and receive memos, messages and files. Inbox supports Apple's Appletalk and by the second quarter, Think said, it will also support IBM's Netbios.

Inbox for the Appletalk micro version allows communications between Macintoshes and IBM Personal Computers. It costs $195 per connection.

Release 2.0 of Inbox for the Macintosh supports Apple's Appleshare and Appletalk File Protocols. It costs $350 for a starter kit and $125 per connection.

Think Technologies, 420 Bedford St., Lexington, Mass. 02173.

Infosphere, Inc. has introduced **Comserve**, a modem server for Apple Computer, Inc.'s Appletalk networks.

Comserve provides terminal communications to Apple Macintosh local-area networks and supports Hayes Microcomputer Products, Inc.-compatible modems at speeds from 300 to 9.6K bit/sec. The software runs concurrently in the background, eliminating the need for dedicated hardware.

Comserve can be installed on Apple's Appleshare file server and is transparent to the leading Mac telecommunications products. It costs $195 per server.

Infosphere, 4730 S.W. Macadam Ave., Portland, Ore. 97201.

Network management

M/A-Com Telecommunications has expanded its X.5 packet-network offering, the Integrated Packet Network (IPN), to include the **Micro NCP** network control processor.

The Micro NCP is said to offer IPN management and control capabilities such as down-line loading of all packet switching exchanges, security checking and call-record storage.

The Micro NCP is available in redundant and nonredundant configurations. It is priced from $70,000.

M/A-Com Telecommunications, 11717 Exploration Lane, Germantown, Md. 20874.

Customer-premise equipment

Lightspeed has announced the **Lightspeed Rapport** system, a viewing station said to allow the telecommunication of design work to remote locations.

The Rapport system transmits full-color images over standard telephone lines. The images, created using either a color pre-press system or the Lightspeed Design System, serve as comps or production proofs. Users can transmit, review, annotate and store up to 40 images.

The Rapport system includes an IBM Personal Computer AT compatible with 1M byte of memory.

The Lightspeed Rapport costs $28,900.

Lightspeed, 47 Farnsworth St., Boston, Mass. 02210.

Links

KMW Systems Corp. has announced the **Auscom 8400 VME Channel Interface.**

The Auscom 8400 is said to transfer data between IBM channels and the VMEbus system memory at transfer rates up to 1M bit/sec. Data-code conversion can be accomplished during data transfers. Software can be ported to run under the operating system currently being run on the system processor board.

An on-board bit-slice microcontroller supervises communications as well as channel activity with the VME system CPU.

The Auscom 8400 costs $3,650.

KMW Systems, 100 Shepherd Mountain Plaza, Austin, Texas 78730.

Alloy Computer Products, Inc. has announced **Mainline**, a communications gateway product.

Mainline is said to provide connectivity to mainframes from terminals and printers in its PC-Plus multiuser, multiprocessor clusters. Mainline allows terminals on the PC-Plus cluster to operate in the IBM 3278 emulation mode.

Continued on page 48

POWER.

comes with a standard 640 K RAM, you can take it all the way up to a head-snapping 16 megabytes.

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EPSON
COMPUTERS

Continued from page 47

The product supports IBM SNA/Synchronous Data Link Control. It costs $2,995.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701.

Protocol converters

Digital Link Corp. has announced the **V.35/RS-449 T1 Converter & CSU Model DL551V.**

The product, which includes an integrated channel service unit (CSU), is said to permit direct connectivity of computers, local-area networks, satellite earth stations and high-speed, computer-aided design and manufacturing workstations to 1.544M bit/sec. T1 networks, such as AT&T's Accunet 1.5 service. The DL551V provides the D4 framing and density required for transmission over public or private T1 networks.

According to the vendor, fault-isolation capabilities provided by the unit include a CSU self-test, data terminal equipment loop-back and in-band network loop-back code detection.

The unit costs $3,995.

Digital Link, 133 Caspian Link Court, Sunnyvale, Calif. 94089.

Electronic mail

Cosy Marketing Group has announced **Cosy/VMS**, a product said to enhance group communications on the Digital Equipment Corp. VAX family of computers.

Features include structures for conferences or topics, conversations and mail; an interface to DEC VMS mail and other mail systems; no need for separate VMS identifications for conferencing users; multilingual prompts and Help-file capability; clerical-level user maintenance functions; conference archival and auto-delete functions; and ISAM file structure for low disk overheads.

According to the vendor, up to 40 connected users can be supported on a DEC Microvax II.

Prices start at $4,000.

Cosy Marketing Group, University of Guelph, Guelph, Ontario, Canada N1G 2W1.

RCA Global Communications, Inc. has announced **Ezaccess**, a software program said to connect a Wang Laboratories, Inc. VS series computer and up to 256 workstations to the RCA Globcom telex, telegram and RCA Mail electronic mail networks.

The software uses the Wang Office feature or a built-in menu to provide store and forward real-time telex sending and receiving capabilities throughout the U.S. and with 230 overseas locations. Ezaccess also provides connection to RCA Globcom's telex network information retrieval service. Incoming messages are delivered to the user's mailbox, and the software automatically handles conversions between the Wang word processing document and RCA telex formats.

A basic system is priced from $2,000.

RCA Global Communications, 201 Centennial Ave., Piscataway, N.J. 08854.

Wizard Computer Products Co. has announced an option to its Wizard Electronic Mail System called **Wizard C&S.**

Wizard C&S is a calendar and scheduling system said to allow users to schedule meetings, appointments and facilities. Features include the ability to display a daily schedule in addition to the details of a meeting and the confirmation status of each individual involved, to schedule meetings for groups and to display a week's schedule at a glance.

Meetings can be scheduled as confidential. Notification of meetings is sent when the meeting is scheduled and 10 minutes prior to the meeting time.

Wizard Mail operates on any IBM mainframe using CICS. It costs $3,000, and the Wizard C&S costs $995.

Wizard Computer Products, P.O. Box 1867, Greenville, S.C. 29602.

Modems/Multiplexers

Network Software Associates, Inc. has introduced **Adaptmodem 9600**, a combination high-speed synchronous modem and Synchronous Data Link Control (SDLC) communications adapter for IBM Personal Computers and compatibles.

The product is said to transmit data at 9.6K bit/sec. It is contained on a personal computer plug-in board and comes with automatic dialing control software.

The modem supports both dial-up and leased-line transmissions. The SDLC portion of the board includes all the necessary circuitry to interface to an SDLC communications link.

The Adaptmodem 9600 is priced at $1,795.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653.

Raycom Systems, Inc. has announced three synchronous **I/O modules** for its 5100-series fiber-optic multiplexer.

The V.35 Synchronous I/O module has a V.35 interface, and the RS-422 Synchronous I/O module has an RS-422 interface. Each handles eight channels and is available with either internal or external clock at speeds from 2.4K to 64K bit/sec. Three control lines are available in each direction for each channel. They operate at 1.2K bit/sec.

The third module has 16 channels and an RS-232 interface.

The V.35 I/O module costs $2,100; the RS-422 and RS-232 I/O modules each cost $1,500.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301.

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Racal-Milgo has introduced the **Omnimux Net-1**, a networking time-division multiplexer with built-in network-management control capabilities.

The Omnimux Net-1 is said to support up to eight 1.544M bit/sec. aggregates, up to 255 interconnected nodes and up to 244 channels. The multiplexer also supports synchronous channels up to 1.008M bit/sec., asynchronous channels up to 19.2K bit/sec. and voice up to 64K bit/sec. Networks can be configured in point-to-point, star, ring or multilayer topology.

Software-controlled features include automatic alternate routing, aggregate bypassing, drop and insert and local-channel switching.

The Omnimux Net-1 is priced from $20,000.

Racal-Milgo, 1601 N. Harrison Pkwy., Sunrise, Fla. 33323.

Codex Corp. has announced the **2630 Dual Multipoint Data Modem** said to allow two independent multipoint applications to share a single 3002 unconditioned multipoint leased line.

According to the vendor, Frequency Division Multiplexed inbound channels allow the two different multipoint drops to communicate at the same time, with one channel capable of speeds up to 4.8K bit/sec. and the other capable of speeds up to 2,400 bit/sec.

Dual integral modem-sharing units are standard in the four- and six-port models of the 2630 and permit up to three devices to share either channel of a multipoint drop. All Codex 2630s have a built-in, asynchronous-to-synchronous converter.

Prices start at $4,200.

Codex, 20 Cabot Blvd., Mansfield, Mass. 02048.

Digilog, Inc. has announced a built-in **300/1200 bit/sec. asynchronous modem** for its Digilog 300, 400, 600 and 800 protocol analyzers.

The Hayes Microcomputer Products, Inc.-compatible modem is said to feature autodial and autoanswer capabilities.

The modem is priced at $650. Current owners of the Digilog protocol analyzers can upgrade for $750, according to the vendor.

Digilog, 1370 Welsh Road, Montgomeryville, Pa. 18936.

Diagnostic equipment

Systems Strategies, Inc. has announced **Test APPC** software, said to provide a standardized set of tests for evaluating the functionality of Advanced Program-to-Program Communications (APPC) on IBM systems or compatibles.

Test APPC is composed of three packages: TestLU6.2, EXLU6.2/CICS and EXLU6.2/S36.

They can be used independently or in combination to test and exercise LU6.2 and LU2.1. The software is said to have the ability to provide sample LU6.2 transaction programs.

It can also be used to create LU6.2 training packages, demonstrate LU6.2 functionality and troubleshoot customer problems.

TestLU6.2 costs $10,000 or can be rented for $1,100 per month. EXLU6.2/S36 and EXLU6.2/CICS cost $15,000 each or $2,250 per month.

Systems Strategies, 225 W. 34th St., New York, N.Y. 10001.

Renex Corp. has enhanced its **Datahawk** data line monitor to support seven color monitors for IBM Personal Computers and compatibles.

Datahawk is an add-on package for personal computers that allows users to perform testing and problem determination on dedicated or dial-up lines.

Datahawk also now gives users the ability to monitor and test data transmitted using the Baudot code, according to the vendor.

Datahawk is priced at $1,175. It requires 128K bytes of memory, one double-sided disk drive, an IBM monochrome or color display and Microsoft Corp. MS-DOS Version 2.0 or higher.

Renex, 1513 Davis Ford Road, Woodbridge, Va. 22192.

International Data Sciences, Inc. has enhanced its **Model 66 Green Box** high-speed error-rate test set to include the ability to communicate over DS1-level data links with D4 or extended superframe formats for T1 testing capability.

The Model 66 Green Box is a portable multipurpose bit-error test set. It performs tests such as bit-error rate, block-error rate, errored-seconds and counting synchronous losses.

Other features of the Green Box include the ability to generate, transmit, receive, analyze and display either of two pseudo-random test patterns.

The Model 66 Green Box tester is priced from $1,990.

International Data Sciences, 7 Wellington Road, Lincoln, R.I. 02865.

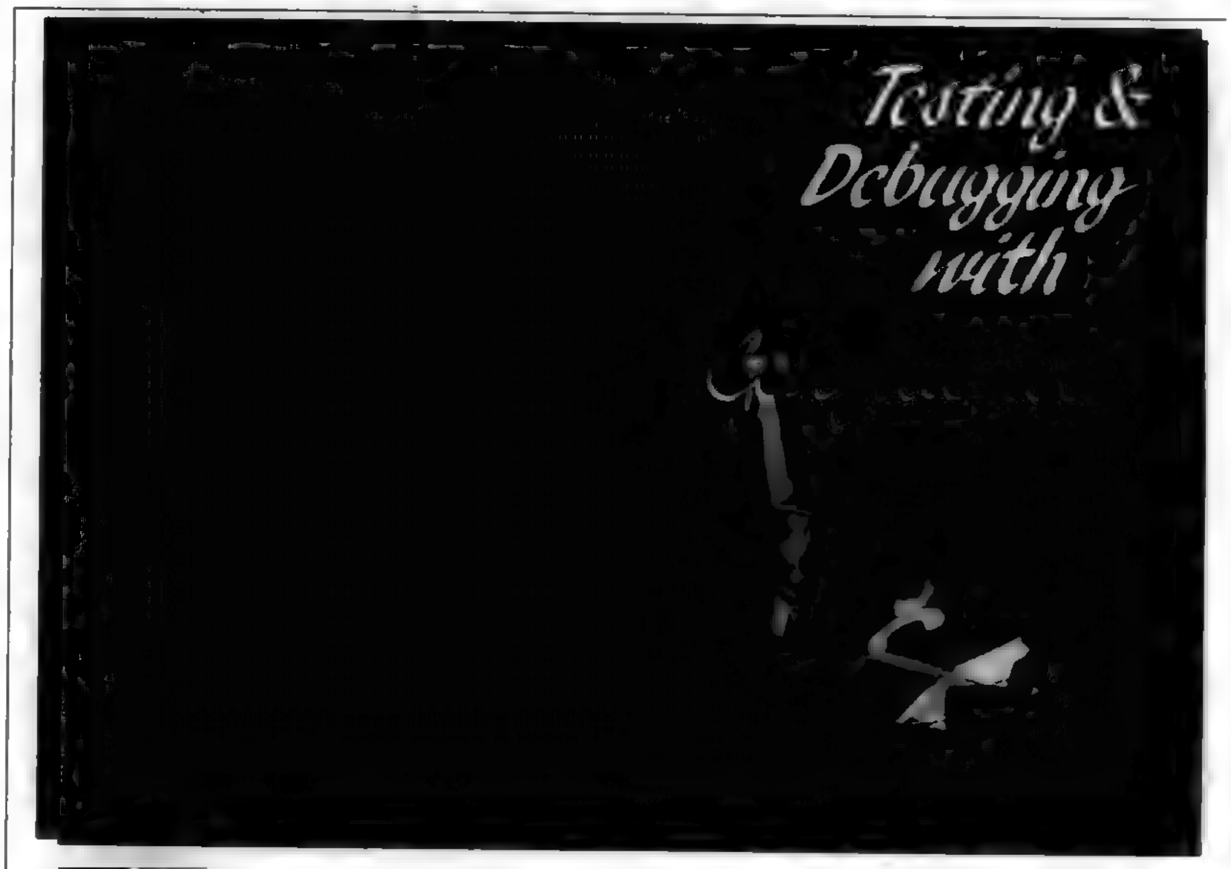
Cabling

Architecture Technology Corp. has announced the **Token-Ring Cabling System Planner**.

The Cabling System Planner was designed to assist with the planning and administration of an IBM cabling system. It allows users to layout, in grid fashion, various cabling system components and define the cable necessary to implement an IBM Token-Ring local-area network. The Planner can be used to change the layout.

Prices range from $99 for a small model to $495 for a large model or local-area network.

Architecture Technology, P.O. Box 24344, Minneapolis, Minn. 55424.



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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

Early death at DEC

The absence of a couple of product names in Digital Equipment Corp.'s announcements two weeks ago hammered home the dangers involved in short product cycles.

There was no voluntary mention of the VAX 8600 or VAX 8650 in DEC's presentations and product literature. The systems that not so long ago were billed as the stars of DEC's lineup were not even shown on a DEC chart ranking the VAX line by relative performance. At least the 1-year-old VAX 8200, VAX 8300 and VAX 8500 were mentioned as being replaced.

Not until someone asked what had become of the 8600 and 8650 did DEC officials acknowledge they aren't promoting those products because the newer models offer better price/performance ratios.

That makes sense for DEC because the new VAX 8530 and 6-month-old VAX 8550 do appear to offer comparable performance for better prices than the 8600 and 8650, while also of-

Continued on page 54

Wang replaces 2200 MVP

BY NINAMARY BUBA MAGINNIS
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. recently introduced the Wang CS small-business computer system, which replaces the 2200 MVP and MicroVP systems.

Current 2200 users can purchase a CS CPU to upgrade, but there is no trade-in allowance offered for old hardware, the vendor said.

Applications written for MVP and MicroVP systems can run unchanged on the CS and perform an average of 7% faster than non-very large-scale integration (VLSI) CPUs, Wang said.

Users' existing MVP and MicroVP peripherals, option boards and communication controllers will also reportedly operate with the new hardware.

The CS, based on VLSI technology, employs Release 3.0 of Wang's BASIC-2 multiuser operating system. Under the new release, BASIC-2 will support a maximum of 16 users per CPU, an increase of three over the old version. Release 3.0 has 22 enhancements, including Ramdisk, which allows CPU user memory to work as a high-speed disk.

Cache memory, located in the data storage cabinet, can also be used as a high-speed Ramdisk. For disk-intensive routines, both cache memory and Ramdisk can increase throughput by as much as 70% over the older systems'. The latest version of BASIC-2 can also run on any multiuser Wang 2200 system with 28K bytes of control memory.

The CS data storage cabinet can house either a 320K- or 1.2M-byte diskette, a 10M-byte removable Winchester disk drive, a 45M-byte streaming tape cartridge and combinations of 20M-, 32M- and 64M-byte fixed Winchester drives.

The cabinet can accommodate up to 192M bytes of disk storage. As many as 16 CS CPUs can reportedly share a disk system with the new multiplexer and multiplexer extenders.

A single printed-circuit board makes up the CS CPU. The processor includes 32K bytes of control memory and nine I/O slots.

The CS CPU is offered in two versions, the CS-2 and the CS-5. The CS-2 with 128K bytes of memory costs $4,950, and the CS-5 with 512K bytes of memory costs $6,400. The systems are also offered in four packaged configurations.

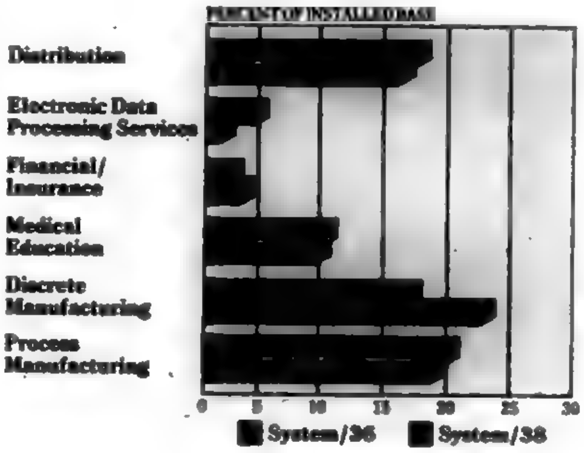
Prices for packaged configurations start at $6,950 for a CS-2 CPU with 128K bytes of user memory, a 22C11 dual controller, a 2236MXE terminal processor and a data storage cabinet with a 1.2M-byte diskette drive. Cost savings for CS packages can be as high as 28% for hardware

Continued on page 52

Data View

Industry breakdown

IBM System/36 and 38 show slight difference in target markets



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Builders will test engine

BY JAMES CONNOLLY
CW STAFF

NASHUA, N.H. — A start-up company that introduced a graphics workstation for the publishing industry last year announced last week that the workstation engine will be offered to systems builders in markets such as computer-aided design, manufacturing, the military, process control, finance, publishing and education.

Bettex, Inc. said it has concluded no sales for its Bettex 3000 Superstation, but that systems will be delivered to five beta-test sites this month.

The Bettex 3000 employs a combination of symbolic processing and parallel processing to achieve performance rates between 10 millions of instructions per second (MIPS) and 40 MIPS, Bettex officials claimed. The company also reported the system handles screen filling at more than 1 million pixel/sec., vector-to-raster-vector conver-

Continued on page 52

Inside

- Nixdorf unwraps new products at Cebit. Page 52.
- Output Technology offers networking printer. Page 54.
- Pixar ties computer to Silicon Graphics and DEC systems. Page 54.

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Nixdorf unwraps gifts to mid-range systems

BY AMIEL KORNEL
SPECIAL TO CW

HANNOVER, West Germany — Nixdorf Computer AG has announced multiprocessor versions of its 8860 and 8870 families of mid-range systems and an IBM Personal Computer AT-type small system.

The recently launched 8870 Quatro processor, running on the firm's proprietary Niros operating system, can be hooked up in parallel using an intelligent-disk controller and 2M bytes of cache memory, Nixdorf said.

Nixdorf also said users can now cluster up to eight 8860 processors, linking up to 100 terminals. Nixdorf developed a fast bus and modified the system's Didos operating system to permit data processing departments to develop transaction-oriented applications.

The firm also unwrapped the PC8810 M55 personal computer, an Intel Corp. 80286-based PC AT compatible. Priced at about $8,000 and ready for delivery, Model 55 includes an emergency power supply and remote-switching capability.

According to Rolf Kriescher, director of product marketing for small business systems, Model 55 includes a board from Japan's Matsushita Electric Industrial Co. similar to the one used in NCR Corp.'s PC8. It can be used as a stand-alone personal computer or as a multistation system. It runs Microsoft Corp.'s MS-DOS 3.2 and Unix.

The machine can run in terminal emulation mode while connected to hosts from such suppliers as Digital Equipment Corp., IBM and Siemens AG. The PC is also being positioned as an intelligent workstation with the firm's 8870 Quatro line.

Vice-chairman Arno Bohn said Nixdorf will be looking to increase its presence in the U.S., which currently accounts for 5% to 6% of its sales.

Efforts to win contracts in the retail sector will continue, he said, hinting that discussions are under way with Sears, Roebuck and Co.

He added that Nixdorf is creating a U.S. division for its banking products and has installed 18 pilot installations of its Unix-based Targon systems.

Kornel is a correspondent for CW Communications International News Service's European bureau.

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Builders

FROM PAGE 51

sion at more than 100,000 vector/sec. and hyphenation and justification at more than 75,000 char./sec.

The system is currently designed to operate with Microsoft Corp. MS-DOS-based front-end systems but can be adapted by Bettex to utilize other front ends, the vendor said.

The product's three primary processors include a symbolic processor and a general arithmetic processor based on Texas Instruments, Inc.'s technology and a proprietary pixel output processor. The processors operate in a parallel manner. A basic system costs $50,000.

Wang

FROM PAGE 51

and 24% for monthly maintenance compared with MicroVP package prices, Wang officials claimed.

The 2275MUX multiplexer allows any combination of two, three or four 2200, MicroVP or CS CPUs to share a single data storage cabinet. Users can add extenders to connect up to four CPUs each. In a multiplexed configuration, up to 16 CPUs can share as many as three data storage cabinets. The CS-2 and CS-5 are scheduled to ship in June.

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Sharon B. Weinberg, President of Codd & Date Consulting Group and a former relational database consultant with IBM® responsible for releases of DB2, will review Dr. Codd's point-by-point comparison of SUPRA Release 1.3 and Release 2 of DB2. She'll demonstrate why Dr. Codd concluded that SUPRA adheres to 10 of his 12 basic rules for the relational model, versus DB2's 7 of 12, and explain why he stated, "SUPRA's rating is the highest achieved of all those I have reviewed to date."

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Pixar ties system to Microvax

SAN RAFAEL, Calif. — Pixar has introduced interfaces to tie its Pixar Image Computer to Silicon Graphics, Inc.'s 3100 series and the Digital Equipment Corp. Microvax II.

Pixar had earlier been available as an add-on for Sun Microsystems, Inc.'s Sun-3 and Symbolics, Inc.'s 3600 family of systems. The Microvax II interface is intended to provide DEC Ultrix users with advanced image processing and computer graphics in a single system.

Pixar also announced a C compiler that allows standard C programs to run on the image computer. The compiler will be included in Pixar's Chaptools, which provides software development tools as well as the source code for the system's run-time environment, Chaplibraries. Chaptools costs $10,000.

Pixar also announced Chapreyes, a software package designed to render images of three-dimensional objects and scenes in a fraction of the time that a similar operation would take on a general-purpose computer.

The vendor said the host interfaces will be available during the second quarter. The Pixar Image Computer costs $79,000.

Networking printer out

SPOKANE, Wash. — Output Technology Corp. has announced a dot matrix printer designed with built-in networking capabilities including a network communication controller and memory storage unit.

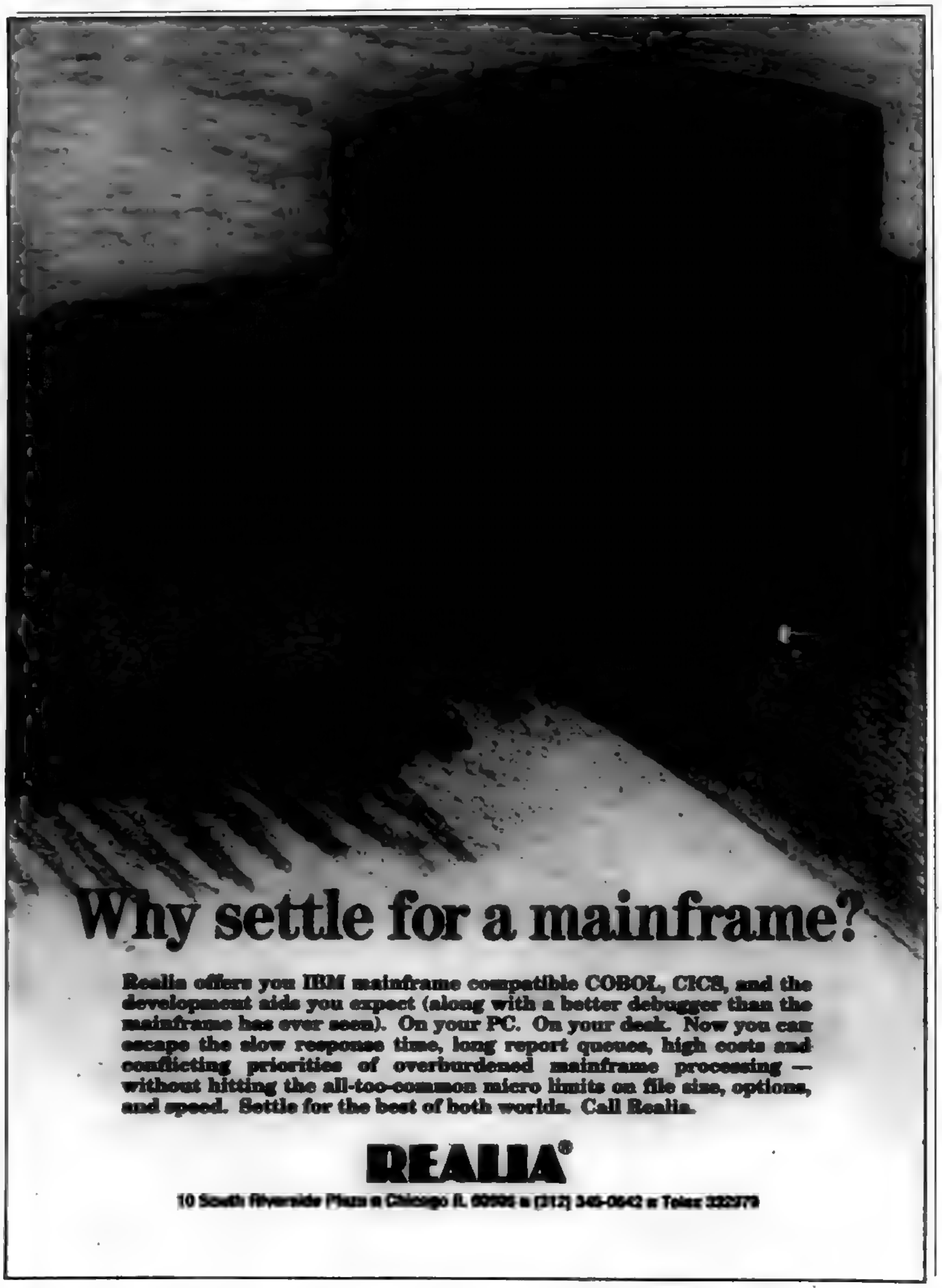
The Trimatrix 850 Printnet is one of a series of 850 char./sec. printers recently introduced by Output Technology. According to the vendor, users can connect any device capable of serial communication, including computers, printers and modems, to the Trimatrix 850 Printnet.

"Many people find local-area networks too expensive and more complex than they need. [The 850 Printnet] allows resource sharing to be done simply, without a lot of fuss and expense," said Roy Messena, director of marketing for Output Technology.

The network printer costs $2,995.

Output Technology also announced the 888XL for use with IBM System/34, 36 and 38 minicomputers, the 889XL for use in IBM 3270 environments and the 850XL serial dot matrix printer, which can be used for 80-col. or 136-col. printing.

The 888XL costs $3,795, the 889XL costs $3,995, and the 850XL is priced at $2,395.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Early death

CONTINUED FROM PAGE 51

fering the DEC Vaxbi capabilities that the Unibus-based 8600 and 8650 are lacking.

But what makes sense for DEC may not be fair to its customers, particularly the more than 2,000 owners of 8600s and 8650s. At least the 8200, 8300 and 8500 customers, who saw their systems made obsolete a year after they were announced, know DEC might offer an upgrade package to help them move to the replacement models. The people who jumped at the chance to buy 8600s and 8650s in 1985 may be at a dead end less than three months into 1987.

DEC's replacement of its product line every year with little capability should not only concern users but should also bother DEC. The strategy dents DEC's promise of letting customers grow with a single hardware and software platform.

The 8600 was announced in late 1984, delivered in early 1985 and effectively replaced by the 8650 in late 1985. Now both the 8600 and 8650 have quietly slipped into oblivion. That would be shocking if DEC was operating by the computer industry's old standard of three- to five-year product cycles. Under that standard, the 8600 and 8650 would still be adolescents.

The result of the one-year turnover strategy is that those who spend $400,000 for a system get stuck with no way to grow with that system — unless they want to follow DEC's advice and write hefty checks to add more CPUs and clustering tools — and minimal opportunity to recover their investments on the used market.

Some of DEC's biggest customers have said they aren't upset with the company's strategy. They have been kept informed of DEC's plans since before the 8600 was announced, and they have space in their computer rooms and their budgets for the Unibus systems. But the users who have to watch their backs are in the small and medium-size companies and don't have the big user's flexibility.

If the DEC strategy sounds familiar, it's because it should. DEC is adopting the tactics of a well-known computer company that happens to be DEC's favorite target these days. Each day, DEC is acting more and more like IBM in how it treats its customers and how it deals with third-party competitors.

Connolly is *Computerworld*'s senior editor, systems & peripherals.

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NEW PRODUCTS

Printers/Plotters

Output Technology Corp. has announced the **Trimatrix 850XL** serial dot matrix printer.

The printer is said to provide a burst speed of 850 char./sec. and a throughput of 240 line/min. The Trimatrix 850XL is suitable for 80-col applications but, according to the vendor, was designed for 136-col printing. It is capable of handling up to six-part forms.

Features include front-panel menu programming, multipitch printing, front and bottom paper feeds, an 8K-byte data buffer, serial and parallel ports and Epson America, Inc. and Digital Equipment Corp. emulations.

The Trimatrix 850XL costs $2,395.

Output Technology, Suite #6, E. 9922 Montgomery, Spokane, Wash. 99206.

Ithaca Peripherals, Inc. has announced the **Pcos Series 50** of compact stand-alone 40-col dot matrix printers for point-of-sale applications.

Three models make up the series: the Model 51 Receipt Printer, the Model 52 Journal/Receipt Printer and the Model 53 Enhanced Journal/Receipt Printer. The printers utilize bidirectional, short line-seeking logic. According to the vendor, print speed can be greater than 340 line/min.

Other features include a standard Centronics Data Computer Corp. parallel port with an optional RS-232 port to 19.2K bit/sec. with a 2K-byte buffer.

The basic parallel receipt printer is priced at $699.

Ithaca Peripherals, 147 Main St., Groton, N.Y. 13073.

Burr-Brown Corp. has announced the **TM3100 Thermal Bar Code Printer** and the **TM3200 Dot Matrix Bar Code Printer.**

The TM3100 is a demand-label printer capable of printing labels up to 2.2-in. wide at 1-in. per second. Maximum dot density is 101 dot/in. Four expandable font styles are available.

The TM3200 is a tractor-feed printer said to print 22 different bar code symbologies with 120 dot/in. horizontal resolution and 72 dot/in. vertical resolution. Characters are in a 9-by-7 matrix and print speed is 150 char./sec.

The TM3100 costs $2,595 and the TM3200 costs $4,495.

Burr-Brown, P.O. Box 11400, Tucson, Ariz. 85734.

Power supplies

Lowell Corp. has introduced the **Micropower II** computer power distribution center for mini and microcomputer systems, networks and word processors.

The single-phase line conditioner is said to exact the electrical standards for the systems. It prevents sags, surges, transients and outages from damaging hardware that cause data loss.

The system provides 3- to 10-kVA output ratings and plugs into any 240V outlet.

The Micropower II computer power-distribution center is priced from $2,000 depending on output options.

Lowell, P.O. Box 158, 97 Temple St., Worcester, Mass. 01613.

NCR Power Systems has announced a four output **switching-power supply unit** rated at 500W total power.

The unit is said to utilize metal oxide semiconductor field-effect transistor technology for lightweight, cool operation. Auxiliary outputs are controlled by a magnetic switch technology. Standard features include 50-KHz switching speed, 40 msec average hold-up time, overvoltage protection and overcurrent protection.

NCR Power Systems also offers the 500W power system in semicustom configuration with individual output characteristics tailored to the needs of specific applications, the vendor said.

Price for the standard unit is $824.

NCR, 3200 Lake Emma Road, Lake Mary, Fla. 32746.

Dranetz Technologies, Inc. has announced its **Series 656 Disturbance Waveform Analyzer.**

The AC-power waveform analyzer is said to be capable of monitoring and analyzing power-line disturbances for up to a month, storing the data in nonvolatile memory and displaying it on a built-in CRT.

Features include on-line Help routines, a touch-screen interface and a zoom capability, allowing details of waveforms to be closely examined. Hard copy printouts can be made via a built-in printer.

The Series 656 Disturbance Waveform Analyzer is priced at $9,750.

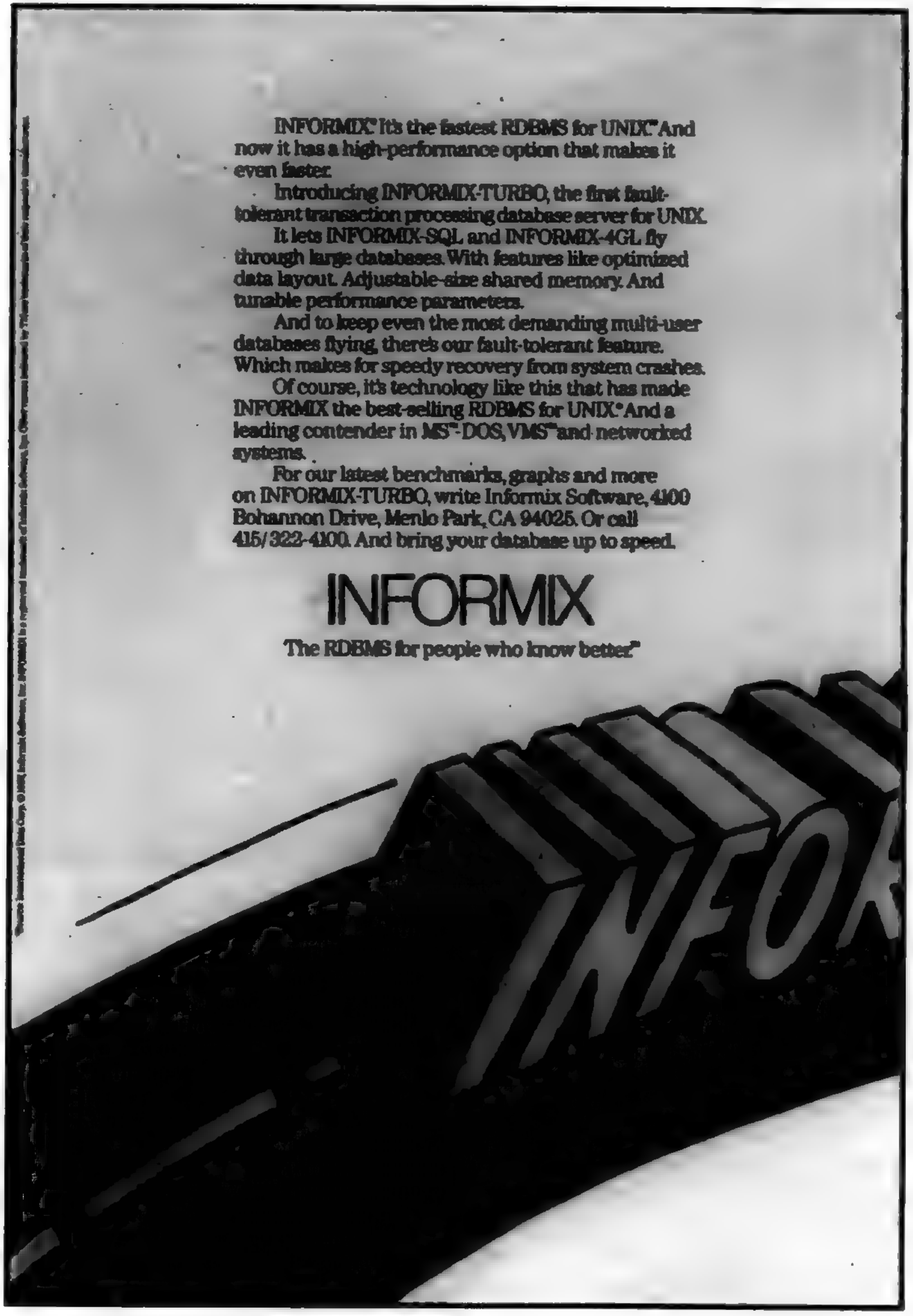
Dranetz Technologies, P.O. Box 4019, Edison, N.J. 08818.

Triad Power Systems has introduced the **MP-1** and the **MP-2** on-line uninterruptible power supplies for microcomputers, common peripherals and other power-sensitive equipment.

The MP-1 is rated at 200W and the MP-2 is rated at 400W continuous output. Ride-through time is 12 min at full-rated load and about 30 min at half load. Features include an audible alarm.

The MP-1 is priced at $795 and the MP-2 costs $995.

Triad Power Systems, 10362 Miller Road, Dallas, Texas 75238.



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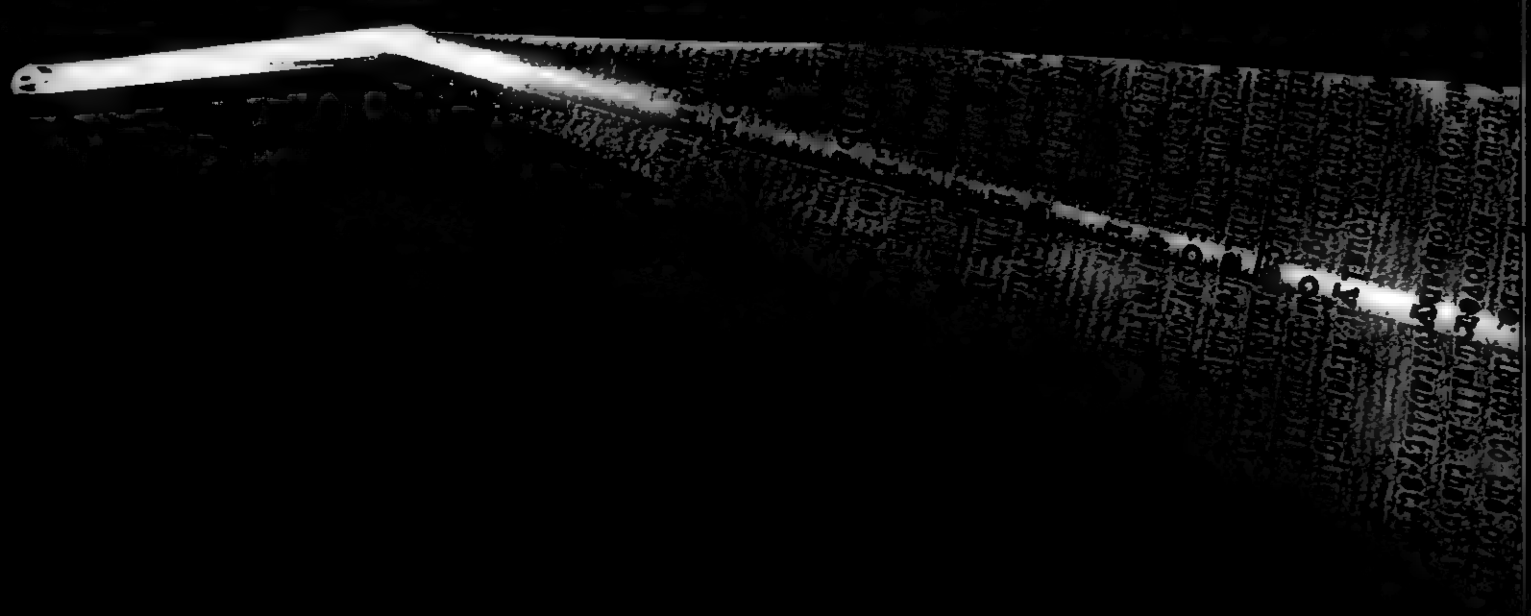

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It's our fastest
printer yet.
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Actual print sample from the Pinwriter P9XL printer.

It cruises at 400 characters per second in draft mode, 140 characters per second in letter quality mode.

Which means it can really make those business letters fly. In fact, no other 24-pin printer is faster.

And because it uses a 24-pin printhead and a multistrike film ribbon—the same kind that's used in typewriters and letter-quality printers—the P9XL also delivers better print quality than its competitors. It even prints in color.

But it's not limited to letters. The Pinwriter P9XL is a true multi-purpose printer that can fly through payroll, invoices, continuous forms, multipart forms—just about any business or office application.

Best of all, it's from NEC—the world's largest

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PINWRITER P9XL.
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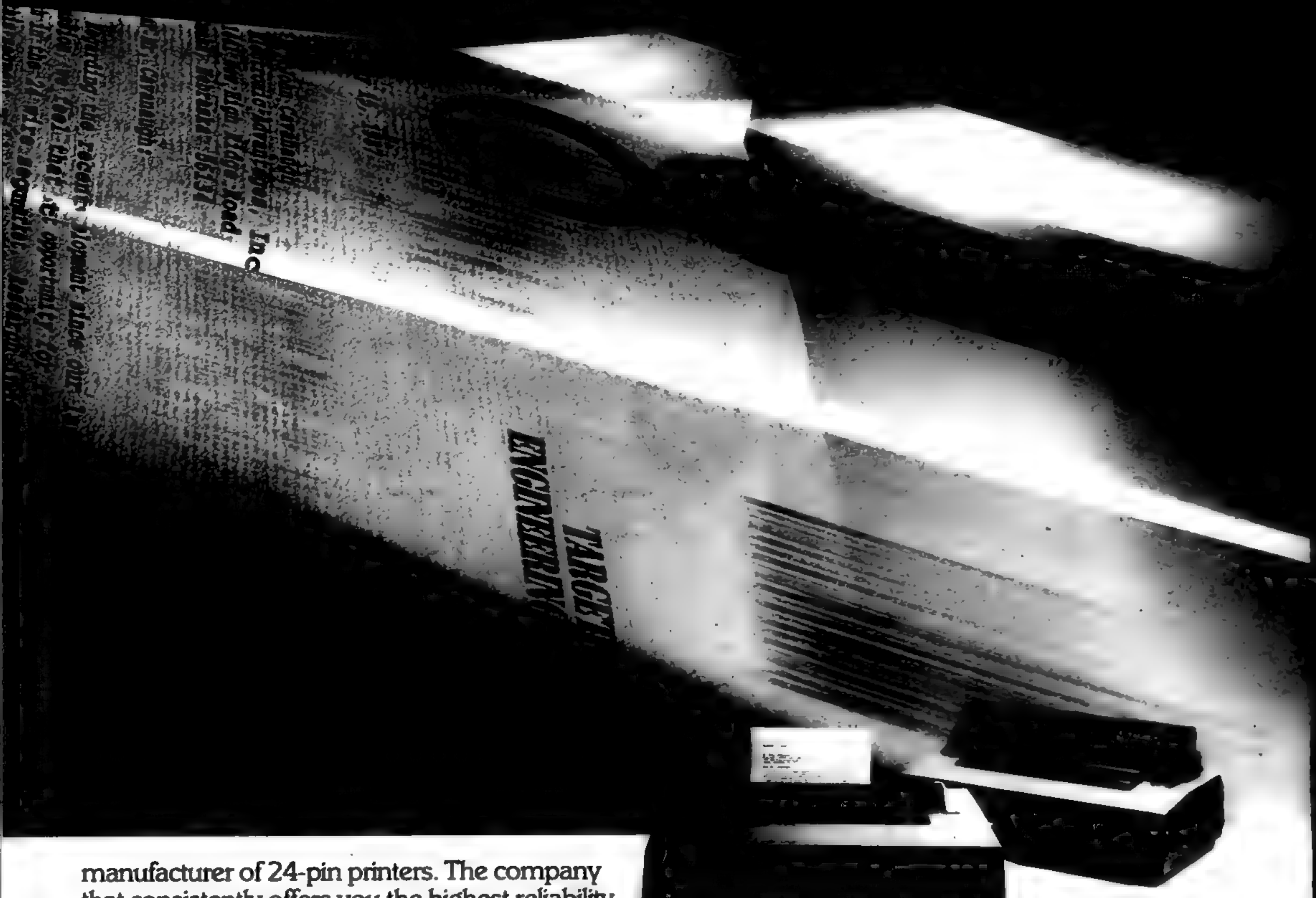


manufacturer of 24-pin printers. The company that consistently offers you the highest reliability ratings in the industry. (You can expect your P9XL to run for five years before it might need a repair.)

So don't waste any more time. Fly down to your nearest dealer and ask to see the new Pinwriter P9XL. Or call NEC at 1-800-343-4418 (in MA, (617) 264-8635). Or if you prefer, write to NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

NEC PRINTERS. THEY ONLY STOP WHEN YOU WANT THEM TO.

NEC

Auxiliary equipment

Electro Standards Laboratory, Inc. has introduced its **Models 303 and 308 Sure-Guard** surge protection devices.

The devices were designed to protect terminals and computers by suppressing large voltage transients that may damage RS-232 ports.

The Sure-Guard installs between the data cable and the equipment connector to suppress the voltage transients. The Model 303 protects transmit data, receive data and signal ground inputs. The Model 308 protects five handshake control signals in addition to transmit data, receive data and signal ground inputs.

The Model 303 costs $34. The Model 308 costs $44.

Electro Standards Laboratory, P.O. Box 9144, Providence, R.I. 02940.

Input devices

Barcode Industries, Inc. has added a series of bar code readers to its **Mindreader** line.

The bar code readers are said to support the IBM 3179, 3180, 3191, 3196 and 5291 terminals as well as the Digital Equipment Corp. VT220 and VT240, the Unisys Corp. UTS-30, the AT&T PC 6300 and Unix PC 7300, the Zenith Data Systems Corp. 148, 150, 151 and 241 and the Wyse Technology 50 machines.

The readers connect to the terminals as wedges between keyboard and screen.

Signals from the bar-code reader emulate input from the keyboard.

Input devices supported include pens, laser scanners and magnetic stripe or bar-code badge readers.

The Mindreader line ranges in price from $595, including light pen, to $2,090, including hand-held laser scanner.

Barcode Industries, 17 Barstow Road, Great Neck, N.Y. 11021.

Seiko Instruments U.S.A., Inc. has announced its **Screenplay** tablets, a family of eight digitizing tablets and tables.

The Screenplay tables are desktop units that function as data input devices attached to personal computers or terminals. The Screenplay tabletop or floor-mounted digitizing tables communicate directly with a mainframe computer.

The tablets range in size from 8 in. by 12 in. to 18 in. by 25 in. The tables range in size from 17 in. by 24 in. to 42 in. by 60 in. Prices range from $495 to $1,895 for the tablets and from $3,495 to $5,888 for the tables.

Seiko, 1130 Ringwood Court, San Jose, Calif. 95131.

Maintenance equipment

Gen/Comp, Inc. has introduced its **Model 2042 DMA Interface** for the Unibus.

The interface and interprocessor link is said to emulate the Digital Equipment Corp. DR11-W, DR11-B or DA11-B. It features hardware parity generation and checking of transferred data to assure data transfer integrity. Switch-selectable direct memory addressing (DMA) pacing and one- to 16-cycle burst lengths are possible.

The Gen/Comp Model 2042 DMA Interface is priced at $1,000. An optional on-board opto-isolator for long-line data transmission costs an additional $500.

Gen/Comp, Six Algonquin Road, Canton, Mass. 02021.

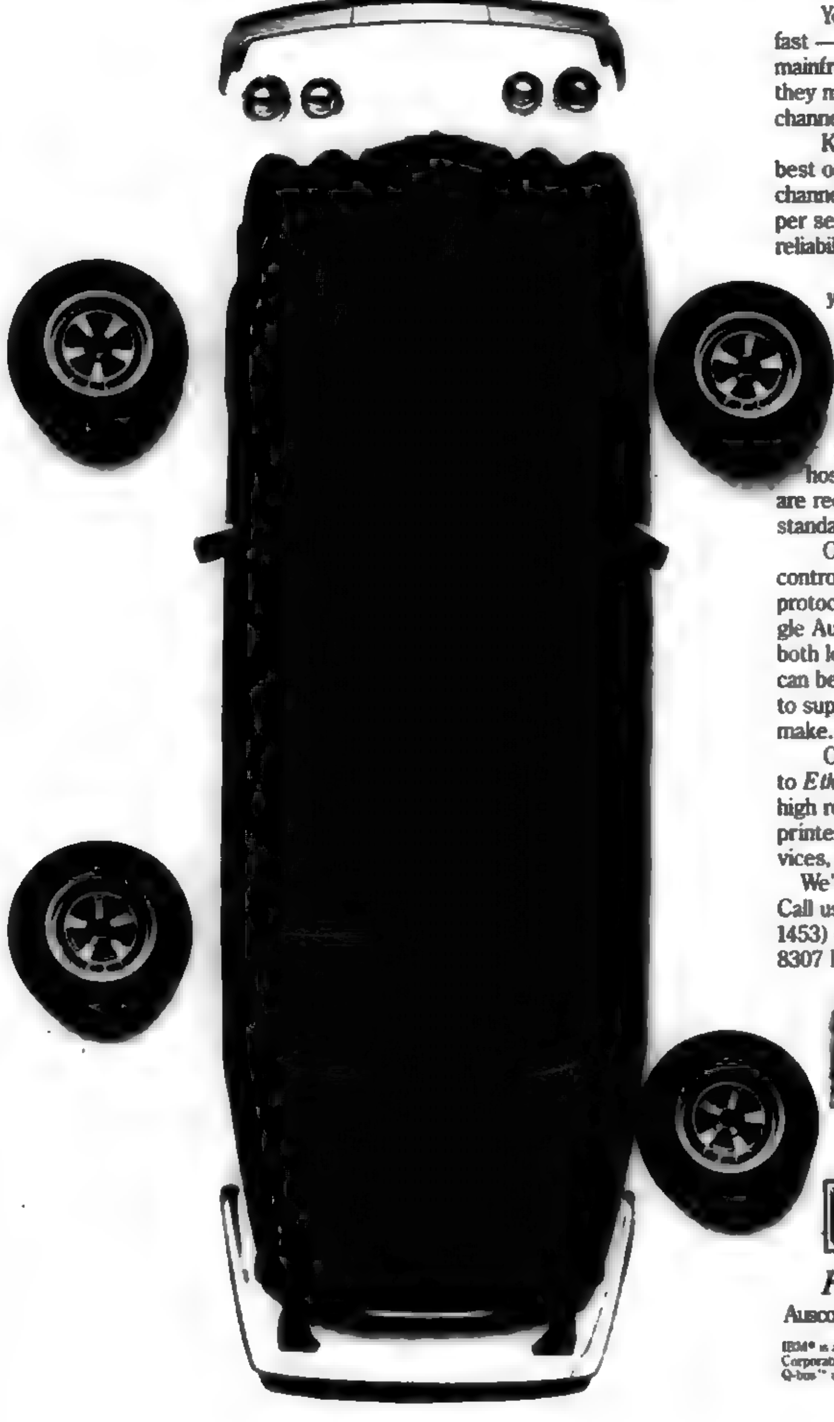
Applied Memory Technology has introduced its **DX525AT/P** portable Winchester disk drive test system.

The system was designed to execute a linked sequence of performance tests on either enhanced small device interface or ST506 interface Winchester disk drives. Features include a 40-col thermal printer and built-in drive power supplies.

Both automatic and engineering modes of operation are offered. Tests included in automatic mode are interface status, disk format and media verify.

Single unit pricing for the DX525AT/P is $6,800.

Applied Memory Technology, Unit E, 2822 Walnut Ave., Tustin, Calif. 92680.



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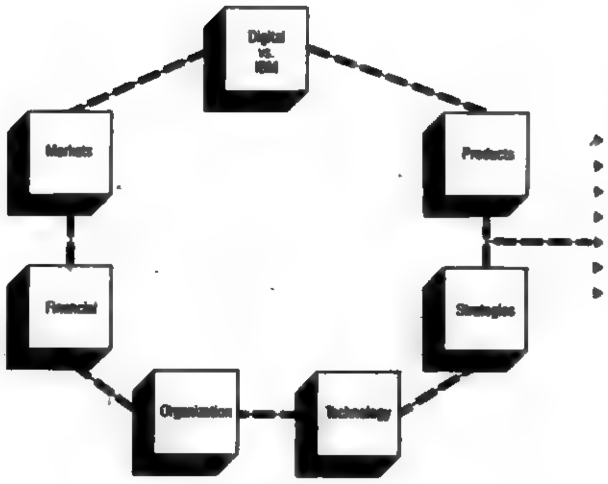
The Digital Challenge



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DEC's Network-Based Strategy
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DEC: Leasing Opportunity and Perspective
Dave Harmon, President, El Camino Resources Ltd.

Day 2

Digital and Technology
Will Zachman, Corp. V.P., IDC

Digital: The Prognosis
John Levinson, V.P., Goldman Sachs & Company

IBM vs. DEC Frank Gens, V.P., IDC

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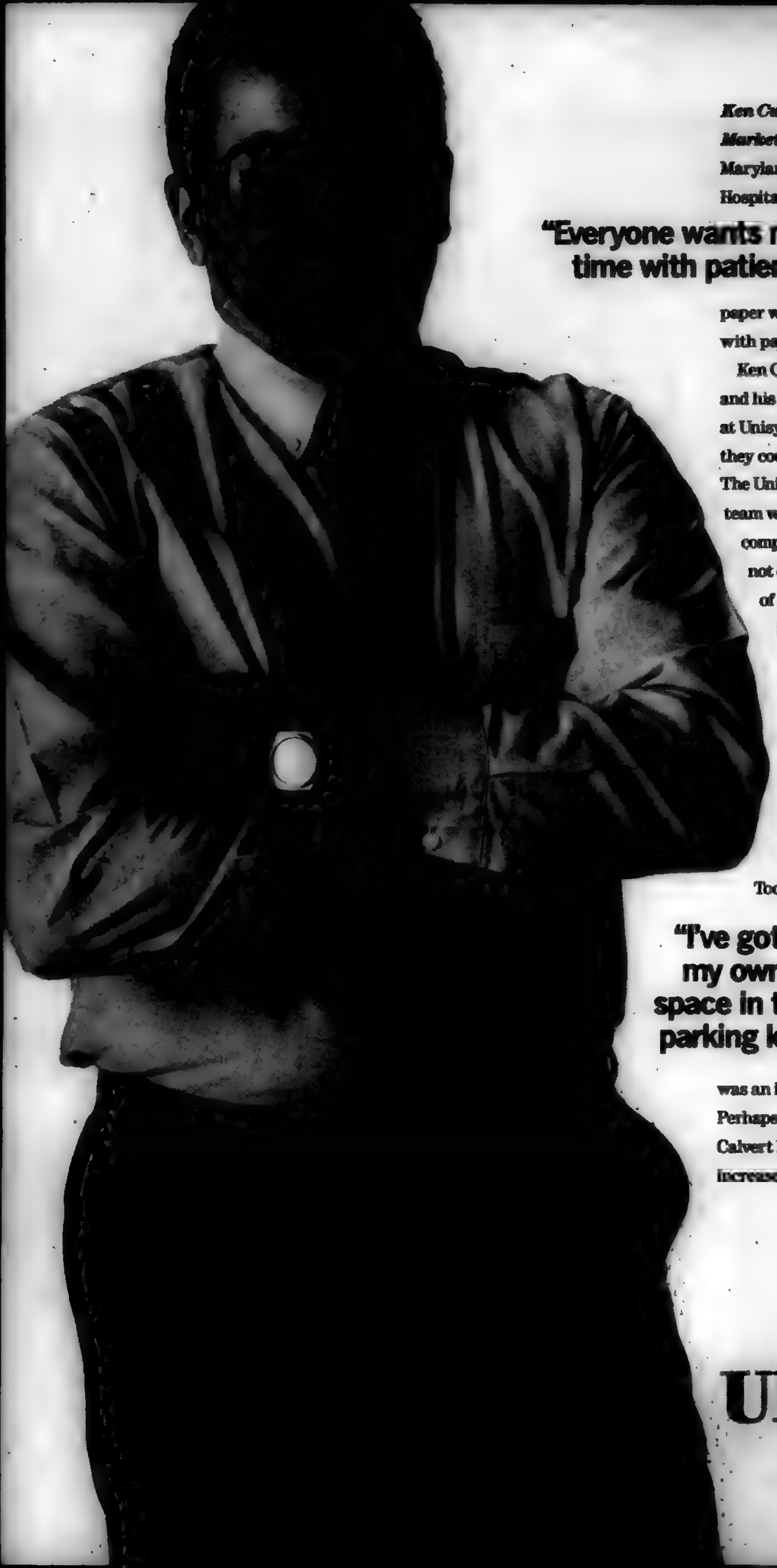

Ken Cunzeman,
Marketing Manager, Unisys.

Maryland's Calvert Memorial Hospital wanted the same things all hospitals want today. Less time spent on paper work and more time spent with patients.

"Everyone wants more time with patients."

"We recommended a system that gave them more time, and less paperwork."

Ken Cunzeman and his crew at Unisys thought they could help. The Unisys team was composed not only of computer experts; it included nurses and hospital managers as well. Together with Calvert, they implemented a system that took away mundane chores and replaced them with the most precious commodity of all—time. Today, a nurse can order a lab test, inform other departments, and make sure charges are recorded automatically. Needless to say, there was an increase in productivity. Perhaps more importantly for Calvert Memorial, there was an increase in smiles.

"I've got my own space in the parking lot."

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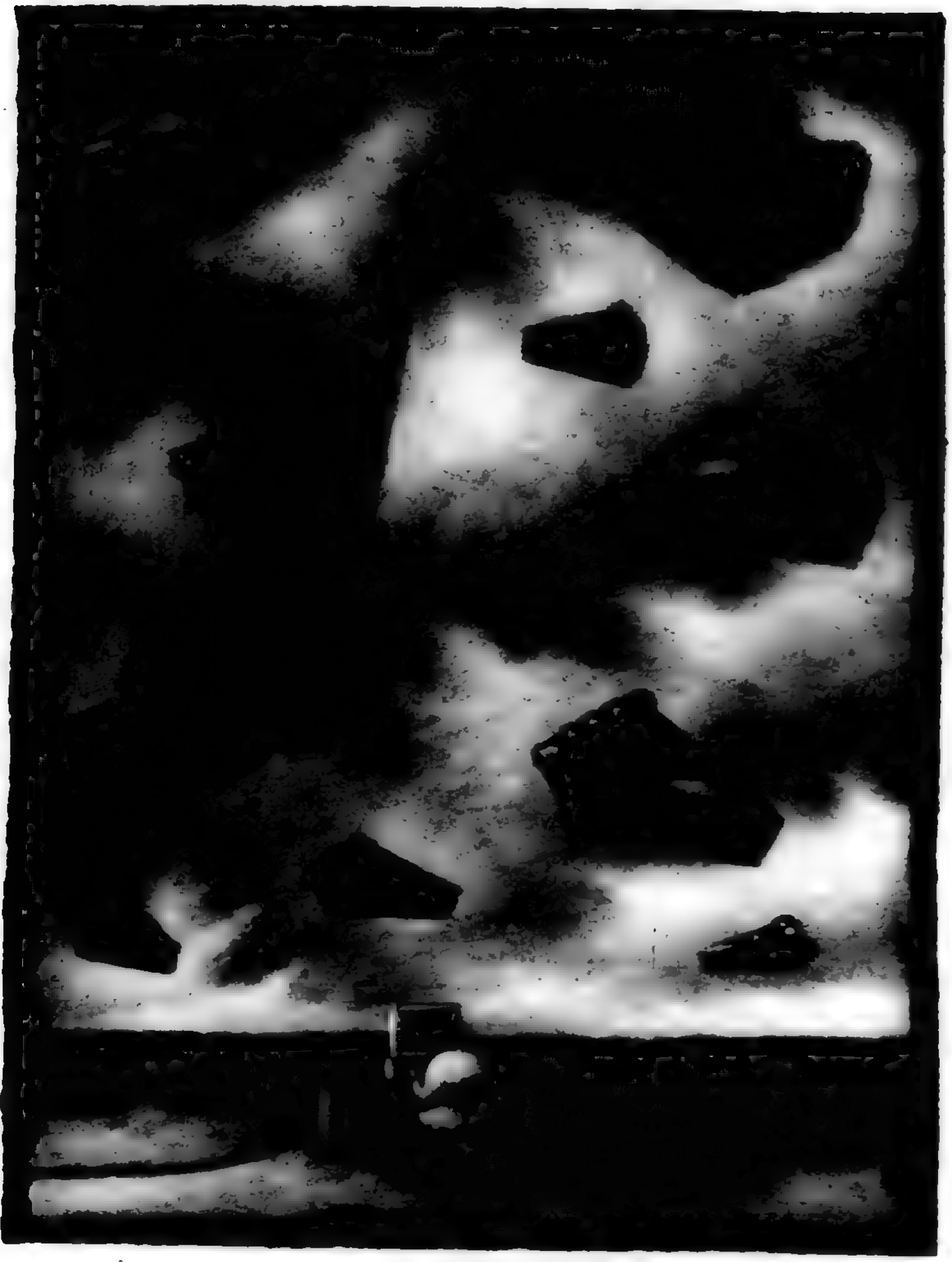

Graphics software has become much more business compatible. Now managers have to learn how to use these tools to the best advantage.

FEATURING DIAL-INQ Reader response service SEE INSIDE BACK COVER

MARCH 16, 1987 • SPOTLIGHT NO. 4

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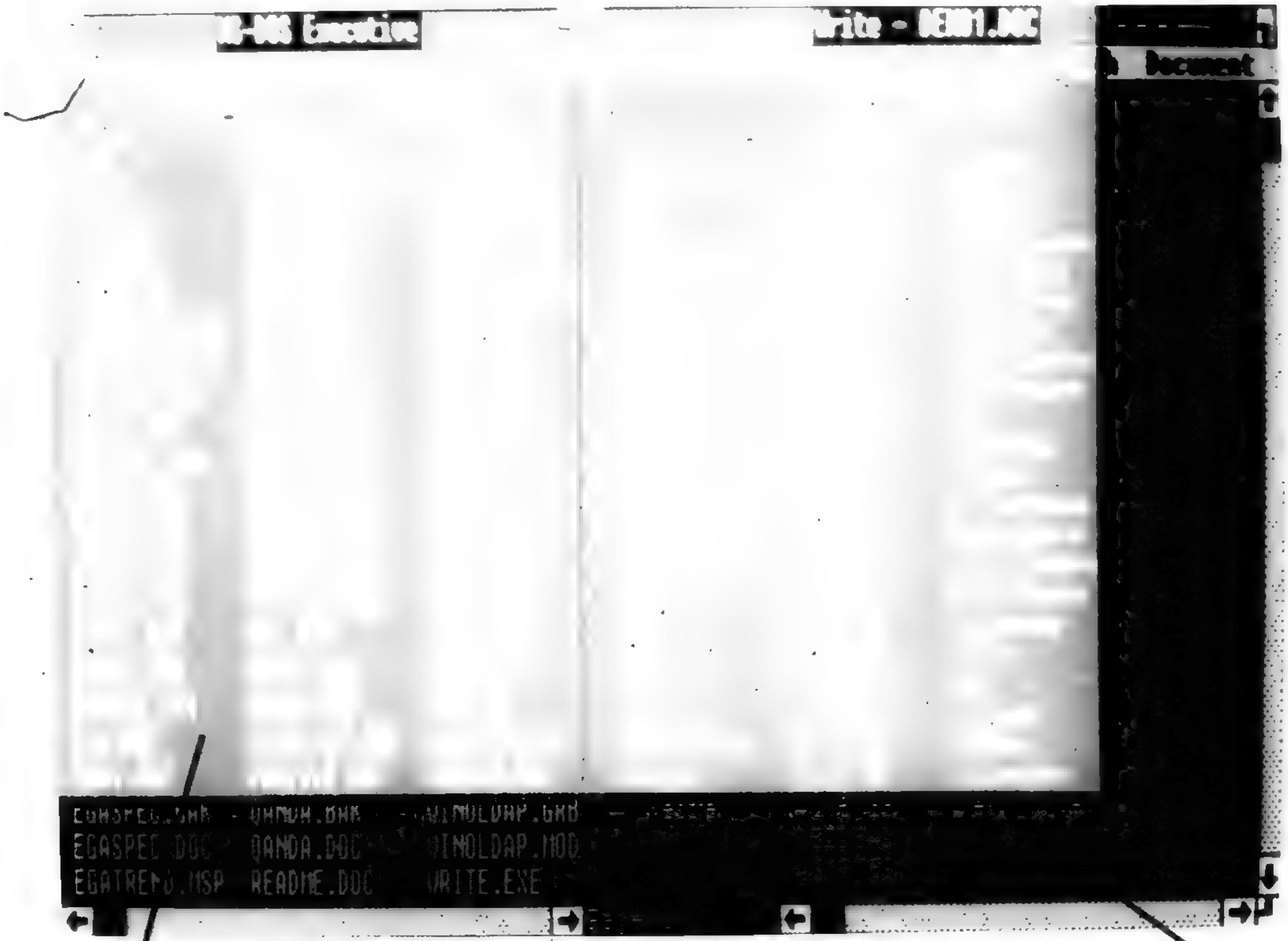

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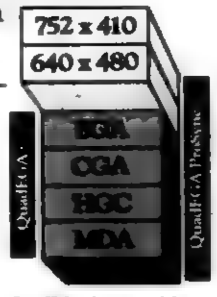

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DIAL-INQ READER SERVICE NUMBER 28

INSIDE

Graphics Exploration

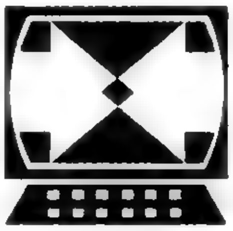
A mainframe graphics package is helping a Texas oil and gas company cut time and costs in the production of its budget proposals. Page S2.

Interview

Industry expert Carl Machover discusses the state of the art, what's needed and what's coming in the field of graphics software. Page S3.

Test Patterns

Researchers at the University of Minnesota's Management Graphics Project report their latest findings regarding the role of graphics in business. Pages S6 and S7.



Product Face-Off

Leading mainframe graphics packages possess varying strengths and weaknesses. Which package will satisfy your company's needs? Page S9.

Product Chart

A comprehensive guide to business graphics software for systems of all sizes. Page S10.

SENIOR EDITOR
Joanne Kelleher
ASSOCIATE EDITOR
Penny Janzen
RESEARCHER
Sally Cusack
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Turning business data into charts and graphs is now easy. What's hard is making the images convey what you mean.

THE PROMISE OF PICTURES

BY JOEL ORR

ANTHONY RUSSO

The role of graphics in business is currently undergoing a major transition as translation of facts and figures into visual images becomes less of a mechanical task and more of an automated process. At this point, business graphics software can do almost everything a graphic artist can do by hand, and it can do it faster and with greater variety of formats. Text charts, for example, which currently represent the type of business graphics used most often, can be created more easily than typed memos and reformatted with the click of a mouse for overhead transparencies, 35mm slides or paper. This level of facility was not acquired overnight. It required about 15 years to capture these skills in code and consolidate them in packages that are both affordable and accessible.

Until recently, only the most expensive business computer graphics software — such as the $30,000 Tell-A-Graf package for large IBM mainframes, originally from Integrated Software Systems Corp., which was recently acquired by Computer Associates International, Inc. — could replicate the typographic qualities of manual work or even produce acceptable stylized arrows, pointers and pictorial embellishments to standard pie, bar and line charts.

Now, however, products such as Freelance Plus from Lotus Development Corp. in Cambridge, Mass., which has a price tag of $495, and the $695 35mm Express from Business & Professional Software, Inc., also based in Cambridge, do all of that and more — on personal computers that sell for $3,000. The cost of hard-copy output has also dropped off sharply, especially for the occasional user.

Hewlett-Packard Co., the leader in quality multiple-pen plotters, now offers desktop models for less than $2,000 that interface easily to personal computers. In the same price range, Xerox Corp. provides a color ink-jet plotter that produces both paper copies and transparencies. For slightly more money, Calcomp in Sunnyvale, Calif., offers a thermal-transfer unit called the Colormaster, which provides 200 dot/in. output on paper or transparencies. This $4,000 printer comes with a cut-sheet feeder and a variety of standard interfaces, including RS-232 and the Centronics parallel port. Software drivers for the leading graph packages are included in the base price.

A few years ago, users could obtain almost any business graphics feature they desired, but not in a single package. For example, they could get freehand drawing, but not in the same package that produced high-quality typography. Today, many programs provide most of the features users seek, and selection is often based on the support of specific pieces of hardware, ease of use and price.

Perhaps even more important than the breakthroughs in affordability and ease of use, however, is the fact that computer graphics systems have reached levels of performance necessary to

---

Orr, a speaker and author on graphics, heads Orr Associates, Inc., a computer graphics consulting firm in Great Falls, Va. He is a founder of the National Computer Graphics Association.

Graphics

FROM PREVIOUS PAGE

make business graphics palatable for business executives.

A recent article in *The Wall Street Journal* notes that computers churned out more than 3 billion sheets of hard copy in the U.S. last year — 1,500 sheets for every man, woman and child in the country. It is a fact that more computer-generated data is being produced than can possibly be assimilated, but graphics can aid in the digestive process. Marvin Patterson, an analyst with Hewlett-Packard in San Diego, Calif., reports that while we absorb verbal and numeric information at up to 1,200 words per minute, we are capable of taking in pictorial data at a rate equivalent to 50 million words per minute. Graphics can therefore help us deal with the quantity of information with which we are bombarded.

In 1986, computer-generated images accounted for only 10% of the $15 billion spent on visual presentation materials, a small showing that Doug Neal, executive vice-president of DRC, a Washington, D.C., systems house, attributes to now-rectified performance deficiencies in graphics systems. "There are certain minimal levels of responsiveness, resolution and color that important buyers — senior and upper-middle executives — demand," he says. When those critical limits aren't met, these professionals aren't interested.

The big news this year is that those performance requirements can be satisfied with off-the-shelf components. According to Neal, Compaq Computer Corp.'s Compaq 386 "draws complex and colorful charts in under two seconds, while IBM Enhanced Graphics Adapter boards provide the minimum required resolution with 16 or more colors." Such developments, Neal contends, will lead to much greater use of graphics at the executive level.

Putting it on the PC

Personal computers have had a great impact on business graphics, and their influence is bound to increase as these machines become more powerful and the graphics software written for them becomes more capable. In fact, some people consider PCs to be already capable of supplanting mainframes for graphics applications. "Everything that can be done on a mainframe," says Morris Samit, a Framingham, Mass., computer graphics consultant, "can also be done on a micro."

There are, however, some gaps remaining and some arguments for keeping the graphics applications within the mainframe environment.

Richard Dym, executive vice-president of Interchart Software, Inc. in Princeton, N.J., says, "Ideally, we should get to a point where the user doesn't care whether he's on PC or mainframe. But data links aren't there yet: There are no fully functional programs for automatically extracting data from all data bases. And mainframe companies still don't understand the user interface issues. I think the next hot product will be an expert system that helps users use the vast graphics power that is now at their fingertips."

Alan Paller, president of AUI /Computer Associates, a computer graphics consulting and training firm in Arlington, Va., adds that for large organizations, centralized graphics on mainframes are usually less expensive, more flexible and easier to control.

"Producing a pie chart on an IBM Personal Computer with a desktop HP plotter is fun and almost easy," Paller says. "But producing 150 charts on that system is almost impossible." Besides, he adds, production-quality graphics in large quantities require expensive output devices and trained operators, and these are difficult to provide to the PC user, except by means of a centralized facility associated with a large computer.

Space agency solution

There are ways to achieve production quality without sacrificing the convenience of business graphics capability at the PC level, as is demonstrated at the National Aeronautics and Space Administration headquarters in Washington, D.C. NASA installed extensive centralized graphics facilities as part of a comprehensive office automation plan. Two Digital Equipment Corp. VAX-11/780 computers run Tell-A-Graf and DEC's All-In-1 to support a network that ties together terminals and PCs on the desks of virtually all knowledge workers, from clerks and secretaries to executives.

David Lavery and Cathy Sonnek of Planning Research Corp., a consulting and engineering firm in Washington, D.C., who worked with NASA to create the system, report that All-In-1 has been enhanced to permit users to generate graphics with low-quality output devices. If they want high-quality graphics, they send the chart or graph with a message to a graphic artist over the network. The artist does not have to rekey the chart but can simply enhance it and output it on one of the spooling slidemakers also connected to the VAXs through the network.

The term "business graphics" covers a broad range of resolution and artistic quality. At the top of the spectrum is business graphics as defined by graphic arts professionals who expect high resolution, multiple colors, professional layout and the ability to produce slides, transparencies and paper output. These charts and graphs are used for boardroom presentations, television and newspapers.

This user is served by systems such as those offered by Genigraphics, Inc., based in Liverpool, N.Y., Management Graphics, Inc. in Minneapolis and Cubicomp Corp. in Hayward, Calif.

These systems are based on specialized graphics processors and displays and dedicated minis and micros. Mainframe-based packages, such as Tell-A-Graf and Precision Visuals, Inc.'s Grafmaker, are used by artists and nonartists, under the tutelage of MIS's graphics experts.

An increasingly important category is made up of systems that run generic micros, including systems such as IBM's PC Storyboard and Time Arts, Inc.'s Lumena. These systems are aimed at not only graphic artists but also talented nonprofessionals. They can be used to produce high-quality presentation graphics with the appropriate output devices, but they

Continued on page S8

Graphics tips

- Concentrate on summary data, not details.
- Don't use more than five slices in a pie chart.
- Don't have more than seven bars in a bar or column chart.
- When making 35mm slides, the text is too small if you can't read it without magnification on the slide itself.
- Use either a portrait or landscape orientation, not both.
- Don't use underlining for emphasis; instead, use italics, upper-case letters or — sparingly — bold-face type.
- Graphic artists can mix typefaces nicely; the rest of us should stick to a single typeface in a presentation. If your equipment allows it, change sizes for headings.
- Use solid colors to fill graph areas; avoid patterns.
- Black backgrounds make slides and viewgraphs easier to read.
- Use only key words on text charts, not entire sentences.
- If you have to apologize when the slide comes on the screen, don't use that slide.

JOEL ORR

Cutting a big graphics chore down to size

Andy Andraczke, *senior systems specialist at Tenneco*

BY ROSEMARY HAMILTON

In 1986, the six operating divisions of Houston-based Tenneco Oil and Gas Co. coordinated twice-yearly budget proposals, a task that involved outside contractors and more than 50 people per division, many of whom worked overtime to produce the extensive reports, each of which was supported by an average of 400 graphs and charts.

This year, Tenneco's divisions again face the massive reporting chore, but it is expected to be a much easier and much less expensive project, according to senior systems specialist Andy Andraczke. The divisions are using a mainframe graphics software package to complete their budget reports, and, based on the experience of the first budget project that used the software, future efforts will require fewer people, no overtime and no outside contractors.

Business graphics software is not new to Tenneco, which has been using SAS Institute, Inc.'s SAS/Graph and Tell-A-Graf — originally from Integrated Software Systems Corp., which was recently acquired by Computer Associates International, Inc. — at its headquarters for statistical analysis and economic planning, Andraczke says. But the installation of Uniras, Inc. software, however, marks the first time end users have interacted with and directly benefited from graphics software, he says, excluding isolated cases of Lotus Development Corp. 1-2-3 usage.

The late 1986 budget presentation prepared by the Lafayette, La., division, which served as a first test site for the Uniras graphics software, netted many positive results. According to Andraczke, this division used about 50 people for each of the two yearly projects. With Uniras, that group was cut to between 30 and 40 employees, none of whom worked overtime.

The software, with a Tektronix, Inc. 4692 ink-jet printer, enabled users to produce all the graphics as hard copy. In fact, Andraczke says, the savings resulting from fewer staff people, no overtime and no contractors paid for the two $18,000 Tektronix printers.

Uniras was chosen in early 1986 for divisional use over two other packages, including Tell-A-Graf software. The software was required to meet two criteria: It had to operate in a mainframe environment and be as user friendly as possible. All three of the packages ran on mainframes, but Uniras, unlike the other two, is menu driven. This, Andraczke says, allows nonprogrammers to easily follow the steps required to run an application. "We wanted to have a package that everybody could use," he says. "Users don't want to learn how to run it. They want a tool. And they're not responsible for the software; they're responsible for production."

Tenneco chose mainframe software instead of a micro-based system primarily because of budget restraints, Andraczke says. "When the cost of oil went down, we had a pretty big budget crunch," he explains. "Since we already had pretty powerful systems, it was easier to cut all expenses on the personal computer end. We have a big PC base, but we are not buying new ones right now, and we're not buying much software for them."

Andraczke says micros are used for some graphics applications, such as the creation of charts with 1-2-3. However, he says "there is no general graphics package used throughout the company." The Uniras software will be running under the IBM VM operating system on the 4361s, which are installed at each of the divisions. ●

Hamilton is a *Computerworld* staff writer.

INTERVIEW
DRAWING ON THE PC

Carl Machover is president of White Plains, N.Y.-based Machover Associates Corp., a consulting firm he founded in 1976 to provide management, engineering, marketing and financial services to computer graphics users and vendors. He is also an adjunct professor of computer graphics at Rensselaer Polytechnic Institute in Troy, N.Y., and a member of the advisory board of the Pratt Center for Computer Graphics in Design.

Recently, Machover spoke with *Computerworld* Associate Editor Penny Janzen about this rapidly emerging industry.

What have been the most significant technical breakthroughs in business graphics software in the past few years?
Well, both the quality of the imagery that has become available and the versatility of the software running on relatively small resources have really been astonishing. Those advances, combined with the recent availability of some equipment capable of producing good-quality hardcopy output, have been very important.

Do you see any roadblocks to further progress at any level — personal computer through mainframe — in graphics software development?
My feeling is that the roadblocks are probably not in the hardware or the software. The roadblocks really are attitudinal ones on the part of the users. I think that there still are portions of our business community that are just not comfortable with graphics and are still a little more comfortable with numbers.

I also think there is some concern still about the fact that the presentation of business data using graphics has not been standardized, so that the idea of being able to distort information may cause problems.

Is user reluctance responsible for the relatively low penetration of computer graphics in business?
Certainly that's one issue. The other issue is that, until recently, the stuff has been a little hard to use. Some of the current crop is much better, and, of course, one of the things that has helped to broaden use is that it is increasingly possible to go back to your data bases and use data base information for graphics instead of rekeying it.

One of the things we're seeing that may help to move the user community is that some of the very large software houses that have been involved in the numeric side of business are beginning to reach out and buy up some of the major graphics companies.

The few examples we had of such combinations in the past were notably unsuccessful. But Lotus Development Corp. seems to have done a far better job than others did in the past of promoting the graphics side, especially the Freelance package, which was part of Graphic Communications. So I'm more optimistic about these being successful.

How far have we come in systems integration, in terms of ability to download data from the mainframe data bases to create graphics on micros?
I would say that most of the suppliers of business graphics have that kind of capability to one degree or another. Some of it is easy and some of it is hard, but if you had asked me that same question four years ago, I would have said then that no one had the capability. So I think there's been major progress in that direction.

Do you see graphics eventually becoming the sole province of the PC?
I think that the personal computer is growing so powerful that to void it and to void its intelligence doesn't make sense. On the other hand, I think for very large companies the mainframe still represents the repository of the data.

So, what I would expect to happen is that the mainframe will remain the repository of the data, and what will be sent to the PC will be essentially a description of the form in which the data is to be presented. As PCs become more intelligent, that description may simply be a description that says, "Put this in a pie chart or put this in a bar chart." All the handling to generate that chart will be done within the PC.

What changes do you see taking place in large systems graphics software in response to the growth in interest in PC graphics?
Well, I think you see it right now. I think the large systems people are buying up the small systems vendors. Every vendor of what was essentially mainframe-based software has a PC option associated with it. I think that's without exception.

What do you see happening to the minicomputer market as a result of the increased micro-to-mainframe link usage?
It's awfully hard to see very much future for them. And again — what do these words mean? The problem is that the things we used to define as minis are now being accomplished beautifully as personal computers. I understand that Dataquest, Inc. has tried to use a division of the size of the CPU to determine if it's a personal computer or a mini. They say that a PC is a 16-bit machine and a mini is a 32-bit machine. If that's true, there will soon be no PCs.

Are there any functionalities currently missing from business graphics software that you feel need to be addressed?
I think there's an opportunity for what people might describe as expert systems. There still is a substantial amount of judgment required by the user to come up with reasonably good graphics.

Some efforts have been made to overcome that by having template kinds of things in which the user selects from some preformed graphs. But there is very little that helps the user understand the best way to plot the kind of data he has or the best kind of presentation for what needs to be done.

For example, if I'm going to make a business chart that I'm going to show as a slide, I'm going to have to have a much simpler image than if I were going to put that same piece of information as a graph in a report.

There's no software today that lets you press a button to indicate, "this is going to be a slide" and "that's going to be a chart." There is software now that says, "Do you want spring colors or autumn colors?" but there's no software that says, "What you have is a time series, and therefore the sort of chart you need is this." So I think there's some very real opportunities to help the user achieve professional-level quality in the way the charting is done.

ALAN WITSCHONKE

Carl Machover

What, if any, effect will the emergence of an Intel Corp. 80386 hardware standard have on business graphics?
I think that it will be somewhat less important in the business graphics area than in the engineering and scientific area.

One way that the increased power and capacity may impact business graphics, however, is in allowing greater movement of images. Business graphics are normally perceived as being very static. I put up a chart, I put up another chart. Well, there may be a lot of applications in which what I'd really like to look at is a three-dimensional representation of the data and to move that three-dimensional representation so I can look at it from different points of view. When we get resources like the 386 — which make it easier to think about real-time manipulation of those images — I think that's going to lead to some of that kind of capability ●

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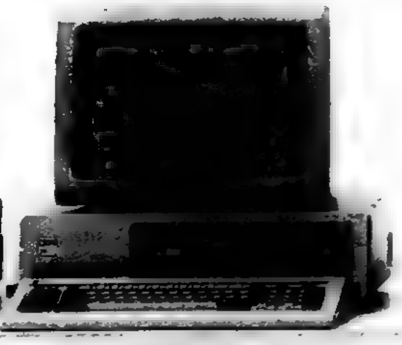
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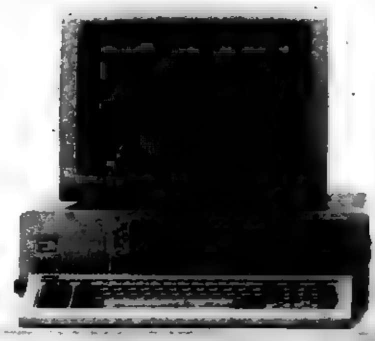
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Mixed forecast for business graphics

The Management Graphics Project has been operating at the University of Minnesota in Minneapolis since summer 1983 under the sponsorship of Integrated Software Systems Corp., which was recently acquired by Computer Associates International, Inc., 3M Corp., Decision Resources, Inc. and Execucom Systems Corp. Its purpose is to examine the role of graphics as a tool for effective management. The two articles that follow summarize the project's findings regarding the use of computer graphics in organizations and the role of graphics in decision making.

BY JOHN A. LEHMAN

Corporations have been quick to jump on the business graphics bandwagon in the past couple of years, but studies indicate that the momentum may be slowing.

Research recently completed at the University of Minnesota reveals that business graphics use has increased significantly in organizations during the last two years. At the same time, the study indicates that future growth in this area may be slower.

In 1984, more than 200 managers of data processing and information centers were surveyed regarding their use of computer graphics for management applications. At that time, almost 90% of the organizations possessed business graphics capabilities, but most of these were limited and only recently installed.

At that time, almost three-quarters of the respondents reported having few computer graphics workstations, including personal computers with graphics capabilities. At almost half of the organizations, less than 5% of the users had management graphics experience, and at almost three-quarters of the organizations, less than 20% of users had such experience.

Looking to the future, more than 40% of the respondents in 1984 forecast that the use of management graphics would grow greatly during the next few years, while more than 96% forecast at least moderate growth.

In mid-1986, the same respondents were surveyed again, along with an additional matched group consisting of managers and users. The new survey revealed considerable growth in both the number of business graphics workstations in use and those operating them.

On the other hand, forecasts for future growth were reduced, indicating that, given the current technology, the use of business graphics may be reaching saturation in many organizations.

The mean number of business graphics devices in use at organizations has grown considerably (see lower left chart, page S7) with PCs and plotters constituting most of the increase. At the same time, the percentage growth in color graphics terminals is considerable. Most organizations distribute these devices among users rather than centralizing them.

The number of organizations with experienced business graphics users has increased during our study. For example, between the years 1984 and 1986, the percentage of companies reporting less than 5% experienced graphics users decreased from 40% to 25.5%, while the percentage of those reporting 50% to 59% experienced users increased from 3% to 9.4%.

Further, the amount of experience those users report also increased. In 1984, 31.5% reported one year of experience. In 1986, that dropped to 12.6%. The percentage of users reporting five years' experience increased from 8.5% in 1984 to 15.5% in 1986.

In spite of this pool of inexperienced users, forecasts for growth in business graphics technology are somewhat subdued (see upper right chart, page S7). The number of respondents forecasting a great amount of growth has decreased significantly, while a much higher percentage of respondents forecast no growth at all. When respondents were asked to project which areas of business graphics would experience the greatest amount of growth out of oral presentations, written reports, decision support and data analysis, they rated the categories about equally, not a significant change from 1984.

The results of this study regarding growth of business graphics are strengthened by the "1986 Key Information Systems Management Issues" study recently completed by Professor James Wetherbe and James Brancheau at the MIS Research Center of the University of Minnesota. In 1983, this Delphi study ranked computer graphics 19th out of 25 key MIS issues. In the 1986 study, it was ranked 25th. One interpretation of this result is that organizations have been relatively successful in integrating graphics with their information systems, and so success is now taken for granted.

Our study shows a strong growth in business graphics in the last two years, both in terms of technology and number of users. At the same time, it appears the use of business graphics may have reached a plateau. Further growth may require changes in cost, performance or ease of use in the technology. •

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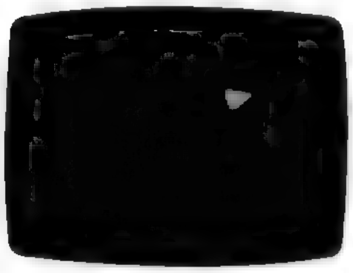

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DIAL-INQ READER SERVICE NUMBER 30

Quality graphics design supports quality decisions

BY GARY DICKSON
and JOHN A. LEHMAN

There is little empirical evidence to prove that the use of graphics automatically improves decision making. Research finds that users of graphs outperform users of numerical tables in some tasks but not in others. Differences in performance appear to be influenced by task characteristics, design of graphs and learning effects.

The suitability of graphical representation depends on the decision at hand. Graphs are best used when the tasks involve detecting subtle trend changes over time, comparing pattern changes over time, searching for patterns in large amounts of data or analyzing the relationships among variables. All of these tasks are compatible with the traditional use of graphics as a technique for statistical analysis, whether in time series or modeling.

Tabular data representation, on the other hand, appears to be most suitable when a decision maker needs to read specific data values or determine absolute or percentage changes between two numbers. Nomographs and related techniques of graphical representation may be concise, but they are not as accurate or as fast as tabular presentation for this sort of task, as any ex-users of slide rules will probably remember.

The right graph, appropriately constructed, carries out a considerable effect on the utility of graphics as support for decision making. However, deceptive and poorly designed charts occur frequently in business graphics.

Deceptive graphics design is common. One study found that more than 40% of corporate annual reports contain at least one misleading graph. And research carried out at the University of Minnesota found that charts and graphs with inconsistent scaling, a common method of distortion, yield worse decision performance than do correctly designed charts and graphics.

Poor graphics design is not necessarily the result of an intention to deceive. Improvements in ease of use of computer graphics systems have also contributed to the problem.

At one time, charts and graphs were produced only by graphic artists or statisticians who had received training in representational design. Today, anyone who can operate a personal computer can generate charts and graphs that are mechanically perfect even when their design logic is flawed. The design quality of many of these products is poor. This problem has increased in the last few years with the increase in clip art packages, which enable naive users to create "chart junk" reminiscent of the jumbled profusion of Victorian advertisements.

Even professionals are not immune to errors in design. We have observed presentations by vendors of computer graphics systems in which much more than half of the slides contained major design errors, whether in color, layout or selection of graph type.

The type of chart or graph used makes a difference. Our research indicates that decision makers find clustered bar charts easy to use. This is especially true when the charts use horizontal bars and when data values are included at the end of the bars.

Line charts are preferred to bar charts in which speed of comprehension is important. On the other hand, decision makers have difficulty interpreting pie charts, segmented bars and area charts.

Unlabeled or poorly scaled graphs hinder comprehension. Clashing patterns of cross hatching and poor color choice, such as dark red on a dark blue background, make graphs difficult to read.

Producing quality design

Many user-friendly graphics packages are not set up to produce good graphics design. Deceptive scales are almost universal as defaults, and better scales are often not available.

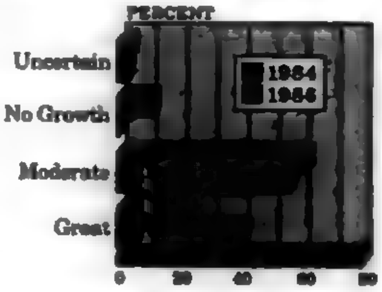
Furthermore, some pen plotters produce colors that are, at best, hard to read. One popular plotter, for example, features light yellow and light orange among its default colors for use on white paper and provides light yellow, light orange and light brown among its transparency pens.

Since most users are not expert at interpreting charts and graphs, some training or practice or both should be provided in the use of business graphics for decision support. Our studies have shown an improvement over time as users learn to use the displays.

Graphics design quality is closely related to decision quality, and users require training and practice before the full benefits of graphical data presentation can be realized. ●

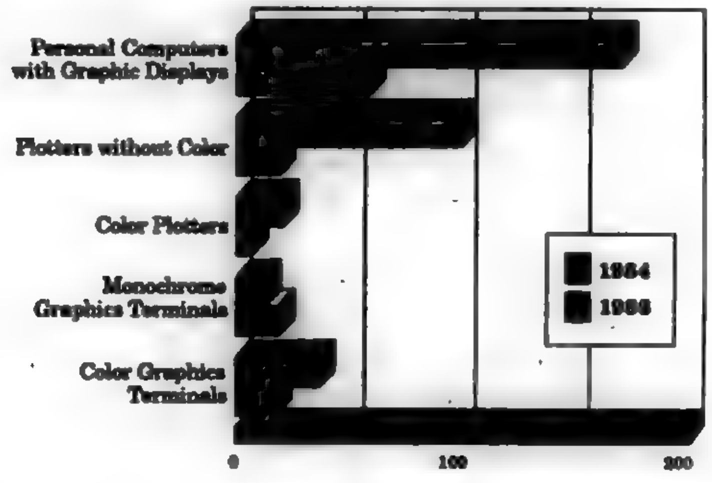
Lehman is an associate professor of MIS at the University of Alaska, Fairbanks; Dickson is president of Group Delta System Sciences in Minneapolis.

Projected growth of applications
User forecasts for spread of business graphics in their organizations



CW CHART

Population of graphics devices in organizations
Mean numbers by type of device



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Graphics

CONTINUED FROM PAGE S2

run on standard hardware configurations. They can also produce electronic slideshows — sequences of charts that can be displayed like slides in a slide projector — with accompanying wipes, dissolves and other transition effects and even sound on systems that have the suitable hardware.

Also included in this group are products that possess strong data base management capabilities, such as Mirage from Zenographics, and animation packages, such as Macromind's Videoworks for the Apple Computer, Inc. Macintosh, Show Partner from Brightbill-Roberts and Co. and Videowork for the PC from West End Film, Inc.

> WHEN executives give presentations, their slides make as much of an impression as their clothes do and reflect the organization they represent. Corporate image should be clearly and consistently presented in the corporation's pronouncements.

Next in line are peer, or management, graphics. These are used by managers in working meetings. Quality of form is not as important as ease of production; the internal graphics of leading PC spreadsheets like Lotus's 1-2-3 and Microsoft Corp.'s Excel fall into this category. Paper and overhead projection transparencies are the main forms of output.

Analytical graphics are at the bottom of the scale. They are designed to be seen only by the person producing them; their most important characteristics are speed of production and flexibility. The statistical routines of SAS from SAS Institute, Inc. in Cary, N.C., and SPSS from SPSS, Inc. based in Chicago, both of which run on mainframes, minis and micros, are often used this way, although these packages are capable of producing the quality required for other applications.

Other important types of business graphics include project management charts, such as those used with PERT, the product management methodology that was developed in 1958 by the U.S. Naval Special Projects Office for planning and monitoring the Polaris submarine project.

Betsy Riley and Stanford Witcher, from Martin Marietta Energy Systems in Oak Ridge, Tenn., used business graphics to reduce from 392 to three the number of man-hours per month spent on PERT project management charts.

The PERT charts were required for monthly presentations made by the Outside Contractors Planning Office at Oak Ridge, which is run by Martin Marietta, to the Department of Energy. Prior to implementing the computer graphics system, data was frozen each month for 10 days before the presentation to the DOE. A staff of seven, mostly engineers, performed the work, and the average number of man-hours spent each month was 392, many of which were overtime hours.

When the DOE demanded more timely data, the contractors planning office was at a loss. They did not possess the budget to add people, and the people on the presentation chart team were already working at capacity.

A project management system, written by in-house programmers and employing some commercial graphics subroutines, saved the division roughly $800,000 during the seven-year life of the project. The system generates slides on film recorders from data on the division's network of DEC VAXs.

With the system in place, the time necessary to produce the charts required by the DOE dropped from 10 days to four, and the number of people required fell from seven to one. And that one person required only three hours to create the charts.

Who's using it?

Business graphics vendors often have difficulty identifying their markets of which there are three: graphic artists, MIS departments and occasional users. All three groups have varying requirements for flexibility and ease of use. Many products try to address two of these or all three and fall short of usefulness in any of them.

Graphic artists need the flexibility of freehand drawing, simple typesetting, accessible clip art and an easy-to-use human interface. They require a system to use as a tool on a regular basis. They will become familiar with it over time, and it must be responsive and consistent.

MIS departments need production tools — software that enables their users to produce presentations quickly and easily and that supports centrally controlled and operated output devices. Seamless interfaces to existing mainframe data bases are also important.

Occasional users make up the fastest growing segment of business graphics users. These are mostly middle managers and executives who need charts from time to time but not regularly enough to warrant their learning a complex charting system.

Occasional users must have tools that are easy to learn and remember, since they are not regularly used. They also need systems that ensure compliance

Continued on page S10

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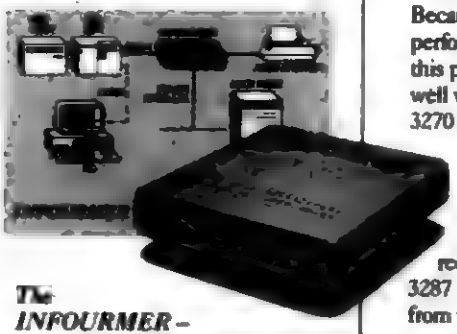

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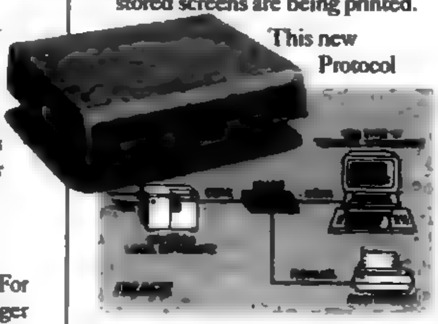

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[illegible] READER SERVICE NUMBER 32

PRODUCT FACE-OFF

Considering a general-purpose package from the bottom up

BY BRIAN MCGRATH

MIS management must consider graphics anytime it contemplates the future of end-user computing. It must adopt a strategy to handle the imminent flood tide of demand for graphics from users of all types.

Without a sound foundation at the mainframe level — the toughest and most complex environment — organizations will be swamped by incompatibilities and problems. If the graphics software within an organization is allowed to migrate from the personal computer level, MIS is going to have a serious problem satisfying an end user's distributed processing needs.

Business and statistical graphics packages such as SAS Institute, Inc.'s SAS and SPSS, Inc.'s SPSS are a requirement for any mainframe installation, just as are graphics for PCs. But because of the tremendous impact graphics will induce, it is of the utmost importance to install a general-purpose graphics package as well. By implementing a suitable package on the mainframe, MIS management establishes a set of guidelines for the acquisition of other graphics resources and ensures compatibility and transportability within the organization.

"Suitable" is, of course, a vague term. But it is appropriate here because each of the leading general-purpose mainframe graphics software packages has characteristics that may work for or against it in particular situations. None of the following graphics packages would be the wrong selection. More likely, the wrong selection would be a choice made without consideration of the need for graphics at all levels of computer resources.

The following categories are the most important ones for comparing graphics products:

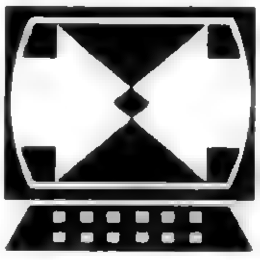
Usability: The ease with which a product can be used and/or its appropriateness for a particular vertical application can largely determine the user's acceptance of the package. .

Transportability: The product's ability to run on — or at least interface with — the mini, or departmental, and micro environments can minimize problems of upload and download compatibility and resource availability.

Applications and utilities: The number of vertical applications and utility packages available for a given graphics base product is important because even if you do not need a certain one today, you can bet you will need it tomorrow.

Enhancement strategy: This is the vendor's approach to staying current with the ever-changing graphics technology; also its relationships with your company's other major vendors, if good, tend to minimize any future compatibility problems.

Support: This involves the extent to which the vendor's support personnel are competent in graphics and are available for special projects or assistance if necessary.



GRAPHICS packages are like any productivity tool: Most installations both want and need more than one.

Computer Associates International, Inc., which recently acquired Integrated Software Systems Corp. (Issco), is the leading general-purpose mainframe graphics software vendor, by virtue not only of its product line but also its heavy participation in the graphics industry.

This company has a more extensive line of business graphics software than any other mainframe vendor, and its Tell-A-Plan product, originally an Issco product, is probably the hottest selling vertical application for business. This software for project planning produces excellent Gantt charts and network diagrams.

Vector technology

Another Computer Associates product, Tell-A-Graf, also a former Issco product, is a user-friendly, command-driven interactive system with a complete set of utilities. These include Text for corporate publishing; Cue Chart for a library of charts; Data Connection for extracting input from data files, reports and flat files; Tables for setting up word, number or symbol tables; and Decision Support, a language for arithmetic functions. Disspla, formerly Issco's, is Computer Associates' subroutine-level base product that has additional capabilities for mapping, contouring and three-dimensional presentation.

Tell-A-Graf and Disspla share one negative attribute — both are based on vector technology. When used on a complex layered graph, the vector technology can become computing intensive due to hidden line removal. Computer Associates also comes up one level short in the important area of transportability. Its products .run on mainframes, Digital Equipment Corp.'s VAX and other minis and workstations. Disspla is available for the IBM Personal Computer AT level, but there is some question about whether that version needs code contained in the mainframe version in order to run, or whether the AT software is only sold in combination with the mainframe package.

The company's newly announced Superimage PC-based drawing package provides a partial solution to the issue of transportability.

Issco worked with its customers to develop a wide variety of applications including IVISS Manager, an interactive system that runs under IBM's ISPF and is panels oriented; Graphics Kernel Systems (GKS) for GKS users; Dynamic, an interactive input system for mouses, light pens and similar devices; and Codebook, which produces commented Fortran source code for compiling.

Issco has historically worked at maintaining an excellent support level. Now, with its acquisition by Computer Associates, the company will have the greatest amount of resources of any independent mainframe graphics software company.

Pansophic Systems, Inc. deserves mention because, as a large software house, it will have an impact on the graphics software marketplace. Pansophic recently acquired the VAX/Unix D-Pict British Petroleum product line and has transported the base products to the IBM mainframe. The D-Pict product line is an excellent one, and, with its recently acquired Starburst line of PC-based presentation graphics, it will be a viable future option. The mainframe product line should be released sometime in the first quarter.

3-D expertise

Precision Visuals, Inc. enjoys the reputation of a competent technical company. Its product success is more at the subroutine level than the stand-alone interactive system, and it stresses the use of devices to their fullest. This means the company codes its device drivers to all the idiosyncrasies and minute capabilities of each device in order to get the most efficient utilization. The payoff is apparent in the splendid interactive support achieved at the terminal level.

There is a need in many installations for modeling or three-dimensional presentations outside of the computer-aided design environment, and this is where Precision Visuals seems to be placing its emphasis and expertise. The company's mainframe subroutine-level products include DI-3000 for base graphics, Grafmaker for business presentation graphics and DI-3000 XPM for modeling and 3D representations. Picsure, its mainframe interactive system, is somewhat difficult to use because it is command driven, but the company says this will be corrected when Picsure-Plus for the IBM mainframe is released this spring.

In the area of transportability, Precision Visuals is also one level shy. It has migrated its product from the VAX environment to the mainframe, other minis, Unix and some supermicro workstations. What is missing is the PC level. The reason for this, according to the company, is that the complexity of Precision Visuals' software solution currently prohibits a PC version.

Other Precison Visuals products include Addsys-3000 for advanced device-access capabilities, Enter/Act for device independence and a contouring system for surface display. The firm is also active on the Programmer's Heirarchical Interface to Graphics Standard committee, better known as Phigs, .

Enhancing trends

The Uniras, Inc. product line is unique among mainframe graphics packages in that it is based on raster technology. A vector-based system produces a complex, layered graph by plotting and, when necessary, removing all lines before overlaying. This is called hidden line removal and can be inefficient and demanding of computer resources. With raster technology, however, no hidden line removal is necessary. Each new layer merely overlays the previous one.

Uniras's product line includes Unigraph, a nonprogrammer, menu-driven, interactive business-graphics package that is as easy to use as any graphics package available. The disadvantage of Unigraph is that it lacks the depth of functionality offered by other business graphics packages, a problem shared at a subroutine level by other Uniras business graphics products. This problem will be solved as the number of Uniras business graphics users increase.

Uniras also offers the only completely transportable corporate solution. All Uniras products run on mainframes, VAXs and other minis, workstations and at the PC AT level. The PC AT version is not a separate software package acquired by Uniras but the same mainframe package with the same user instructions. This transportability includes both the nonprogrammer interactive systems and those at the subroutine level.

Cross-level products

Uniras has an extensive line of products, including Unigraph, Uniedit and Unimap at the nonprogrammer interactive level, and subroutine-level products including Geopak, Geoint, Gimage and Seispak for mapping and contouring; Raspak, Raspak-CAD and Gimage for modeling and imaging; and Bizpak and Bizmap for business.

The enhancement strategy of Uniras is in sync with the current trends in the graphics industry. Color and raster output devices are rapidly gaining ground in the graphics marketplace, and raster-based Uniras software has received acclaim for the quality of its hard-copy color capabilities.

Uniras has formal relationships with most hardware vendors, but the most interesting one is with IBM. IBM markets the Uniras products within its RT Personal Computer line.

Uniras customers rate the company's technical support and assistance as excellent. Though a small company, it has a high ratio of technical support personnel to sales personnel.

Graphics packages are like report writers or any other productivity tool: Most installations both want and need more than one. The payback from graphics software used within individual user departments will be high enough to justify the acquisition of any of these packages. A multivendor software environment is, in fact, the norm for graphics software, and MIS departments can buy all of the systems mentioned for less than the price of one major code generator package. •

McGrath is founder of McGrath and Associates in Plano, Texas, which consults on software selection for corporate MIS installations and performs market research analysis.

Business graphics software

COMPANY	PRODUCT NAME	RUNS ON (OPERATING SYSTEM)	DECISION SUPPORT OR PRESENTATION	NUMBER OF GRAPHS/CHARTS	COMMAND OR MENU DRIVEN	ANIMATION CAPABILITY	ACCEPTS FILES FROM OTHER SOFTWARE	NUMBER OF COLORS	NUMBER OF FONTS (TYPEFACES)	NUMBER OF READY-MADE IMAGES	EGA COMPATIBLE	TYPES OF OUTPUT	HARD COPY OUTPUT DEVICES SUPPORTED	BASE PRICE	READER SERVICE NUMBER
Access Technology, Inc. (617) 656-9191	20/20	MS-DOS, Unix, VAX/VMS, AOS/VS, Primos, VS	Decision support	12	Menu	No	Yes	8	—	None	Yes	Hard copy	Dot matrix, ink jet, laser, plotter	$500 - $12,000	680
AD&P Analysis Design & Programming (703) 790-9433	Color"Graph	MS-DOS, Xenix, Unix, Primos	Presentation	6	Menu	No	Yes	8	24	None	NA	Hard copy	Plotter	$3,000	681
Adobe Systems, Inc. (415) 852-0271	Adobe Illustrator	Macintosh	Presentation	Unltd.	Menu	No	Yes	1	120	15	Yes	Hard copy	Ink jet, laser	$495	682
Advanced Graphics Software, Inc. (408) 749-8620	Slidewrite Plus	MS-DOS	Presentation	10	Menu	No	Yes	7	6	101	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser	$345	683
Advanced Technology Center (213) 988-0119	Plot It	PC-DOS	Presentation	35	Command	No	Yes	10	5	85	Yes	Hard copy, slides, video	Dot matrix, ink jet, thermal, laser, plotter	$550	684
AGS Management Systems, Inc. (215) 265-1550	PAC Management Graphics	IBM mainframes, DEC VAX	Both	5	Both	No	No	8	1	5	NA	Hard copy	Dot matrix, plotter	$13,000	685
Alphasoft (213) 212-7477	First	IBM Series/1	Both	6	Menu	No	Yes	8	1	None	NA	Hard copy	Plotter	$1,000	686
Alternate View Corp. (716) 223-4880	Image	Primos	Both	4	Menu	No	Yes	8	9	27	Yes	Hard copy, slides	Dot matrix, thermal, laser, plotter	$6,000 - $37,000	687
Analytical Software, Inc. (214) 340-2564	Boardroom Graphics	MS-DOS	Both	12	Menu	No	Yes	8	4	9	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$150	688
Analytx International, Inc. (617) 641-0400	Monografx	MS-DOS	—	4	Menu	No	Yes	1	3	12	Yes	Hard copy	Dot matrix, laser	$99.95	689
Apache Electronics Graphics, Inc. (312) 990-7712	Ax Omnigraphics	CP/M, MP/M, MS-DOS, PC-DOS	Both	15	Both	Yes	Yes	Device dependent	6	None	Yes	Hard copy, slides, video	Dot matrix, ink jet, thermal, laser, plotter	$7,000	690

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

Graphics

CONTINUED FROM PAGE S8

with corporate color and form standards for presentations.

Many of these users also need what Professor John Rockart of MIT calls "exploratory graphics" — charting and graphing tools that are easily applied to data, allowing the user to explore the data's nature.

A recent breakthrough product in this arena is Macspin, a Macintosh-compatible package from D2 Software, Inc. in Austin, Texas. Macspin accepts multidimensional data and allows the user to select any three factors for defining points in space. It displays the data as clusters of points in three-dimensional space, with or without a 3-D axis symbol. Analysis is performed interactively by rotating the cloud of points and visually searching for patterns. Rotation motion is smooth and is defined by the user. Any point can be interrogated by touching it with the cursor, which then displays the identified text.

Consultant Samit emphasizes the importance of corporate graphics standards. When executives give presentations, their slides make as much of an impression as their clothes do and reflect the organization they represent. Corporate image should be clearly and consistently presented in the corporation's pronouncements.

Many of the new business graphics systems simplify this by allowing the user to create templates. These are fill-in-the-blanks charts that are laid out and designed to conform to corporate standards. The user simply adds data, and the template formats it into professional-looking graphics output in keeping with the corporate image. The Genigraphics, Inc. Graftime package for personal computers provides this capability, as do most mainframe- and mini-based systems.

Here today, hot tomorrow

Some system features longed for by early users of business graphics are now commonplace. The often-expressed wish for automatic charts and graphs from spreadsheets and other applications has been satisfied. Lotus's 1-2-3, Microsoft's Excel, Provue Development Corp.'s Overvue and other spreadsheets and data base packages offer integral charting.

Furthermore, many successful micro-based graphing packages accept 1-2-3 files as input; Interchart Software, Inc.'s Chartbuster/PC — billed by its vendor as "Tell-A-Graf for the PC" — imports spreadsheets and retains their appearance along with their menu.

PC business-graphics packages that do well with both text and graphics, such as Business & Professional Software's 35mm Express, Interchart's Chartbuster/PC and Computer Associates' Superimage, are the growth products for this year. They can produce both documentation and presentations and are more useful than combinations of single-use packages.

> "THERE'S something wrong with computer graphics. Too much chart junk. No sense of visual craft!"
>
> EDWARD TUFTE
> YALE UNIVERSITY

Professor Edward Tufte of Yale University writes, "There's something wrong with computer graphics. Too much chart junk. No sense of visual craft!"

As our definition of computer literacy matures and we stop teaching programming to business majors, we should find time and resources to make Graphics 101 just as important as English 101. We do not all need to become graphic artists, just as we do not all need to become writers. But what we do need is to grasp the basics of design and graphic communication.

For instance, 20 years ago, psychologist George Miller published a monograph called, "The Magic Number Seven, Plus or Minus Two." In it, he discussed experiments showing that people cannot deal with more than about seven items at a time. This piece of information is invaluable in the design of text and pie charts: If the charts contain more than seven items, they are probably too difficult for an audience to follow.

Colored to suit

Color is another important area of graphics education for the nonartistic professional. Color has meaning that varies by context; to accountants, for instance, red usually means bad news. Presentations can have disastrous results when such connotations are ignored.

Anders Vinberg, a vice-president at Issco, now a part of Computer Associates International, speaks of the need for "layout intelligence," or built-in processes for ensuring that the layout of the chart or graph is suited to both the medium and the desired results. Some systems, for example, change letter thickness and line spacing for 35mm slides and overhead projection transparencies.

However, Darryl Huff's classic, *How to Lie with Statistics*, has yet to influence the features of any business graphics system. Users can still produce deceptive charts, often without realizing they are doing so. A common mistake is setting the vertical origin at a number other than zero and not explicitly informing the viewer. This can have the effect of smoothing or exaggerating the graph.

The big picture

Several years ago, a meeting was held in Seattle. Its title was, "Why is Computer Graphics Always a Year Away?" Pictorial communications have long excited those with an inkling of their power. The old saying suggesting the number of words a picture is worth has earned cliche status because of its broad applicability.

While the widespread application of business computer graphics may still be "a year away," the concept of graphics is now broadly accepted; computers are expected to produce graphics. Although the use and creation of charts and graphics is still not taught to business majors, such pictures are now an important component of most business proposals.

We are becoming aware of the communication power of computer-generated pictures. But, as is true of all languages, comprehension and appreciation are only the first steps toward achieving fluency. ●

COMPANY	PRODUCT NAME	RUNS ON (OPERATING SYSTEM)	DECISION SUPPORT OR PRESENTATION	NUMBER OF GRAPHS/CHARTS	COMMAND OR MENU DRIVEN	ANIMATION CAPABILITY	ACCEPTS FILES FROM OTHER SOFTWARE	NUMBER OF COLORS	NUMBER OF FONTS (TYPEFACES)	NUMBER OF READY-MADE IMAGES	EGA COMPATIBLE	TYPES OF OUTPUT	HARD COPY OUTPUT DEVICES SUPPORTED	BASE PRICE	READER SERVICE NUMBER
Arens Applied Electromagnetics, Inc. (800) 882-4428	Presentation Graphics by Arens	MS-DOS, Unix, MPE	Both	30	Both	No	Yes	8	18	None	Yes	Hard copy, slides	Thermal, ink jet, laser, plotter	Under $500 - $8,000	691
Artech Software, Inc. (703) 860-3085	Highlight	MS-DOS	Both	NA	Menu	Yes	Yes	16	—	80	Yes	Hard copy, slides	Dot matrix, ink jet, laser	$99.95	692
	Freeform	MS-DOS	Presentation	NA	Menu	Yes	Yes	16	9	80	Yes	Hard copy, slides	Dot matrix, ink jet, laser	$149.95	
Artronics, Inc. (201) 750-6868	Slideware	MS-DOS	Presentation	17	Both	No	Yes	256	15	36	Yes	Hard copy, slides	Thermal, laser	$2,000	693
	Chart	MS-DOS	Presentation	17	Both	No	Yes	256	15	36	No	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$7,000	
Ashton-Tate (203) 222-1974	Chart-Master	MS-DOS	Presentation	8	Menu	No	Yes	8	7	94	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$375	694
	Sign-Master	MS-DOS	Presentation	Unltd.	Menu	No	No	8	7	94	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$245	
	Diagram-Master	MS-DOS	Presentation	3	Menu	No	No	8	7	195	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$345	
	Map-Master	MS-DOS	Presentation	Unltd.	Menu	No	Yes	8	7	94	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$395	
AT&T Information Systems (800) 247-1212	AT&T PC Business Graphics	Unix	Presentation	5	Both	No	Yes	1	1	None	NA	Hard copy	Dot matrix, ink jet, plotter	$195	695
Autographix, Inc. (800) 258-4357	Autographix Slide	MS-DOS	Presentation	7	Menu	No	Yes	4	5	72	Yes	Hard copy, slides	Dot matrix, laser	$249	696
	Autographix 35	MS-DOS	Presentation	7	Menu	No	Yes	4	5	72	Yes	Hard copy, slides	Dot matrix, laser	$895	
Antek, Inc. (714) 770-8406	PCartist	MS-DOS	Presentation	—	Menu	No	No	128	28	None	No	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	Contact vendor	697
	PCchart	MS-DOS	Presentation	50	Both	No	Yes	16	1	30	No	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$895	
Batteries Included (416) 881-9941	B/Graph	Atari 130XE, 800XL, 800; Apple operating systems	Both	5	Command	No	Yes	8	2	None	No	Hard copy	Dot matrix, laser	$39.95	698
	Portfolio	Macintosh, MS-DOS, PC-DOS	Both	2	Menu	No	Yes	1	1	None	Yes	Hard copy	Dot matrix, laser	$199.95 - $249.95	
Beagle Bros, Inc. (619) 296-6400	Triple-Dump	DOS 3.3, PRODOS	Presentation	NA	Both	No	Yes	1	None	None	No	Hard copy	Dot matrix, ink jet, thermal	$39.95	699
	Frame-Up	DOS 3.3	Presentation	NA	Menu	No	Yes	6	None	None	No	Slides	—	$29.50	
Bell and Howell Co. Quintar Division (213) 320-5700	Slide Port	MS-DOS 2.0	Both	6	Command	No	Yes	16	20	NA	Yes	Slides	NA	Contact vendor	700
Benchmark Software (800) 621-1908	Benchmark Graphics	MS-DOS	Both	4	Both	Yes	No	8	15	None	Yes	Hard copy	Dot matrix, thermal, ink jet, laser, plotter	$199	701
Brighthill-Roberts and Co. (315) 474-3400	Show Partner	MS-DOS	Presentation	None	Menu	Yes	Yes	16	20	75	Yes	Hard copy, slides, video	Dot matrix, ink jet, thermal, laser	$79	702
Business & Professional Software, Inc. (800) DIALBPS	35mm Express	MS-DOS	Presentation	9	Menu	Yes	Yes	64	20	300	Yes	Hard copy, slides	Dot matrix, ink jet, thermal, laser	$695	703
	Overhead Express	MS-DOS	Presentation	None	Command	Yes	Yes	8	4	100	No	Hard copy	Dot matrix, ink jet, thermal, laser	$195	
BV Engineering (714) 781-0252	PCPlot3	MS-DOS	Presentation	5	Menu	No	Yes	1	1	1	—	Hard copy	Dot matrix, ink jet, plotter	$95	704
	PDP	MS-DOS, CP/M 80	Presentation	1	Menu	No	Yes	1	1	1	—	Hard copy	Dot matrix, ink jet, plotter	$72.95	
Calcomp (800) CALCOMP	Image 1	MS-DOS	Presentation	6	Menu	No	Yes	16	9	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet	$495	705
CE Software (515) 224-1995	Mock Package Plus/Mockchart	Macintosh	Both	5	Menu	No	Yes	None	Unltd.	None	No	Hard copy	Dot matrix, laser	$35	706
Chang Laboratories, Inc. (800) 831-8080 in Calif. (800) 972-8800 outside Calif.	Graphplan	MS-DOS	Both	8	Menu	No	Yes	6	6	None	Yes	Hard copy, slides	Dot matrix, laser, plotter, ink jet	$295	707
Cognos Corp. (800) 4-COGNOS	Powerhouse Graphics	MPE	Presentation	15	Command	No	Yes	Device dependent	Device dependent	NA	No	Hard copy, video	Any HP printer, plotter	Contact vendor	708
Collins & Associates (415) 571-6991	Plot It	H-P Basic	Both	8	Menu	No	Yes	1	1	80	No	Hard copy, video	Dot matrix, plotter	$185	709
Commodity Systems, Inc. (800) 327-0175	Quickplot	Apple-DOS, MS-DOS, C-64 DOS	Decision support	10	Menu	No	No	Device dependent	1	None	Yes	Hard copy	Dot matrix	$150	710
Communication Dynamics, Inc. (503) 684-5151	Sound Presentation	MS-DOS	Presentation	NA	Menu	No	Yes	8	7	350	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$300	711

COMPANY	PRODUCT NAME	RUNS ON (OPERATING SYSTEM)	DECISION SUPPORT OR PRESENTATION	NUMBER OF GRAPHS/CHARTS	COMMAND OR MENU DRIVEN	ANIMATION CAPABILITY	ACCEPTS FILES FROM OTHER SOFTWARE	NUMBER OF COLORS	NUMBER OF FONTS (TYPEFACES)	NUMBER OF READY-MADE IMAGES	EGA COMPATIBLE	TYPES OF OUTPUT	HARD COPY OUTPUT DEVICES SUPPORTED	BASE PRICE	READER SERVICE NUMBER
Communications Dynamics, Inc.	Templace	MS-DOS	Presentation	19	Menu	No	No	8	3	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$495	
Computer Associates International, Inc. (Issco) (619)-452-0170	Tell-A-Graf	Unix, VAX/VMS, VM/CMS, MVS	Both	6	Both	No	Yes	Device dependent	16	1,300	NA	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$6,500 - $24,000	712
	Super Image	MS-DOS	Presentation	NA	Menu	Yes	Yes	Device, dependent	4	100	Hard copy, slides	Yes	Dot matrix, thermal, ink jet, laser, plotter	$495	
Computer Support Corp. (214) 661-8960	Diagraph	MS-DOS	Presentation	NA	Menu	No	No	9	65	2,300	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$395	713
	Picture Perfect	MS-DOS	Both	7	Menu	No	Yes	9	13	None	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$195	
Convergent Technologies, Inc. (408) 434-2848	Art Designer	CTOS, BTOS	Presentation	7	Menu	No	Yes	8	5	75	NA	Hard copy	Dot matrix, laser, plotter	$350	714
CPT Corp. (612) 937-8000	EZ Graph	Proprietary	Presentation	4	Menu	No	Yes	6	8	None	NA	Hard copy	Dot matrix, laser, plotter	$100.	715
Cricket Software, Inc. (215) 251-9890	Cricket Graph	Macintosh	Both	11	Both	No	Yes	NA	Unltd.	None	No	Hard copy, slides	Plotter, laser, dot matrix	$195	716
Cullinet Software, Inc. (617) 329-7700	Goldengate	MS-DOS	Both	19	Both	No	Yes	16	1	None	Yes	Hard copy	Dot matrix, laser	$695	717
Data Business Vision, Inc. (619) 450-1557	Graffhopper	MS-DOS, CTOS, Xenix, Unix	Both	101	Both	No	Yes	16	7	101	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$295	718
	GDSS	MS-DOS, CTOS	Both	101	Both	No	Yes	16	7	101	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$795	
	Private Eye	MS-DOS, CTOS	Both	101	Both	No	Yes	16	7	None	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, plotter	$99	
Data Computing Group (415) 883-2300	Data*Easy PC Employee Scheduler	MS-DOS	Presentation	4	Both	No	No	6	1	4	—	Hard copy	Dot matrix, laser	$75	719
	Data*Easy PC Project Scheduler	MS-DOS	Presentation	4	Both	No	No	6	1	4	—	Hard copy	Dot matrix, laser	$75	
Data Ease International, Inc. (800) 243-5123	Graftalk	MS-DOS	Both	14	Both	No	No	4	4	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$350 - $400	720
Data General Corp. (617) 366-8911	Trendview	MS-DOS (via CEO), Graphics Display Terminals	Both	4	Both	No	Yes	4	12	40	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$320 - $2,250	721
	CEO Drawing Board	MS-DOS, Graphics Display Terminals	Presentation	—	Both	No	Yes	4	12	40	Yes	Hard copy, slides	Dot matrix, laser, plotter	$1,000 - $4,900	
Data Processing Design, Inc. (800) 843-1317 outside Calif.	Graphics 11	VMS	Presentation	20	Both	No	Yes	8	10	50+	NA	Hard copy, slides	Dot matrix, laser, plotter	$3,500	722
	IB Graph	VMS, RSTS	Both	4	Both	No	Yes	8	9	None	NA	Hard copy, slides	Dot matrix, laser, plotter	$3,500	
Decision Graphics (203) 796-6841	DGI Sign Maker	DOS 3.3, PC-DOS, MS-DOS 2.1 and higher	Presentation	NA	Menu	No	Yes	16	2	None	—	Hard copy	Plotter	$75	723
	DGI Type Shop	DOS 3.3, PC-DOS, MS-DOS 2.1 and higher	Presentation	NA	Menu	No	Yes	16	4	None	—	Hard copy	Plotter	$175	
Decision Resources Corp. (202) 223-5555	Graphics Production Manager	VM/CMS, MVS/TSO, MS-DOS	NA	NA	Both	No	Yes	Device dependent	Device dependent	None	Yes	Hard copy, slides, video	Ink jet, laser	$30,000	724
Dialogue, Inc. (212) 425-3666	Analect DSS Graphics	VM/CMS, MVS, VAX/VMS, Primos, Unix	Both	6	Command	Yes	Yes	Device dependent	40	None	NA	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$3,000 - $35,000	725
Dicomed Corp. (800) 342-6633	Presenter PC	MS-DOS	Presentation	12	Menu	No	Yes	64	2	None	Yes	Hard copy, slides, video	Dot matrix, thermal, laser	$995	726
Digital Equipment Corp. (800) DIGITAL	Decslide	VAX/VMS	Presentation	8	Both	No	No	8	3	None	No	Hard copy, slides, video	Dot matrix, ink jet, laser	$1,500	727
	Decgraph	VAX/VMS	Both	8	Both	No	Yes	8	3	6	No	Hard copy, slides, video	Dot matrix, ink jet, laser	$1,500	
Digital Research, Inc. (800) 443-4200	GEM Draw Plus	MS-DOS	Presentation	NA	Menu	No	Yes	8	2	43	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$299	728
	GEM Wordchart	MS-DOS	Presentation	9	Menu	No	Yes	16	2	9	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$149	
	GEM Graph	MS-DOS	Presentation	12	Menu	No	Yes	8	4	—	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$249	
Dynacomp, Inc. (716) 671-6160	OSGraph	CP/M	Presentation	4	Menu	No	Yes	NA	1	24	NA	Hard copy, slides	Dot matrix	$69.95	729
EDC Software, Inc. (617) 749-1794	Graphic Impact A	Wang VS	Both	15-20	Menu	No	Yes	Device dependent	50	78	NA	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$6,000	730
	Graphic Impact B	All Wang operating systems	Both	20	Both	No	Yes	Device dependent	Device dependent	100	Yes	Hard copy, slides	Dot matrix, laser, plotter	$3,950 - $20,000	

COMPANY	PRODUCT NAME	RUNS ON (OPERATING SYSTEM)	DECISION SUPPORT OR PRESENTATION	NUMBER OF GRAPHS/CHARTS	COMMAND OR MENU DRIVEN	ANIMATION CAPABILITY	ACCEPTS FILES FROM OTHER SOFTWARE	NUMBER OF COLORS	NUMBER OF FONTS (TYPEFACES)	NUMBER OF READY-MADE IMAGES	EGA COMPATIBLE	TYPES OF OUTPUT	HARD COPY OUTPUT DEVICES SUPPORTED	BASE PRICE	READER SERVICE NUMBER
Electronic Data Systems Corp. (301) 231-6256	Graphics	TOPS	Both	16	Command	No	Yes	NA	10	None	No	Hard copy, slides	Dot matrix, thermal, plotter	[illegible]	731
Enertronics Research, Inc. (800) 325-0174	Energraphics	MS-DOS	Presentation	6	Menu	No	Yes	16	7	300	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$585	732
X Soft Enterprises Ltd./IO Design (800) 341-2122	Color Chart	Macintosh	Both	100+	Both	No	Yes	NA	9	2	No	Hard copy	Dot matrix, laser	$29.95	733
Execucom Systems Corp. (800) 531-5038	Impressionist	MVS, VM/CMS, VAX/VMS, Primos	Presentation	17	Both	No	Yes	Device dependent	6	100	Yes	Hard copy, slides	Dot matrix, laser, ink jet, thermal, plotter	$995	734
Forest Microsystems, Inc. (703) 841-0800	[illegible]	MS-DOS	Decision support	11	Both	No	Yes	4	1	None	No	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$495	735
Ficor (513) 771-4466	Autograph	Unix	Presentation	10	Both	No	Yes	8	2	20	NA	Hard copy, slides	Dot matrix, laser, plotter	$895 - $6,995	736
Fox & Geller, Inc. (201) 794-8883	Dgraph for Dbase	MS-DOS	Presentation	4	Menu	No	Yes	12	1	None	Yes	Hard copy, video	Dot matrix, laser, plotter	$295	737
	Rgraph for Rbase	MS-DOS	Presentation	4	Menu	No	Yes	12	1	None	Yes	Hard copy, video	Dot matrix, laser, plotter	$295	
Gantt Systems, Inc. (201) 968-9550	Gantt-Pack	MS-DOS	Presentation	3	Both	No	No	3	1	2	No	Hard copy	Dot matrix, ink jet	$225	738
General Parametrics Corp. (415) 524-3950	Picture It	Proprietary, MS-DOS	Presentation	20	Menu	No	Yes	1,000	2	None	Yes	Hard copy, slides, video	Dot matrix, ink jet, thermal, laser	$700	739
Genigraphics, Inc. (315) 451-6600	Graftime	MS-DOS	Presentation	14	Menu	No	No	20	4	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$395	740
Geographix, Inc. (215) 925-6600	Graphix 11	VAX/VMS, PDP-11	Decision support	4	Both	No	Yes	6	1	None	NA	Hard copy	Dot matrix, plotter	$1,995 - $2,995	741
Golden Software, Inc. (800) 972-1021	Grapher	MS-DOS	Presentation	10	Both	No	Yes	16	17	None	Yes	Hard copy	Dot matrix, ink jet, laser, plotter	$199	742
	Surfer	MS-DOS	Both	7	Both	No	Yes	16	17	None	Yes	Hard copy	Dot matrix, ink jet, laser, plotter	$399	
Graphic Information Systems Technology, Inc. (212) 662-0263	DAPS	VM/CMS, MVS/ISO, Primos, Unix, VAX/VMS, MS-DOS	Presentation	Unltd.	Both	Yes	Yes	Device dependent	5	None	Yes	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	Contact vendor	743
	BGS	VMS/CMS, MVS/ISO, Primos, Unix, VAX/VMS, MS-DOS	Decision support	Unltd.	Command	No	No	Device dependent	Device dependent	None	Yes	Hard copy	Dot matrix, ink jet, laser, thermal, plotter	Contact vendor	
Graphic M*I*S, Inc. (312) 786-1330	Fingraph II	MS-DOS	Presentation	—	Menu	No	Yes	—	—	None	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$795	744
	Speechmaster	MS-DOS	Presentation	NA	Menu	No	No	NA	3	100+	No	Hard copy	Dot matrix, plotter	$70	
Graphic Software Systems, Inc. (503) 641-2200	GSS*CHART	MS-DOS, Unix	Both	9	Menu	No	Yes	Unltd.	3	3	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$295	745
	GSS*[illegible]	MS-DOS, Unix	Both	9	Command	No	Yes	Unltd.	3	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$295	
Graphicus (Graphic User Systems, Inc.) (408) 246-9530	Grafit	HP-Unix, RTE	Both	20	Command	No	Yes	16	14	20+	NA	Hard copy	Laser, plotter	$1,200 - $7,800	746
Graphware, Inc. (513) 434-6733	Charts Unlimited	MS-DOS	Presentation	NA	Both	No	Yes	1	1	50	No	Hard copy	Dot matrix, thermal, ink jet, laser	$295	747
Grid Systems Corp. (800) 222-GRID	Gridpoint	Proprietary, MS-DOS	Presentation	NA	Command	No	Yes	2	15	30	No	Hard copy	Dot matrix, ink jet, laser, plotter	$200	748
	Drawit	HP-Unix, RTE	Both	NA	Menu	No	Yes	16	14	1,000	NA	Hard copy	Laser, plotter	$1,100 - $6,900	
Hewlett-Packard Co. (800) 367-4772	HP Graphics Gallery	MS-DOS	Presentation	3	Menu	No	Yes	8	17	60-1,000	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$395 - $895	749
	HP Draw	HP 3000, MPE	Presentation	7	Menu	No	Yes	—	31	500+	NA	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$2,000 - $6,500	
Honeywell Information Systems, Inc. (800) 328-5111	Onegraph	DPS 6, DPS 6 Plus, MS-DOS	Both	9	Both	No	Yes	8	7	None	Yes	Hard copy, slides	Dot matrix, laser, plotter	$1,145 and up	750
IBM (301) 310-0074	Graphical Data Display Manager	MVS, VM, VSE	Presentation	5	Both	No	Yes	64	63	None	NA	Hard copy	Dot matrix, thermal, laser, plotter	$100 - $900/month	751
Information Builders, Inc. (212) 736-4433	Focus	MS-DOS, Wang VS, Unix, VAX/VMS, VM/CMS, MVS, DOS, CICS	Both	5	Both	No	Yes	Device dependent	—	None	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$1,295 - $74,500	752
Information Processing Techniques, Corp. (415) 494-7500	Exhibit	VAX/VMS, VM/CMS, MVS/TSO, DOS/VSE	Presentation	7	Both	No	Yes	8	12	12	NA	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$900 - $3,000	753
Inner Loop Software (213) 822-2800	Boxes and Arrows	MS-DOS, PC-DOS Version 2	Both	1	Menu	No	Yes	16	1	None	Yes	Hard copy	Dot matrix, laser	$395	754

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Innovative Software, Inc. (913) 492-3800	Smart Spreadsheet with Graphics	MS-DOS, Unix	Presentation	9	Menu	No	Yes	16	11	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$495	755
Interactive Systems Corp. (303) 797-9800	AGIS	VAX/VMS	Both	4	Both	No	Yes	Device dependent	5	7	No	Hard copy	Dot matrix, ink jet, laser, plotter	$57,000 - $125,000	756
Interactive Systems and Software, Inc. (617) 744-6700	EKChart	VAX/VMS, PDP-11, RT-11, RSX-11-M, RST S/E	Both	6	Command	No	Yes	Device dependent	1	None	No	Hard copy	Dot matrix, ink jet, laser, plotter	$1,795	757
Interchart Software, Inc. (609) 987-1590	Chartbuster/PC	MS-DOS	Presentation	9	Menu	No	Yes	8	8	26	Yes	Hard copy	Dot matrix, ink jet, plotter	$750	758
International Financial Data Systems, Inc. (404) 256-6447	Graphics Presentation System	MS-DOS	Presentation	11	Menu	No	Yes	—	—	34	No	Hard copy	Dot matrix, thermal, ink jet, laser, plotter	$750 - $1,000	759
IPT Corp. (415) 494-7500	Exhibit	VMS, Unix, AOS/VS, AOS, EM/RDOS	Presentation	12	Both	No	Yes	Device dependent	16	12	No	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	$900 - $3,000	760
Kinetic Software (502) 585-3403	Kinetic Graphics System	PC-DOS	Presentation	Unltd.	Menu	No	Yes	225	10	80	Yes	Hard copy, slides, video	Dot matrix, thermal, laser, plotter	$695	761
Laticorp, Inc. (415) 543-1199	High Tech Business Graphics	MS-DOS, Xenix, Unix	Decision support	4	Menu	No	Yes	1	2	None	Yes	Hard copy	Dot matrix, laser, plotter	$195 - $4,995	762
LCS/Telegraphics (617) 547-4738	Telepaint	MS-DOS, PC-DOS	Both	NA	Menu	No	Yes	4	16	20	No	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$99	763
Logicon, Inc. (402) 291-7750	Jgraph	Unix, VM, MVS	Both	15	Both	No	Yes	256	25	100	NA	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$20,000 - $50,000	764
Lotus Development Corp. (617) 577-8500	Freelance Plus	MS-DOS	Presentation	5	Menu	No	Yes	13	30	500+	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$495	765
	Graphwriter	MS-DOS	Presentation	23	Menu	No	Yes	13	22	None	No	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$495	
Maddison-Cross Associates, Inc. (213) 387-4044	Artpack	MS-DOS	Presentation	3	Menu	Yes	Yes	4	39	179	Yes	Hard copy, slides, video	Dot matrix, ink jet, laser, plotter	$100	766
McDonnell Douglas Information Systems Group (714) 250-1000	Realgraph	Proprietary	Both	6	Command	No	Yes	Device dependent	Device dependent	None	Yes	Hard copy, slides, video	Dot matrix, laser, thermal, plotter	$995	767
John McLean and Associates, Inc. (713) 780-7262	Optchart	HP 3000, VAX/VMS	Both	5	Menu	No	Yes	8	12	None	NA	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$2,500	768
Media Cybernetics, Inc. (800) 426-HALO	Nimbus	MS-DOS	Presentation	12	Menu	No	Yes	256	18	None	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$195	769
	Dr. Halo II	MS-DOS	Presentation	NA	Menu	Yes	Yes	256	20	NA	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser	$139.95	
Megatek Corp. (619) 457-5359	Contemplate	VAX/VMS, VM/CMS	Decision support	7	Command	Yes	Yes	Device dependent	37	None	NA	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$3,750 - $25,000	770
Micrografx, Inc. (800) 272-3729	Windows Draw	MS-DOS	Presentation	NA	Menu	No	Yes	8	7	500+	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$299	771
	Windows Graph	MS-DOS	Presentation	7	Menu	No	Yes	8	7	None	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$395	
Micro-Labs, Inc. (214) 702-8654	Bizgraph	TRSDOS	Both	6	Menu	No	Yes	1	1	—	No	Hard copy	Dot matrix	$75	772
Microsoft Corp. (206) 882-8080	Microsoft Chart	MS-DOS	Presentation	9	Command	No	Yes	16	12	None	Yes	Hard copy, slides, video	Dot matrix, ink jet, laser, plotter	$295	773
	Microsoft Excel	Macintosh	Both	8	Both	No	Yes	1	Device dependent	None	NA	Hard copy	Dot matrix, laser	$395	
	Microsoft Chart for Macintosh	Macintosh	Both	8	Both	No	Yes	1	—	None	NA	Hard copy	—	$125	
Micro Software Systems, Micro-Plot, Inc. (714) 526-8435	Datagraph	TRSDOS, LDOS, NEWDOS	Both	7	Menu	No	Yes	—	—	20	No	Hard copy	Dot matrix	$80 - $115	774
Microsystems Engineering Corp. (312) 882-0111	Mass-11 Draw	MS-DOS	Presentation	NA	Menu	No	Yes	1	1	17	Yes	Hard copy	Dot matrix, laser, plotter	$495	775
Miracle Computing (913) 843-5863	Graphcalc	MS-DOS, PC-DOS	Presentation	7	Both	No	Yes	16	1	None	No	Hard copy	Plotter	$475	776
	Graphit	MS-DOS, PC-DOS	Presentation	5	Both	No	No	16	1	None	No	Hard copy	Dot matrix	$80	
	Eazygraph	MS-DOS, PC-DOS	Presentation	3	Both	No	No	16	1	None	No	Hard copy	Dot matrix	$35	
Mosaic Software, Inc. (617) 491-2434	Chartman	MS-DOS	Both	16	Menu	No	Yes	9	9	16	Yes	Hard copy	Dot matrix, plotter	$99	777
	Twin	MS-DOS	Presentation	8	Menu	No	Yes	8	11	10	Yes	Hard copy	Dot matrix, laser, plotter	$99	
Multiware, Inc. (916) 956-3291	MGSP	RT-11 TSX, RSX-11-M, VM	Both	4	Command	No	Yes	12	14	20	No	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	$1,800	778

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[illegible], Inc.	Render	RT-11 TSX, RSX-11-M, VM	Both	4	Command	No	Yes	12	14	20	No	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	[illegible]	
Muse Software Co. (301) 831-7090	Data Plot	Apple II family	Both	4	Menu	No	No	6	1	2	No	Hard copy	Dot matrix	$35.97	779
New England Software, Inc. (203) 625-0062	Graph-in-the-Box	MS-DOS	Presentation	11	Menu	No	Yes	16	3	None	Yes	Hard copy	Dot matrix, ink jet, laser, plotter	$87.40 - $147.60	780
Pacific Basin Graphics (415) 824-4910	PBG 200 Business Graphics	Unix, MS-DOS	Presentation	7	Menu	No	Yes	16	3	NA	Yes	Hard copy	Dot matrix, ink jet, laser, plotter	$295 - $750	781
	PBG 300 Business Graphics	Unix, MS-DOS	Presentation	10	Menu	No	Yes	16	3	NA	Yes	Hard copy	Dot matrix, ink jet, laser, plotter	$295 - $995	
Pansophic Systems, Inc. (800) 323-7335	D-Pict	VAX/VMS, MVS/TSO, VM/CMS, Prime 19, AOS/VS (MV)	Both	21	Both	No	Yes	72	44	140	NA	Hard copy, slides	Dot matrix, thermal, ink jet, plotter	$500 - $37,000	782
Parallax Systems, Inc. (212) 475-4001	Execuplot	VM/CMS	Both	8	Menu	No	Yes	6	1	None	Yes	Hard copy	Dot matrix, ink jet, laser, thermal, plotter	$5,000	783
PCSoftware of San Diego (619) 571-0981	Executive Picture Show	MS-DOS	Presentation	7	Both	Yes	Yes	4	11	200	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$345	784
Petrocomp Systems, Inc. (713) 880-0226	Pegs	PC-DOS	Both	1	Menu	No	Yes	10	1	None	Yes	Hard copy, slides, video	Dot matrix, laser, plotter	$295 - $595	785
Pilot Executive Software, Inc. (617) 350-7035	Command Center	VAX/VMS, VM/CMS	Decision support	1,000	Menu	No	Yes	8	—	50	Yes	Hard copy, slides	Ink jet, laser	$75,000 - $135,000	786
	The Pilot Advantage	VM/CMS	Decision support	1,000	Menu	No	Yes	8	—	50	Yes	Hard copy, slides	Ink jet, laser	$15,000	
Pinstripe Software Ltd. (703) 790-8488	Wallstreet Window	MS-DOS, PC-DOS	Both	1	Menu	No	Yes	Device dependent	Device dependent	None	Yes	Hard copy, slides	Dot matrix, laser, ink jet	$295	787
Practicorp International (617) 965-9870	Practigraph	MS-DOS	Both	8	Menu	No	Yes	16	9	None	No	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$99.95	788
Precision Visuals, Inc. (303) 530-9000	Picture Plus	VAX/VMS, Unix, VM/CMS	Both	14	Both	No	Yes	Device dependent	50	None	NA	Hard copy, slides, video	Ink jet, laser, plotter	$6,600 - $52,000	789
Primesoft Corp. (301) 229-4229	Prime Plotter	Apple IIc	Both	13	Menu	Yes	Yes	8	4	40	No	Hard copy, slides, video	Dot matrix, plotter	$340	790
Progressive Peripherals and Software, Inc. (303) 825-4144	Add Graph	MS-DOS	Presentation	12	Menu	No	Yes	4	1	4	Yes	Hard copy, slides	Dot matrix, thermal, ink jet, laser, plotter	$149.95	791
Pynal Applications (804) 320-6573	Pynal Visuals	PC-DOS	Presentation	1	Menu	No	No	1	2	None	Yes	Hard copy	Dot matrix, laser	$60	792
Quadratron Systems, Inc. (818) 789-8588	Q-Chart	Unix, MS-DOS	Presentation	9	Menu	No	Yes	8	6	None	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$325 - $7,000	793
Samna Corp. (800) 831-9679	Samna Decision Graphics	MS-DOS	Both	7	Menu	No	Yes	Device dependent	10	12	Yes	Hard copy, slides, video	Plotter	$450	794
SAS Institute, Inc. (919) 467-8000	SAS/Graph	OS, CMS, DOS/VSE, VMS	Both	23	Both	No	Yes	256	61	130	Yes	Hard copy, slides, video	Plotter, ink jet, laser	$1,500 - $10,000	795
Saturn Systems, Inc. (800) 328-6145	Saturn Graph	VAX	Both	6	Menu	No	Yes	8	12	None	No	Hard copy, slides	Dot matrix, thermal, laser, plotter	$2,000 - $10,000	796
Sensible Software, Inc. (313) 258-5566	Graphics Department	Apple II	Both	6	Both	No	Yes	6	40	None	No	Hard copy, video	Dot matrix	$124.95	797
I. P. Sharp and Associates, Ltd. (416) 364-5361	Superplot	MVS	Both	14	Both	No	Yes	Device dependent	12	14	NA	Hard copy	Dot matrix, thermal, ink jet, laser, plotter	$30,000	798
Ship Analytics (203) 535-0990	Athena/graph	DEC VAX	Presentation	4	Menu	No	Yes	8	4	2	NA	Hard copy, slides, video	Dot matrix, plotter	$450 - $1,400	799
Softel, Inc. (212) 677-6500	Videogram	MS-DOS	Presentation	NA	Menu	Yes	No	64	43	NA	Yes	Hard copy, slides	Dot matrix, thermal, ink jet	$50	800
Softkey Software Products, Inc. (416) 598-5033	Key Chart V 4.0	MS-DOS	Both	14	Menu	No	Yes	16	8	None	Yes	Hard copy, slides, video	Dot matrix, laser, thermal, ink jet, plotter	$149 - $375	801
Softrak Systems (801) 531-8550	Protrak	PC-DOS, Unix, Xenix, VAX/VMS, Ultrix	Both	2	Menu	No	Yes	6	2	NA	Yes	Hard copy	Dot matrix, ink jet, laser, thermal, plotter	$295	802
	Multi Gantt	PC-DOS, Unix, Xenix, VAX/VMS, Ultrix	Both	2	Menu	No	Yes	6	2	NA	Yes	Hard copy	Dot matrix, laser, ink jet, thermal, plotter	$195	
	Custom Gantt	PC-DOS, Unix, Xenix, VAX/VMS, Ultrix	Both	1	Menu	No	Yes	6	2	NA	Yes	Hard copy	Dot matrix, laser, ink jet, thermal, plotter	$95	
Software Clearinghouse (513) 451-6950	Graphstation	MS-DOS	Both	9	Menu	No	Yes	Device dependent	8	None	Yes	Hard copy, slides, video	Dot matrix, ink jet, thermal, laser, plotter	$495	803

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Software Products International (800) 421-7400 in Calif. (800) 221-3511 outside Calif.	Spreadsheet Access	MS-DOS	Both	11	Menu	No	Yes	16	1	None	Yes	Hard copy	Dot matrix, thermal, ink jet, laser, plotter	$395	804
Software Publishing Corp. (415) 962-8910	Harvard Presentation Graphics	MS-DOS	Presentation	3	Menu	No	Yes	Device dependent	5	None	Yes	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	$395	805
	PFS Professional Plan	MS-DOS	Both	13	Menu	No	Yes	Device dependent	4	None	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$249	
Southwind Software, Inc. (316) 524-0100	Grafware	Unix	Both	14	Menu	No	Yes	9	80+	Device dependent	No	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	Contact vendor	806
SPSS, Inc. (312) 329-3500	SPSS Graphics	VAX/VMS, Primos, GCOS, VM/CMS, MVS AOS/VS	Presentation	25	Menu	No	Yes	8	14	5	NA	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$3,000 - $12,000	807
Stansfield & Associates (614) 866-0180	P and SC	MS-DOS, PC-DOS	Both	7	Menu	No	No	NA	Device dependent	None	No	Hard copy	Dot matrix	$295	808
Stella Systems (408) 257-6644	Stella Business Graphics	IBM PC	Presentation	12	Menu	No	Yes	8	1	9	Yes	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$199	809
STSC, Inc. (301) 984-5000	Statgraphics	MS-DOS	Both	250+	Both	No	Yes	16	1	None	Yes	Hard copy, slides, video	Dot matrix, plotter	$795	810
Susie Software (312) 824-5154	The Whole Kaboodle	MS-DOS, PC-DOS	Both	2	Menu	No	Yes	1	1	None	No	Hard copy	Dot matrix, ink jet, laser, thermal	$129.95	811
Telos Software Products (213) 450-2424	Business Filevision	Macintosh	Presentation	NA	Menu	Yes	Yes	1	16	NA	NA	Hard copy	Dot matrix, ink jet, laser	$395	812
Trillian Computer Corp. (408) 358-2761	The Trillian Demo Generator	MS-DOS	Presentation	NA	Command	Yes	Yes	4	Unltd.	None	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser	$6,800 (for first license)	813
Uniras, Inc. (714) 990-1000	Unigraph	VAX/VMS, VM/CMS, PC-DOS	Both	18+	Menu	No	No	Device dependent	33	18	Yes	Hard copy, slides	Dot matrix, ink jet, laser, thermal, plotter	$1,500 - $40,000	814
Unisys Corp. Contact local sales office	The Business Graphics Package	BTOS	Both	3	Menu	No	Yes	8	Device dependent	NA	No	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$500	815
	BTOS Systems Draw	BTOS	Both	NA	Menu	No	Yes	8	Device dependent	NA	No	Hard copy, slides	Dot matrix, ink jet, laser, plotter	$250	
Venturcom, Inc. (617) 661-1230	Prelude Graphic Module	Unix	Both	6	Command	No	No	Device dependent	1	None	Yes	Hard copy	Dot matrix, laser, ink jet, plotter	$300	816
Viking Software Services, Inc. (918) 745-6550	Viking Graphic System	VAX/VMS	Decision support	3	NA	No	Yes	1	1	None	No	Video	None	$500	817
Visible Systems Corp. (617) 890-1000	Visible Analyst	MS-DOS, PC-DOS	Both	10	Menu	No	No	1	7	40	Yes	Hard copy	Dot matrix, laser, ink jet	$695	818
Visual Communications Network, Inc. (617) 497-4000	Concorde	MS-DOS	Presentation	8	Menu	Yes	Yes	16	17	3,000	Yes	Hard copy, slides, video	Dot matrix, ink jet, laser, plotter	$695	819
Visual Engineering, Inc. (408) 945-9055	Visual Prochart	Unix	Both	15	Menu	No	Yes	8	8	6	No	Hard copy, slides, video	Dot matrix, ink jet, laser, thermal, plotter	$500 - $1,000	820
Visual Intelligence Corp. (413) 253-3482	Data Views	VMS, Unix, AEGIS, Ultrix	Presentation	25	Both	Yes	Yes	Device dependent	Device dependent	NA	No	Hard copy	Plotter	$7,700	821
Wang Laboratories, Inc. (800) 225-0264	VS Graphics Facility	VS	Both	6	Both	No	Yes	8	15	NA	NA	Hard copy	Dot matrix, laser, plotter	$3,500	822
	Charter	VS	Both	5	Both	No	Yes	1	8	NA	NA	Hard copy	Dot matrix, laser, plotter	$3,500	
	Microsoft Chart	MS-DOS	Both	6	Command	No	Yes	5	—	NA	NA	Hard copy	Dot matrix, ink jet, laser, thermal, plotter	$1,250	
Zenographics (714) 851-6352	Mirage	MS-DOS, PC-DOS	Both	20	Both	No	Yes	256	7	150	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$895	823
	Autumn	MS-DOS, PC-DOS	Both	6	Menu	No	Yes	256	7	150	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser, plotter	$595	
	VR	MS-DOS, PC-DOS	Presentation	NA	Menu	No	Yes	256	2	NA	Yes	Hard copy, slides, video	Dot matrix, thermal, ink jet, laser	$195	
ZSoft Corp. (404) 980-1950	PC Paintbrush	MS-DOS, PC-DOS	Both	NA	Menu	No	Yes	Device dependent	16	4	Yes	Hard copy	Dot matrix, ink jet, thermal, plotter	$99	824
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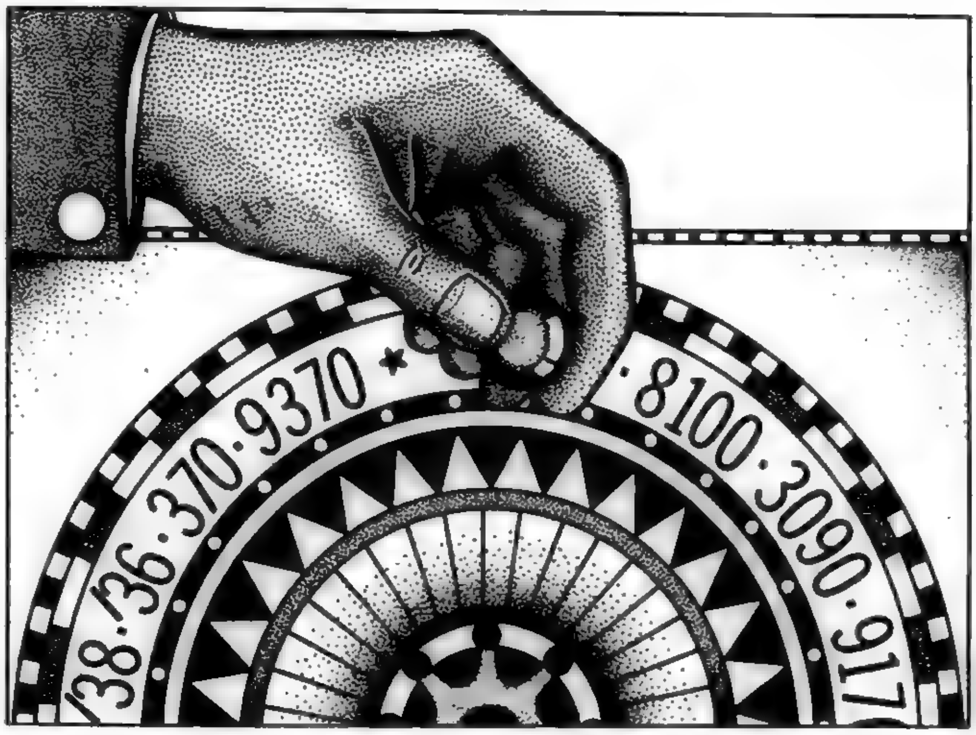
DIAL-INQ READER SERVICE NUMBER 33

Roulette, IBM-style

Will IBM convert all its mid-range customers to 370s, merge System/36 with System/38 or support CPF on the 9370? Users, place your bets.

BY MICHAEL SICILIAN



IAN COLLINS

In mid-February, IBM announced several new products that reveal a little more of its mid-range strategy. It released System/36 hardware enhancements. It proclaimed the benefits of the Solutionpac Office Series, a version of Displaywrite repackaged with common electronic mail and office automation utilities for the System/36 and the 9370. And it reported an extension of Distributed Data Base Management (DDM), a remote file-access method, to the Personal Computer.

IBM also restated its belief that no single architecture is sufficient for its large user community. The company said it will continue to enhance three general-purpose systems — the 370, System/36 and 38 — and three special-purpose systems — the RT Personal Computer, System/88 and Series/1.

These announcements follow a downturn in IBM's financial performance, as well as criticism of lack of compatibility and networking support among its products, sluggish growth in the mainframe systems market, loss of market share in PCs and entry systems, plus record financial and technical achievements by its largest mid-range system competitor, Digital Equipment Corp.

DP managers, market analysts and not a few pundits must now evaluate the importance of these events, predict their near-term impact on the industry and prepare for the longer term evolution of IBM's mid-range strategy as well as the likely response from major competitors. To do this, we need to ask ourselves: How did IBM get into this situation? Is it reasonable for the company to continue indefinite support of so many architectures? What alternatives does IBM face throughout the next few years?

Paying the penalty

In the early 1980s, IBM switched its marketing strategy from leasing to sales, thus creating a three- to five-year surge in revenue. We should all have predicted the decline in growth rate that occurred once the installed base of leased equipment sold. Yet many spoke as if good financial results were a given for IBM because of its dominant market position.

IBM is also paying the penalty for artificially partitioning its product offerings. The company divided its mainframe customers into DOS and OS/MVS camps. It developed an elegant time-sharing system, VM/CMS, and then failed to deliver reasonable file sharing. It split off the System/34s, 36s and 38s from 360/20s, 370/115s and 4300s to position itself for a possible antitrust breakup and because mainframe software was so hard to use. The company still has not addressed this problem of unfriendly software for mainframe customers. It marketed 8100s rather than small 4300s to distribute access to mainframe systems.

To maintain account control, IBM encouraged customers to build machine- and operating system-dependent applications. This policy backfired. IBM customers not only find it difficult to move to competing systems, as IBM hoped, but they are constrained from moving to newer, better supported or larger IBM products as well.

In the late 1970s, IBM canceled the technically successful Future Systems project because it could not move its 370 customer base to a new system. This failure should have provided fair warning, but IBM management could only see the immediate threat from Amdahl Corp.

IBM's strategy of multiple architectures increased the cost and delayed the introduction of PC-to-mainframe communications because separate hardware and software products were required for the 370, System/36 and 38, 8100 and Series/1 machines. This strategy is also the source of IBM's current difficulties with mid-range systems that lack an integrated environment of networked machines with distributed data bases and cost-competitive hardware and software.

IBM would like to justify this multiplicity of systems. Indeed, the company has just restated its position that customers need the

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Sicilian is director of information systems and a vice-president of a major insurance brokerage firm.

- **IBM pays price for off-base 1970s' strategy**
- **Customers blocked from upgrading**
- **Will all users be forced into XA architecture?**

special benefits that differentiate the 370 from the System/36 or 38. Yet, in order to compete effectively with DEC, IBM must promise distributed processing, transferable applications and easy upward migration paths, all of which are difficult to achieve with multiple architectures and differing user and application program interfaces.

The announcement of Solutionpac for the System/36 and 9370 is primarily symbolic. It appears to be IBM's attempt to show that its users can be insulated from differing architectures. However, most computers do not run just IBM office automation systems. It is unlikely that IBM's strategy can insulate its customers' application programs to the point of allowing a transfer to larger machines when upgrades are required.

THE SYSTEM/36 architecture, like DEC's old PDP-8 and PDP-11, has essentially reached the end of its useful life, since it does not provide a foundation for building applications that must grow during the next several years.

IBM's decision to enlarge some models of the System/36 and continue support for multiple architectures will ease some customers' fears and protect the company's current cash flow. On the other hand, the decision to support DDM on PCs holds much greater strategic importance. Application development under CICS requires expensive programming talent, and mainframe systems yield much less programmer productivity than microcomputers or minis.

DDM/PC will allow customers to ignore CICS and the mainframe except as a data base server and batch processing back end. All interactive program development can be transferred to PCs, thus eliminating a major bottleneck for mainframe DP shops.

For the short run, IBM has decided to play it safe and continue business as usual. However, most of its customers are working on applications that will be in production for the next five to 10 years. They must be able to anticipate IBM's longer range strategy.

This requires consideration of the following alternatives, which appear to be the most likely, given IBM's current product mix and available technology:

- Upgrade current hardware and software.
- Convert all customers to 370 architecture.
- Merge System/36 and 38.
- Produce a "9360" and "9380."
- Support CPF on the 370.

Upgrade current hardware and software. IBM could try to ignore the issue of multiple architectures and continue to upgrade current System/36 and 38 hardware and software in accordance with its stated policies. Most customers have not yet tried to connect System/36s and 38s and 370s into a network, and many will never need this capability. Few companies need to move applications from machine to machine or serve multiple architectures from a single programming group. These users need a growth path and improved networking among multiple System/36s or multiple 38s.

Since 1979, when IBM first delivered the System/38, it has enhanced system performance four times. All of these enhancements were provided by installation of new CPU cards as field upgrades.

There is a rumor that IBM will continue this approach this year by announcing a new System/38 Model 800 or 900 with twice the speed of a Model 700. If this strategy is continued, it will be limited primarily by the physical constraints of the card cage that contains the System/38 CPU, its memory and I/O controllers. IBM will be able to provide further system upgrades only as integrated circuit technology permits higher levels of performance within the same physical configuration.

For the System/36, IBM has built a variety of processors, so these physical limits do not apply. When IBM announced the latest round of System/36 improvements, many argued that this move proved System/36s are not obsolete because they can still be used productively and because IBM continues to enhance the system.

However, the System/36's 16-bit software architecture does not support performance improvements when applied to larger, more complex system and application programs. The System/36 architecture, like the Hewlett-Packard Co. HP 3000 and DEC's old PDP-8 and PDP-11, has essentially reached the end of its useful life, since it does not provide a foundation for building applications that must grow during the next several years.

Upgrading current hardware and software would be attractive to IBM's customers. Any company that just bought a Model 700 would not feel abandoned, because the 700 could be upgraded to a Model 800 or 900 next year. Companies with large investments in System/36 and 38 applications would be protected and would see an upgrade path.

On the other hand, the physical layout of the System/38 — mainframe, card cage, power supplies, I/O channels and so on — was designed in the 1970s and cannot go on forever.

The System/36 and 38 do not use floor space as efficiently as the new 9370, and the 38's CPU planer board cannot

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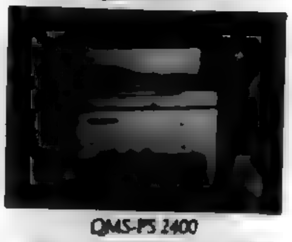
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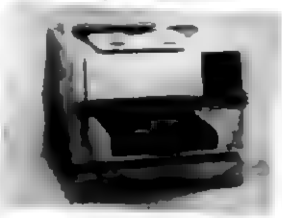
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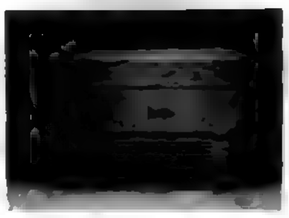
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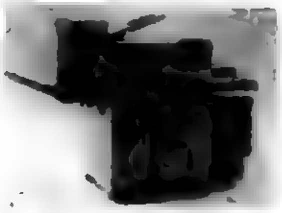
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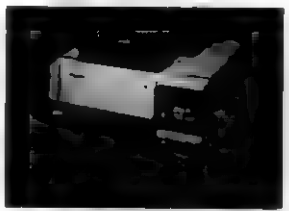
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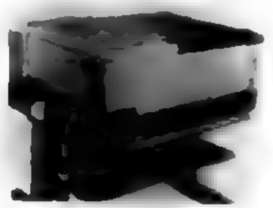
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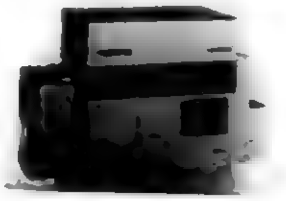
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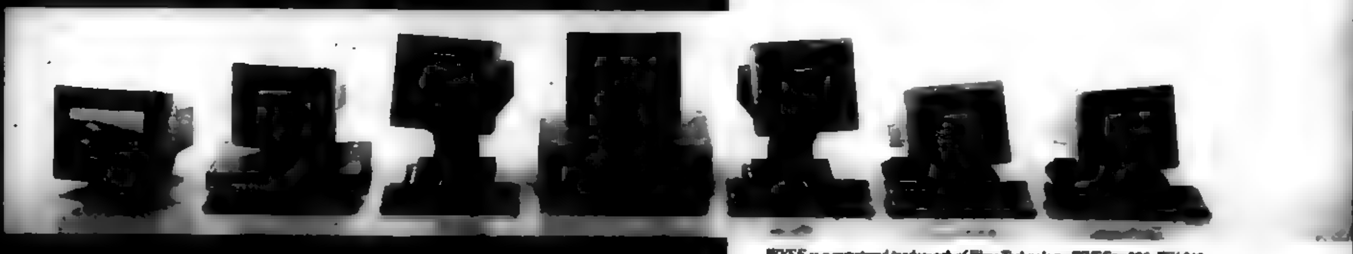

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support the new thermal conduction module that is the basis of the 9370's performance.

Convert all customers to 370 architecture. In theory, IBM could abandon the System/36 and 38 and try to move its entire customer base to 370 machines. Some mainframe advocates predicted this, following announcement of the 9370-series hardware. The 9370 provides CPU speeds of 0.5 to 2.8 million instructions per second (MIPS), whereas the System/38 covers the range of 0.3 to 1.3 MIPS, and the System/36 covers 0.1 to 0.5 MIPS. Further, the 9370s offer more competitive price/performance.

On the other hand, System/36 and 38 operating systems, SSP and CPF, are not compatible with VM/CMS or CICS and DOS or MVS on the 9370. CPF provides a more advanced and shareable data base and a conversational environment not available from the 9370s. SSP is easy to use with minimal operator training.

Unless IBM fixes these defects in its mainframe software and builds bridges, it will lose a significant portion of its System/36 and 38 customer base to DEC, Data General Corp. and other supermini vendors, all of whom offer systems that are superior to IBM mainframe software for this customer group. This is almost inconceivable, since IBM has sold more than 20,000 System/38s and more than 120,000 System/36s.

Merge System/36 and 38. IBM could try to reduce the number of mid-range systems. It could develop a new machine we might call a "System/39." Alternately, it could simply encourage System/36 users to move to the 38 with conversion utilities. Finally, IBM could enhance CPF on the System/38 so it can run SSP and System/36 application code as a virtual machine or task.

Conversion for most System/36 and 38 users to a new machine would be easier than conversion for 370 users. IBM 370 installations often build applications in assembly language that take advantage of operating system user exits; some even modify operating systems internals. System/36 and 38 users rely almost exclusively on higher level languages. Unless the System/39 were a superset of both the System/36 and 38 and could run programs unmodified, this would still be a significant undertaking.

There is a rumor that the next release of CPF on the System/38 will be able to run System/36 code as a task. If this is accomplished through software emulation, it will not be very efficient. It also will not replace small System/36 installations unless IBM markets smaller, less expensive System/38s.

Produce a "9360" and "9380." The very large-scale integration (VLSI) circuit technology in the System/38 is almost identical to that used in the 4300. A System/38 Model 700 uses essentially the same chips as the 4361. IBM could maintain this parallel by announcing a new System/38, a "9380." The 9380 could take advantage of the thermal conduction modules, VLSI technology, packaging in Electronics Industry Association (EIA) equipment racks and integrated enhanced small device interface channel communication features of the 9370. The new System/38 would run CPF and System/38 application code with no change, probably without even a recompile. This approach could also be used to build a 9360 version of the System/36 that would run under SSP.

IN THEORY, IBM could abandon the System/36 and System/38 and try to move its entire customer base to 370 machines.

This alternative would allow IBM to produce a System/38 that is two or three times faster than the Model 700. It would minimize production costs for the 9370, 9360 and the 9380. The 9360 and 9380 could be physically integrated with the new 9335 disks, and a complete system — CPU and disks — could be configured, as with the 9370, in a single equipment rack. As mentioned above, this would alienate some recent purchasers of the System/36 and 38. That possibility did not, however, stop IBM from making 4300s, System/34s and 8100s obsolete.

Support CPF on the 370. In January, IBM announced a partial solution for the now-abandoned 8100. During the next two years, IBM says it will develop a new version of 8100 DPPX, its distributed processing executive, for the 9370. It does not, however, plan to move DPCX or DOSF, the 8100 office automation system.

This approach may signal a strategy that could be applied to other mid-range systems. CPF was originally developed on a 370 and was designed to be retargetable; in other words, the software makes few presumptions about underlying hardware. Just as Unix is available on many different CPUs, CPF and System/38 application code could be moved to some other physical machine. If IBM were to retarget CPF for the 9370, users would reap all the advantages of the 9360/9380 option and would further gain the promise of IBM supporting CPF in even bigger mainframes, such as the 6-MIPS 4381 or even the 50-MIPS 3090.

This option is technically feasible for the System/38. It may be less attractive to retarget SSP from the System/36 to the 370 because of greater differences in underlying architecture. More important, it raises difficult marketing questions for IBM.

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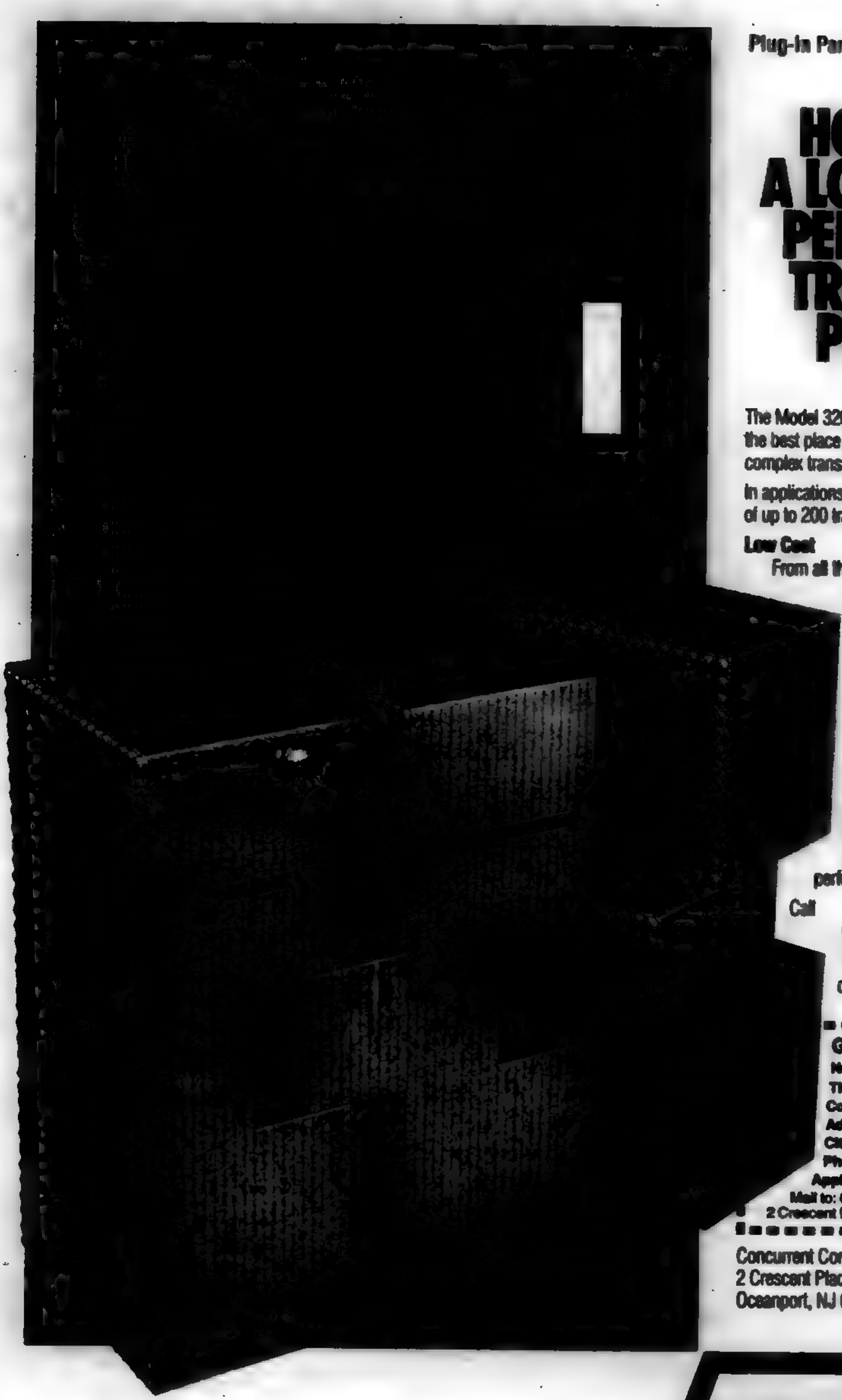

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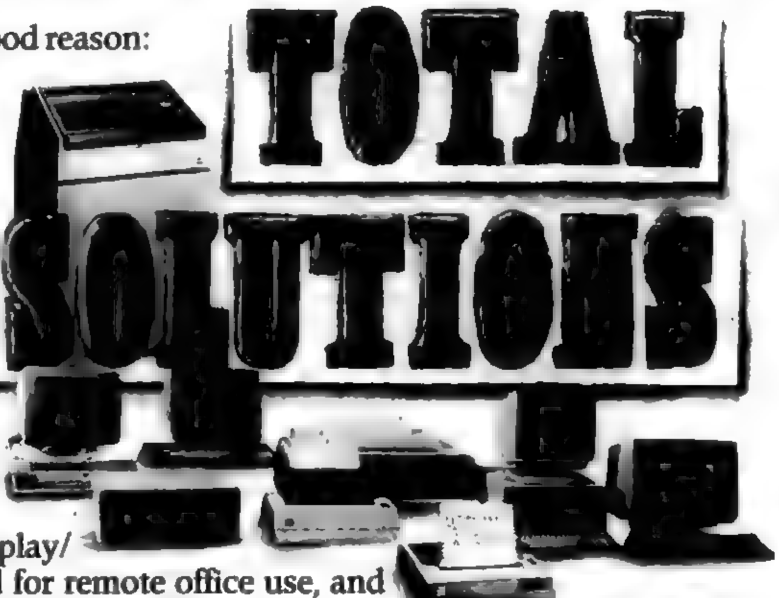

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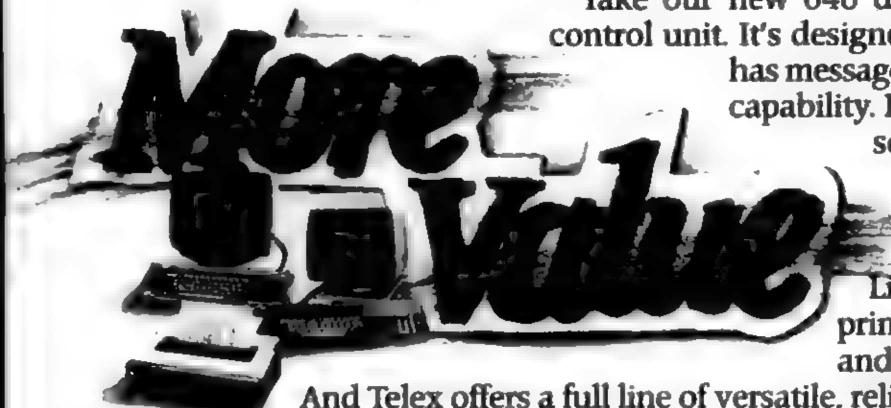

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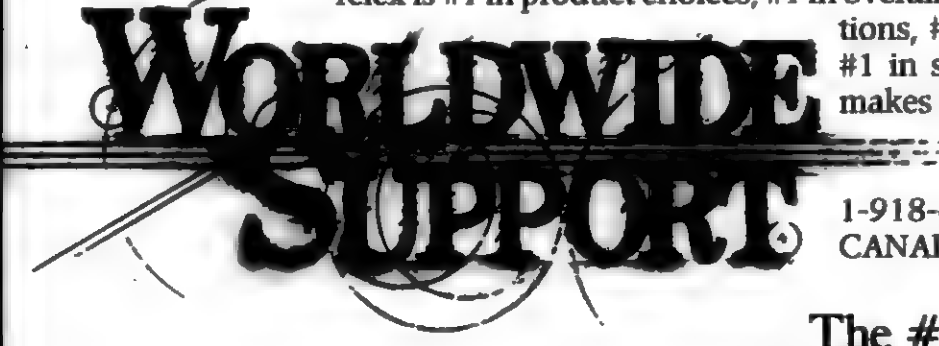

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that its large mainframe users might be afraid that CPF is intended as a replacement for MVS and CICS. This may seem foolish, but IBM believes that its mainframe users are terrified of change. It was slow to develop the relational data base DB2 because IMS users feared abandonment. It canceled the Future Systems project, on which the System/38 was based, even though the former was technically superior to MVS. The company may just not want to gamble by putting its best operating system on 370 hardware.

The primary advantage of supporting CPF on the 370 is that IBM could eliminate some of the perception of architectural incompatibilities across its product lines and reduce DEC's marketing advantage of a single VAX architecture.

IBM's next moves

IBM is correct when it describes its midrange user community as displaying a variety of needs. Diverse needs reflect, in part, the differences between a one-programmer System/36 shop with a few users and a business with 50 or more programmers and a dozen sites with a hundred users each.

Much of this diversity is the direct result of IBM's own marketing strategy of the 1970s, which encouraged users to become dependent on several different operating systems and machine architectures. As demonstrated by DEC's single VAX architecture, which extends from a $12,000 Microvax 2000 to a 30-MIPS Vaxcluster, the number of IBM's systems are unnecessary — a liability rather than an asset.

It is not apparent which of these options best meets IBM's interests or the needs of most of its current and potential customers. Whichever option the company selects, it will hurt some customers and make others happy. IBM seems to believe, at least in the short run, that it should continue to upgrade current hardware and software. It has decided to counter the VAX architecture by selling common office automation programs and presumably other utilities for its many systems.

IBM might be surprised to find that many customers with installed System/38 machines would prefer a new 9380 or a retargeting of CPF to the 9370. These options can support a doubling of system performance to 5 million and 10 million instructions per second in 1988 and 1990, respectively.

The options also increase the probability that IBM will provide channel-speed communications between multiple 9380 CPUs and between 9380s, 9360s and 9370s. This would result in a system similar to the Vaxcluster for System/38s and 36s with DDM software. Users could configure systems with five or 10 CPUs of 3 million, 5 million or 10 million instructions per second each and could process data bases of 100 billion bytes.

This move would furnish a viable migration path, although it would not provide the dynamic process relocation, remote calls and other features one would want from a distributed multiprocessor system.

If IBM markets all of these systems as physically compatible drawers in a 9300-series EIA rack using ESDI channel-speed communications, it would essentially have achieved the rumored goals of its Fort Knox project. That project, discussed in trade journals a year or two ago, described a single system that could run System/36 and 38 and 370 code all at once with file sharing.

AS DEMONSTRATED by DEC's single VAX architecture, which extends from a $12,000 Microvax 2000 to a 30-MIPS Vaxcluster, the number of IBM's systems are unnecessary — a liability rather than an asset.

Although growth has been sluggish for the last 18 months, IBM's biggest single revenue stream continues to flow from its large mainframe systems. However, it will need to face the challenges to its midrange to protect that stronghold.

The Vaxcluster and recent DEC announcements of the 8974 and 8976 already compete with IBM mainframe installations. DEC, DG, HP and other minicomputer vendors will build larger versions of their systems as applications grow to require greater system resources. IBM would like to prevent its minis growing to the point where they compete with its mainframes, but it will not have that luxury if it wishes to remain competitive.

Admittedly, all of the above are hypotheses based purely on careful reading of the trade journals and estimates of IBM's business interests. These hypotheses seem reasonable, but IBM could surprise us. In the past, it has sold several systems as trial balloons just to test market response.

IBM could possess a unique new technical solution for the 1990s and beyond, or it could sleep on the problem until everyone converts to DEC, DG or HP. Top management may not even know what it will do, and internal corporate battles probably still rage, with technicians developing all of these alternatives and others. Even if IBM builds a 9360 or 9380, it may use another name just because it likes to be inscrutable. ●

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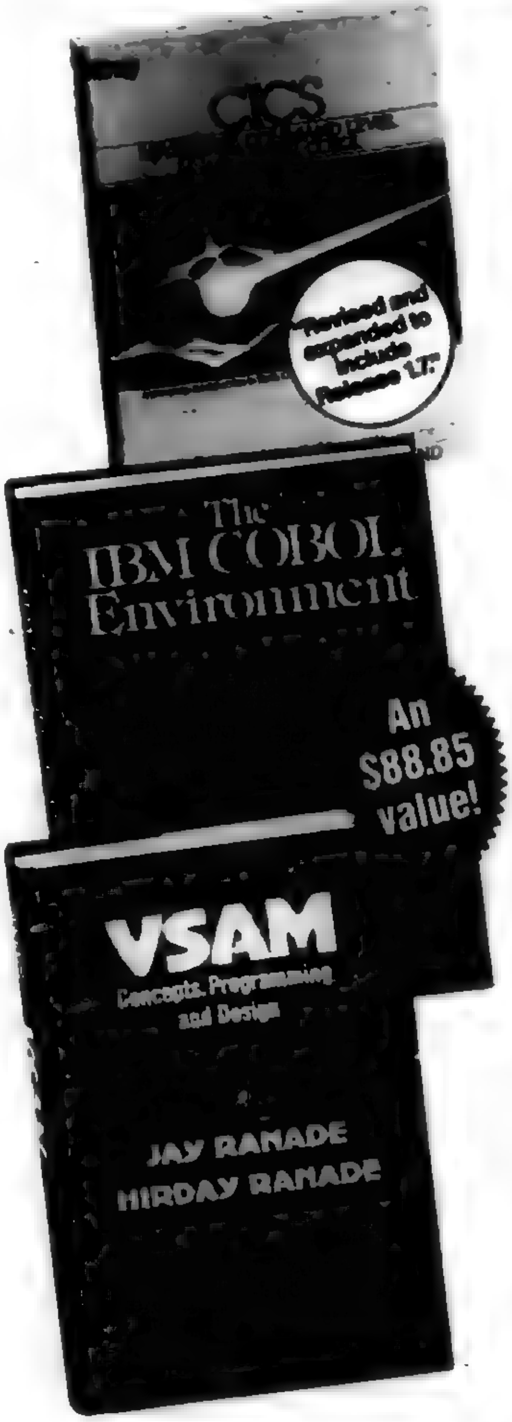
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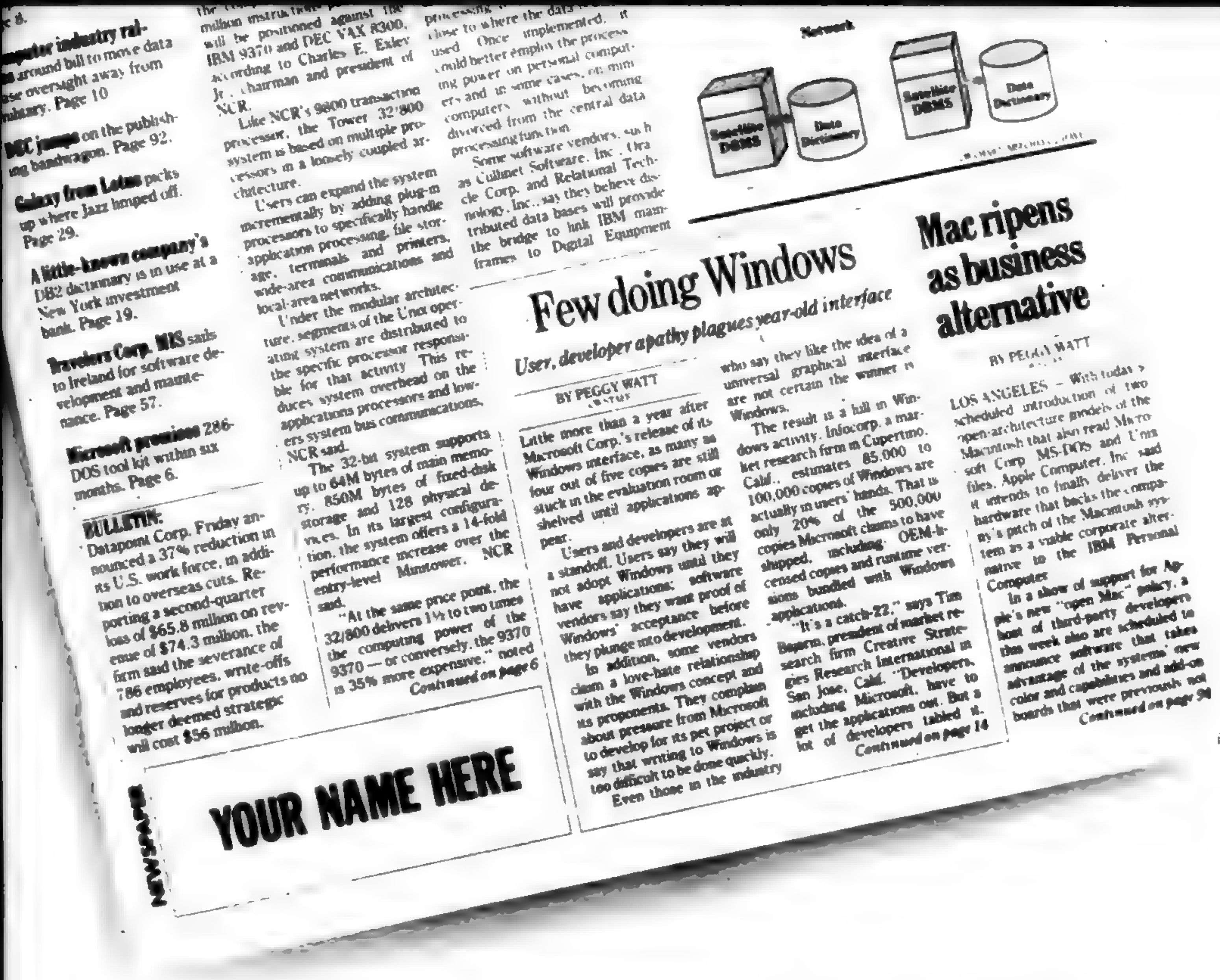

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DEC jumps on the publish-

ing bandwagon. Page 92.

Galaxy from Lotus picks

up where Jazz limped off.

Page 29.

A little-known company's

DB2 dictionary is in use at a

New York investment

bank. Page 19.

Travelers Corp. MIS sails

to Ireland for software de-

velopment and mainte-

nance. Page 57.

Microsoft promises 286-

DOS tool kit within six

months. Page 6.

BULLETIN:

Datapoint Corp. Friday announced a 37% reduction in its U.S. work force, in addition to overseas cuts. Reporting a second-quarter loss of $65.8 million on revenue of $74.3 million, the firm said the severance of 786 employees, write-offs and reserves for products no longer deemed strategic will cost $56 million.

million instructions against the will be positioned against the IBM 9370 and DEC VAX 8300, according to Charles E. Exley Jr., chairman and president of NCR.

Like NCR's 9800 transaction processor, the Tower 32/800 system is based on multiple processors in a loosely coupled architecture.

Users can expand the system incrementally by adding plug-in processors to specifically handle application processing, file storage, terminals and printers, wide-area communications and local-area networks.

Under the modular architecture, segments of the Unix operating system are distributed to the specific processor responsible for that activity. This reduces system overhead on the applications processors and lowers system bus communications, NCR said.

The 32-bit system supports up to 64M bytes of main memory, 850M bytes of fixed-disk storage and 128 physical devices. In its largest configuration, the system offers a 14-fold performance increase over the entry-level Minitower, NCR said.

"At the same price point, the 32/800 delivers 1½ to two times the computing power of the 9370 — or conversely, the 9370 is 35% more expensive," noted

Continued on page 6

processing close to where the data used. Once implemented, it could better employ the processing power on personal computers and in some cases, on minicomputers without becoming divorced from the central data processing function.

Some software vendors, such as Cullinet Software, Inc., Oracle Corp. and Relational Technology, Inc., say they believe distributed data bases will provide the bridge to link IBM mainframes to Digital Equipment

Few doing Windows

User, developer apathy plagues year-old interface

BY PEGGY WATT

Little more than a year after Microsoft Corp.'s release of its Windows interface, as many as four out of five copies are still stuck in the evaluation room or shelved until applications appear.

Users and developers are at a standoff. Users say they will not adopt Windows until they have applications; software vendors say they want proof of Windows' acceptance before they plunge into development.

In addition, some vendors claim a love-hate relationship with the Windows concept and its proponents. They complain about pressure from Microsoft to develop for its pet project or say that writing to Windows is too difficult to be done quickly.

Even those in the industry who say they like the idea of a universal graphical interface are not certain the winner is Windows.

The result is a lull in Windows activity. Infocorp, a market research firm in Cupertino, Calif., estimates 85,000 to 100,000 copies of Windows are actually in users' hands. That is only 20% of the 500,000 copies Microsoft claims to have shipped, including OEM-licensed copies and runtime versions bundled with Windows applications.

"It's a catch-22," says Tim Bajarin, president of market research firm Creative Strategies Research International in San Jose, Calif. "Developers, including Microsoft, have to get the applications out. But a lot of developers tabled it.

Continued on page 14

Mac ripens as business alternative

BY PEGGY WATT

LOS ANGELES — With today's scheduled introduction of two open-architecture models of the Macintosh that also read Microsoft Corp. MS-DOS and Unix files, Apple Computer, Inc. said it intends to finally deliver the hardware that backs the company's pitch of the Macintosh system as a viable corporate alternative to the IBM Personal Computer.

In a show of support for Apple's new "open Mac" policy, a host of third-party developers this week also are scheduled to announce software that takes advantage of the systems' new color and capabilities and add-on boards that were previously not

Continued on page 90

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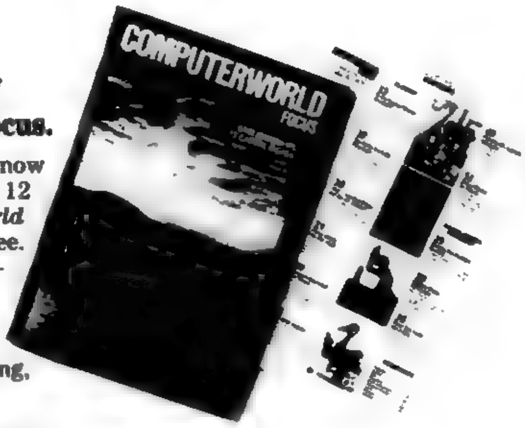

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COMPUTERWORLD

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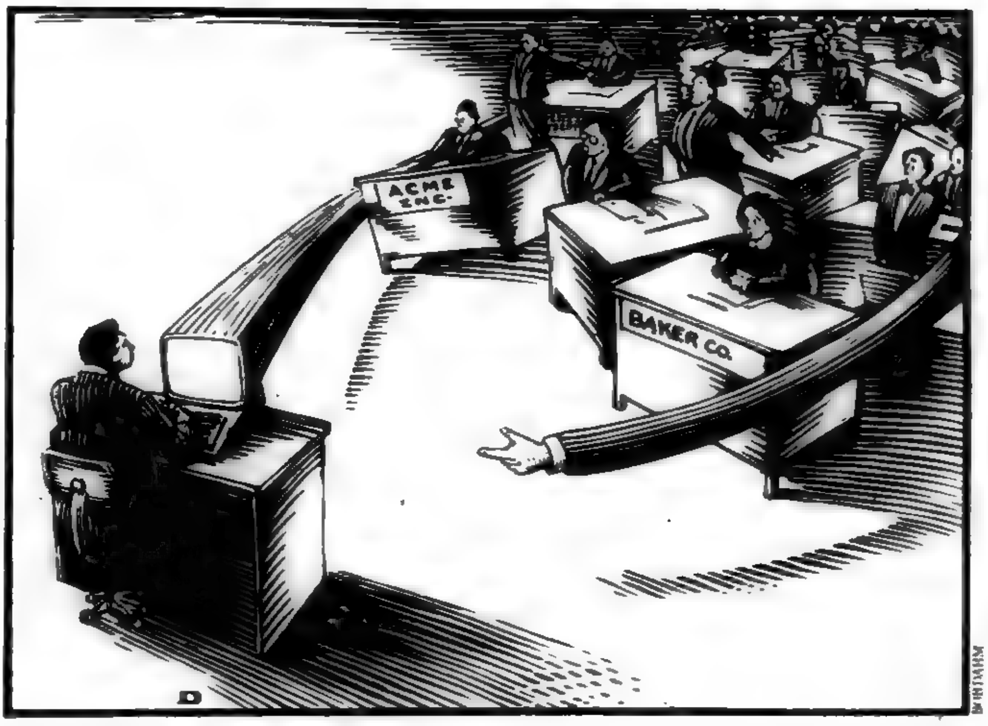
Emerging sales software shows bottom-line promise

Just like spreadsheets, sales and marketing packages are spilling over from PCs onto large systems

BY JIM WALLERSTEDT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The software industry perennially creates more sophisticated and interactive products — this is nearly as inevitable as death and taxes. Yet, from the various products brewed in the cauldron of user requirements occasionally emerges what must be considered a new brand of applications software.

When such a phenomenon combines with a strong potential to affect a company's bottom line, an exciting development occurs that deserves the attention of MIS and user communities alike. Such is the nature, it seems, of sales management software.

Because sales management software is not yet a mature set of applications, a wide range of features has not yet jelled into clearly defined programs. Harry Gilliam, president of software vendor Sales and Marketing Systems in Washington, D.C., observes, "Sales management software today is where accounting software was 20 years ago. In another five to 10 years, you'll see all the various kinds of support develop into sets of generic modules and vertical market versions, just as with accounting software."

A tool by any other name

Sales management software is often called by other names. Some vendors suggest theirs is "sales support" or "sales and marketing" software or that it makes up a "marketing information system."

The primary difference between the new genre of canned sales management software and the older, disparate forms of management support is that the new packages encompass the sales prospecting efforts of a company, serve as event-management or tickler systems and provide management reports that bridge prospective customers and sales as well as existing ones.

The new packages are also defined by a high degree of support delivered directly to the individual sales representative. Many existing systems offer sales analysis or related reports but are rather general in purpose in order to serve the needs of multiple departments.

More current sales management systems offer the kind of reports with which sales representatives are used to dealing on a daily basis, such as call reports, daily reminder and expense reports.

These systems also offer sales and marketing management the ability to massage and evaluate a great deal of information captured within the files, either through user-defined fields or through automatically updated fields, such as "date of last call" or "date entered."

Order-entry breakdown

In addition to canned sales management systems, there are many mainframe-based, homebrewed systems in larger organizations that tend to have a different character and are more appropriately termed "sales support systems." Order entry is the main point of departure between the two types.

Order entry is unquestionably the Achilles' heel of the canned systems; file-transfer procedures on these systems invariably require customized development.

Most mainframe systems, on the other hand, are elaborate order entry systems, with a bit of electronic mail or management reporting thrown in for good measure.

However, mainframe systems tend not to offer comparable levels of support for prospecting, telemarketing and daily productivity. They can, with planning, graciously coexist with a canned application offering

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Wallerstedt is president of Wallerstedt & Co., a La Jolla, Calif., firm that provides systems development and services to companies seeking increased computer support for sales efforts.

……

- **'Event management' for better prospecting**
- **Sales support vs. marketing support**
- **A survey highlights sales force productivity**

these features.

Sales management software benefits sales and marketing departments by providing the following:

- A higher level of communication with prospects and customers through productivity aids such as a word processing interface, autodialing and selective searching.
- More efficient use of time through daily scheduling tools, call reports and automated tickler systems.
- Greater ability for management to measure and understand sales performance, campaign effectiveness and other important criteria.
- Better targeting of prospects for selling and cross-selling and a more professional image as a result of addressing markets more specifically.
- Bonds of convenience and practice between customer and supplier based on use of the sales support system. This bond translates into significant competitive advantages.

Power addicts

Like the spreadsheet software that began sprouting in the accounting departments during the early 1980s, many personal computer-based versions of sales management software are increasingly wending their way into large and medium-size organizations. And like spreadsheets, this application will not be satisfied to stay on the PC.

Furthermore, vendors and users note that sales departments find the newfound power addictive. In fact, the use of sales management software for sales is analogous to the spread of Lotus Development Corp.'s 1-2-3 in accounting.

Powerful personal computer-based programs with outstanding features are available for less than $500. Local-area network versions of these, running on newer chips, can match minicomputer performance while coexisting with PC applications.

The same products for minis are purchased in modules and typically sell for $2,000 to $60,000, depending on configuration. Examples of available modules include field sales, telemarketing, mail, time or marketing management; electronic mail; expense reporting; lead

Continued on page 73

DEC covers all bases

BY MICHAEL SULLIVAN-TRAINOR

Designing a sales and marketing package that is generic enough to meet most companies' needs and open enough to allow easy customization is a challenge for vendors.

Digital Equipment Corp. is one of the largest office systems vendors attempting to meet that challenge with its own application, the All-In-1 System for Sales and Marketing (SSM).

SSM comes with three components: a base system module that tracks sales contacts and prospects; a field reporting module that includes expense tracking, sales activity statistics and forecasting; and a lead management module that lists sales leads and allows reports to be created.

The package is designed to let users move seamlessly between the modules and office systems functions. Accessible from the All-In-1 Version 2.0 menu, SSM costs $11,000 for the VAX-11/730, 750, 780 and 785 and $12,650 for the VAX 8600. Prices range from $6,600 to $7,590 per CPU for clustered VAX systems.

Chemical Bank in New York is testing DEC's claims that the package can be easily adapted. The bank acquired SSM and a VAX-11/750 in January with the goal of implementing it as a nationwide sales-force tracking system. During the customizing phase, the system will run in the bank's New York noncredit sales department, supporting 10 users, says Malcolm Smart, a consultant hired to tailor the system.

If the customization is successful, Chemical Bank will implement the system nationwide, allowing bank executives to track the amount of time each member of the sales force spends on particular functions.

"That's not tracked now in any efficient manner. I think the management team will be surprised when they have access to this information," Smart says.

The bank chose SSM because it is integrated with All-In-1, DEC's office system software, and because it can be customized. One feature that made SSM attractive, Smart says, is that it includes utilities that allow users to design their own screens, making modification of the system for specific functions easier.

Despite the system utilities, SSM will require extensive customizing to adapt to Chemical Bank's needs, according to Smart. For example, adjustments will be made to accommodate the hierarchy of the bank, which requires communication between departmental, regional and national sales executives. SSM is designed to work in a multidepartment organization but not in a company as complex as Chemical Bank, Smart says. ●

Sullivan-Trainor is a senior writer for *Computerworld*.

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Sales tools

FROM PAGE 72

analysis; and order entry.

Users who have installed sales management software agree that it can profoundly affect an organization. Roger Hance, president of R. R. Gable, a real estate brokerage firm in Northridge, Calif., maintains, "There's no question that the use of the computer in sales management can potentially revolutionize the practice of marketing. It has a profound ability to change the fundamental relationship between management and salesperson and between salesperson and client."

Benefits of sales support systems

In a 1986 survey of 45 large companies with sales support systems, one out of four companies reported the system has altered selling tasks in some way. A few see the job of selling as becoming more analytical; none sees the job devalued in any fashion.

Benefits	Percent of 45 Companies reporting[1]
Information to the field	80%
Individual time and territory management	58
Order to shipment time	56
Sales volume per salesman	51
Length of sales cycle	36
Calls per salesman	36
Control of sales expenses	31
Sales call reporting	31
Bid or proposal preparation	29
Orders to calls ratio	18
Sales training	18

[1] Multiple responses.

INFORMATION PROVIDED BY THE CONFERENCE BOARD INC.

Hance's firm purchased the Sales Manager System, a Hewlett-Packard Co. HP 3000-based product, from Business Systems Associates, Inc. in Canoga Park, Calif., two years ago. The system's initial cost was $3,000, although many modifications have been made since. It includes modules for scheduling, electronic mail, sales forecasting and territory management.

In establishing the system, Hance kept specific goals in mind. One goal was to better manage sales leads. In analyzing its lead generation costs, the firm discovered that a typical lead cost between $80 and $100 and, further, that a large percentage of those leads were either lost or mismanaged. Today, Hance says, "we make certain to capture each of these leads as soon as it comes in."

Another goal was to enhance communication with current and prospective clients. With the use of its sales management system, R. R. Gable's brokers can keep clients aware of activities undertaken on its behalf by writing reports based on notes in each client's contact record.

> "THE INCREASED consistency of data and procedures allows us to manage prospects and service activity more efficiently."
>
> ARTHUR HINDMAN
> INSTRON CORP.

Other benefits of using the system include improved sales, through review of brokers' daily scheduling records, and the ability to specifically identify and address target markets and submarkets.

Hance observes, "Where in the past we might have made a direct mail or telemarketing campaign that would shotgun across a group, we are now able to break that into several more specific campaigns based on demographics fields and carry these out without increased manpower. The net result is performance that is only possible with computer support."

'More punch per dollar'

Management's awareness of DP as a strategic resource is strengthening. This awareness of — and willingness to invest in — DP increases the opportunity for MIS to propose high-profile systems that are innovative and aggressive. Sales management software is potentially a favored recipient of this goodwill.

In addition, various megatrends, such as deregulation and increased foreign competition, coincided to increase competitive pressures and simultaneously to erode profit margins across major industries in the U.S.

Many industries, including professional services, are reacting to these mounting pressures by becoming much more marketing oriented and by experimenting with advertising and direct-mail techniques.

One result of these changes is greater competition for the consumer's interest and for his pocketbook. Correspondingly, the changes have created an opportunity for data processing resources to aid organizations in implementing new strategies.

Lou Wallis, a senior research associate for The Conference Board, Inc., recently completed a study of 160 Fortune 500 firms regarding computerized sales support systems. Wallis says that because of competitive pressures, sales force productivity was an important topic at many recent board meetings.

Wallis cites the rising high cost of sales calls made by field sales staffs, noting, "Companies need to focus on delivering more punch per dollar. They need to prospect and prequalify more actively and use telemarketing and direct mail. Many of these activities, by their intrinsic complexity and volume, are ideally supported by a computerized system."

'Beyond expectations'

"Initially, we needed to tie together our branch offices more quickly than we could by developing our own software," explains Arthur Hindman, who spearheaded the introduction of a corporate sales management system three years ago at Instron Corp, a Canton, Mass.-based manufacturer of stress-analysis instruments. "Our goal was to provide a consistent data base to support sales and marketing."

The system, Waters Business Systems, Inc.'s WBS Marketing System, provides separate modules for field sales management. "The WBS software helps us to standardize the flow of information into the home office, then send it back to the branches in a more digested, productive form," says Hindman, Instron's manager of international sales. "The increased consistency of data and procedures allows us to manage prospects and service activity more efficiently than in the past."

The software cost approximately $50,000, although, once again, the source code was greatly modified. While Instron's main processor is an IBM 4300, for reasons of accessibility and cost, the system was placed on a dedicated IBM System/36. Instron presently has tied 17 branch offices in the U.S. and Canada to the application.

Hindman stresses that although the system offers predesigned reports, Instron found great flexibility in defining its own. One useful report Instron developed forecasts sales, anticipating the number of closes based on probabilities, along with expected dates and amounts by product line. The company has also broadly applied its system to handle service activities as well as sales.

According to Hindman, "Initially very few salespeople thought it would benefit the field. Management thought it would benefit greatly but was skeptical about whether it would work. As it's turned out, the benefit to the field has grown sharply beyond staff expectations.

"On the other hand," he continues, "management's expectations have either declined or become more realistic: They realize that maintaining the system requires a lot of attention and advocacy."

The DP department, with a host of solutions, could be a catalyst in assisting sales and marketing to automate the sales process. "Data processing managers need to be more proactive in responding to opportunities within the sales and marketing departments. A primary problem is that DP and sales often have problems speaking the same language," notes Van Mayros, author of *Marketing Information Systems* (Chilton, 1982) and president of Infomarketing Systems Corp., which conducts seminars on computerized marketing support systems.

Language barrier

Mayros points out that vice-presidents of sales or marketing typically know they need computer support, but they need to be shown examples and specific possibilities before anything can be actually formulated.

"We find quite often that the salesperson is terrifically interested but needs a lot of help in developing a structure for the data, codes and procedures, even within the framework of a predesigned, canned application," Mayros says.

John Kennedy, president of Marketing Information Systems, a Chicago-based vendor of sales management software, echoes this sentiment. "I have to sympathize with the systems analyst," Kennedy says, "to the extent that the sales department often has trouble translating needs into a clearly defined problem. What you

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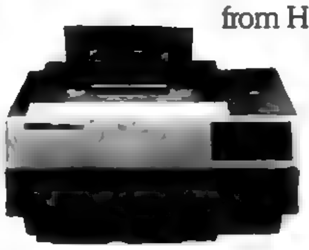

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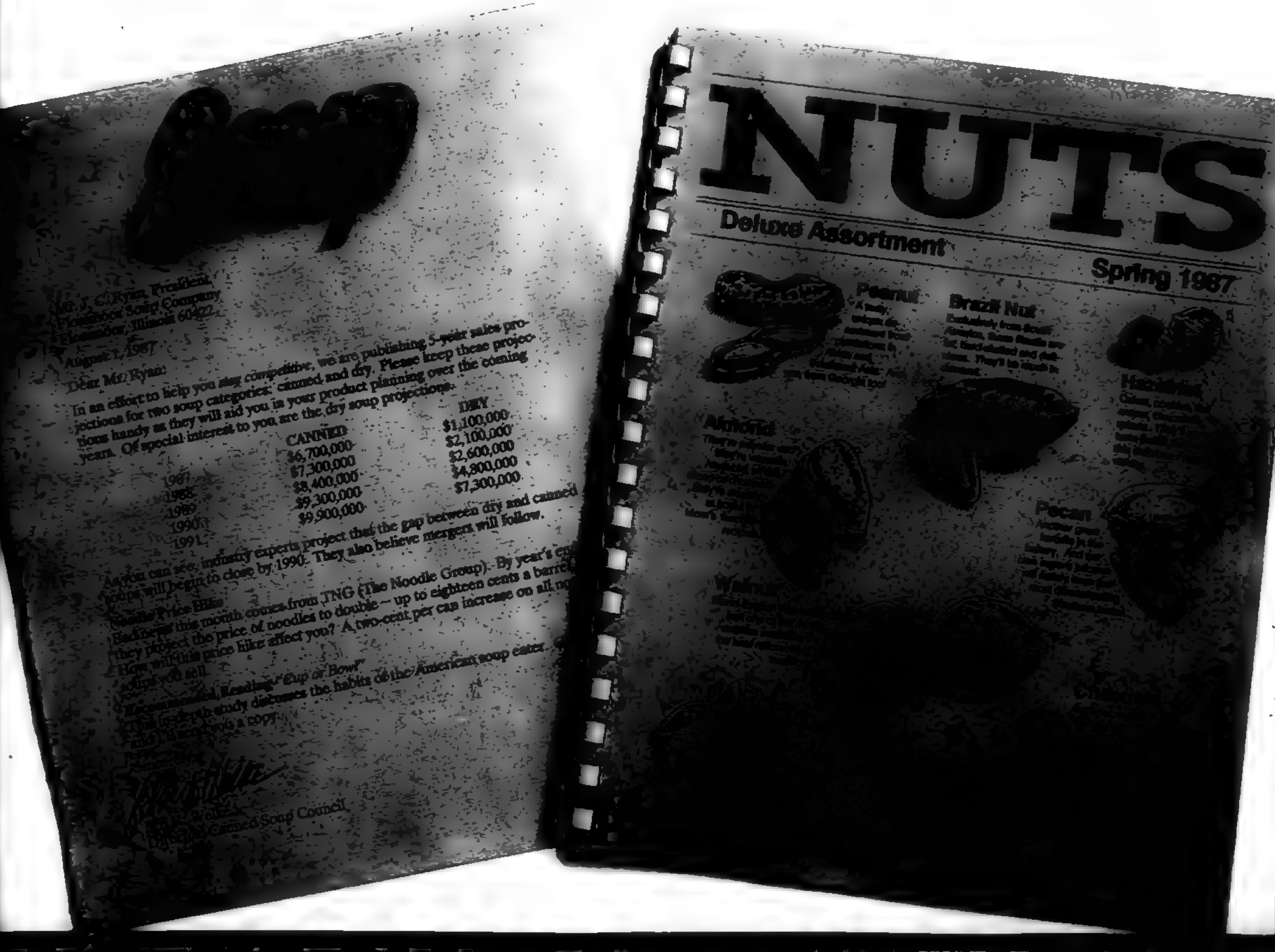


Soup

Mr. J. C. Ryan, President
Flossmoor Soup Company
Flossmoor, Illinois 60422

August 1, 1987

Dear Mr. Ryan:

In an effort to help you stay competitive, we are publishing 5-year sales projections for two soup categories: canned and dry. Please keep these projections handy as they will aid you in your product planning over the coming years. Of special interest to you are the dry soup projections.

	CANNED	DRY
1987	$6,700,000	$1,100,000
1988	$7,300,000	$2,100,000
1989	$8,400,000	$2,600,000
1990	$9,300,000	$4,800,000
1991	$9,900,000	$7,300,000

As you can see, industry experts project that the gap between dry and canned soups will begin to close by 1990. They also believe mergers will follow.

Noodle Price Hike

Bad news this month comes from TNG (The Noodle Group). By year's e
they project the price of noodles to double -- up to eighteen cents a barre
How will this price hike affect you? A two-cent per can increase on all no
soups you sell.

Recommended Reading: "Cup or Bowl"

This in-depth study discusses the habits of the American soup eater.
and I'll send you a copy.

[illegible] Weltz
[illegible] Canned Soup Council

NUTS

Deluxe Assortment

Spring 1987

Peanut

Brazil Nut

Almond

Hazelnut

Walnut

Pecan

end up with is an undefined problem and, therefore, no solution."

On the other hand, everyone agrees that the potential for harnessing more computer power for sales and marketing represents an advantage. Kennedy notes, "Sales and marketing represents the last major business application to be given computer support."

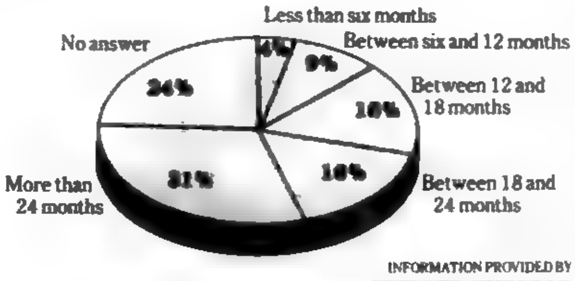
Sales and Marketing Systems' Gilliam offers a concrete example. "Nearly all software increases efficiency. So let's suppose you have a company that generates $10 million per annum in gross revenues," he suggests. "Suppose its accounting department has an annual budget of $400,000. If you develop a system that increases the department's efficiency by 10%, you've impacted the bottom line by approximately $40,000.

"Now, if you could improve the productivity of the sales department by the same margin," he continues, "you would generate gross revenues of $1 million. That could affect the bottom line from a few hundred thousand to a half million dollars or more. Where else does a company have the opportunity to make that kind of return on investment?"

Where, indeed? At the same time, everyone agrees that implementation and user acceptance are sticky wickets. Kennedy says, "The key to success is not the hardware, not the software, but how the organization accepts the new system."

Payback period for sales support systems

In a 1986 survey of 45 large companies with sales support systems, one-third of the companies report their salesmens' earnings have increased. Nearly two-thirds expect the number of sales personnel will be unaffected by the system, 13% expect the number will increase, and only 4% expect it will decrease.



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Melting resistance

Users echo similar sentiments, noting that the changes wrought by a new system must be compensated for early on by productivity and operational bonuses. Mayros says he feels the central issue is in convincing the sales department to embrace the system as its own. He remarks, "First of all, you have to convince the individual salesperson that it will increase his commissions and his efficiency — which it will.

"Second, you need to select a cooperative territory — what might be termed a 'prototype' territory — to serve as the project guinea pig," he continues. "In return, you may offer the territory manager an increased budget and an opportunity to avoid lots of paperwork in his situational reports while improving his stature and results."

A certain amount of preexisting resistance is often felt from the sales and marketing departments. Sales managers generally consider selling to be an individualized, personal activity. Kennedy says, "They always say, 'But we're unique.' The truth is that, even though they're unique, they can be supported. Most find the fundamental problems [to be] staying on top of their leads, daily activities and communications."

Another source of resistance is that sales staffs realize that many activities that were previously unmonitored will receive scrutiny, including daily schedules, length of phone calls and general progress.

On the other hand, sales representatives understand the phrase, "Time is money." The salesman tends to generate results and income proportional to the amount of "face time," or direct contact time, spent each week among prospects. The less desirable portion of the sales representative's responsibilities involves administrative chores, a necessary evil. These include call reports, expense reports, clerical duties and routine correspondence — the primary areas in which the support system offers support. The net result is a lessened administrative burden and more face time.

Companies find that by using support systems, sales representatives are often able to increase their level of weekly contact while reducing the hours spent tending to administrative duties.

Another, less tangible, factor capable of combating any anti-computer bias within the sales departments is the experience of an enhanced professional image. A good sales support system can make the sales representative appear to be more informed, responsive and sophisticated in front of the customer. This may be particularly true for groups that effectively use portable computers to support the field sales staff.

Here's your system

Hindman suggests that the chances for a smooth project can be greatly increased by involving the sales department in the decision to acquire a system. "Typically," he says, "management or DP gets ahold of a system like this, then comes over to the sales department and says, 'Hi, guys, here's your new system.' Instead, the sales staff needs to be involved in defining the project from the beginning."

Other users caution that any organization should expect a temporary downward trend in productivity while the sales department gets acquainted with the system.

The specifics of implementation turn out to be an interesting and varied lot, ranging from

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SALES management software is a new kid on the block but one well worth watching. The general sense one absorbs in talking with vendors, industry experts and consultants is one of excitement. This new application is obviously one with promise.

management of a wide variety of data to order entry.

Data management. While the sales management system contains the names of prospects and customers, the accounts receivable system contains only customers. A core set of data fields, such as names, addresses and the like, applies to both. But even at this fundamental level, the contact name for the sales department can be different from that for the accounting department; the billing address may be different from the address for mailing literature.

Additionally, the sales software will need demographic and ancillary information that will not apply to the customer files, such as date of last call, bid amount or number of children in family. Conversely, many fields within the customer files, such as shipping terms or finance charges, simply will not apply to sales development.

Most firms find these to be good reasons to keep the data bases separate from each other. According to Mayros, "We've found that it generally works best to let marketing separately maintain and control their data base or, where applicable, update the master record."

Data collection. Elia Georgiades, president of banking consultancy Financial Sales Management Institute, says, "Within the financial services industry, one of the primary questions has always been, 'What data should we capture at the time of sale?' It used to be that the answer was only those needed to support transactions processing. Now, with a greatly increased focus on marketing, there is new data to be captured: net worth, tax bracket, investment objectives and the like."

Order entry. Order entry is another major issue. Mainframe-based support systems, while they may be weak in other support duties, were typically designed to serve this function. On the other end of the spectrum, minicomputer and personal computer vendors differ in their approaches to order entry. Some encourage implementations to be coordinated or integrated; most do not.

The main reason for this difference of opinion has to do with the issue of cost vs. utility, or payback. One vendor, dealing with an organization that maintains its accounts receivable files on a large system, may feel that the potential revenue is worth the effort of integration; another may not.

There is a broad range of need across industries in this regard, so that placing a value on this coordination is difficult. However, many vendors offer quotes for tailoring their systems to work with a company's existing accounts receivable system.

The important point is that sales management, marketing management and sales prospecting functions can be provided by a system that exists independent of accounts receivable and order entry.

For example, a simple, common link between the two independent function groups is a sales management system that at the time of order spits out a single-page order summary, which is then manually entered into the order entry system.

However, file-transfer procedures can be useful. Several firms have established a clever routine whereby, in a daily batch run, the accounting system updates customer biography and sales history fields in the sales system, which then updates the accounting files with new order information. This process remains the same whether the applications are on the same processor or whether they are connected by phone lines.

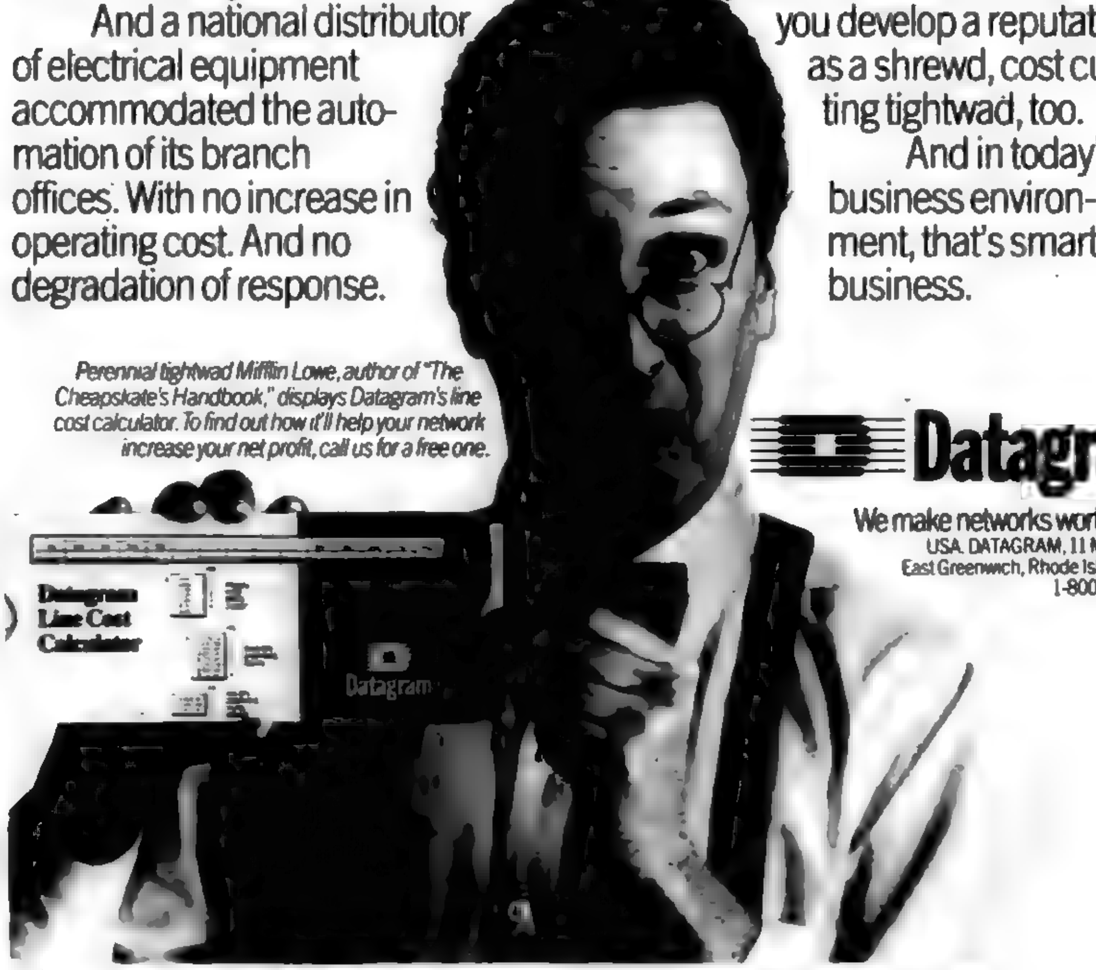
These functions become even more interesting when a portable personal computer calls in to a mini to upload order entry and download electronic mail and current sales history while the mini is refreshed by the accounting files on a larger processor.

Watch the new kid

Sales management software is a new kid on the block but one well worth watching. The general sense one absorbs in talking with vendors, industry experts and consultants is one of excitement. This new application is obviously one with promise.

While stories are told of companies that fail abysmally in their efforts to computerize sales functions because of internal resistance and poor planning, other organizations report substantial increases in sales, particularly in industries that do a great deal of prospecting.

The Conference Board's Wallis notes that it would not be a bad idea, while you are at it, to consider buying some stock from your vendor. He observes that the results of his survey among the Fortune 500 indicates that "most of these systems are put on-line with the expectation of helping the customer, making the firm appear more professional and increasing sales force productivity. At the same time, many of them do pay for themselves within a year." •



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MANAGEMENT

TAKING CHARGE

Jeffry Beeler

Warranties can backfire

In the long run, MIS managers who buy large quantities of microcomputer applications for their users may benefit financially from something that recently happened — or, more precisely, failed to happen — in the California legislature.

During a recent press conference in Sacramento, Assemblywoman Gloria Molina announced that she was suspending her efforts to enact a law to force the state's software developers to strengthen their warranties.

Molina's announcement concerning Assembly Bill 1507, which she introduced, came only 36 hours before she vacated her seat in the legislature to join the Los Angeles City Council, although that move reportedly had little, if anything, to do with her decision to drop sponsorship of the bill.

Instead, her actions were prompted solely by recent events within the industry itself.

In their early days, many microcomputer software develop-

Continued on page 81

Fed security advice assailed

Bill would shift advisory role to civilian group

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The government's National Computer Security Center, which offers federal agencies and private businesses help with data security, faces controversy regarding its usefulness to the civilian sector, according to testimony at a recent congressional hearing.

The center, which is run by the National Security Agency (NSA) near Ft. Meade, Md., assists businesses with data security in accordance with President Ronald Reagan's National Security Decision Directive 145.

The center has worked with more than 70 agencies since the directive was signed in 1984, according to testimony given to the House of Representatives' Government Operations Committee by Lt. Gen. William E. Odom, the director of the NSA. Its services range from training courses and briefings to in-depth technical assistance, he said.

Wrong agency?

While there is widespread agreement that federal agencies need to improve security, a debate is going on in Washington about whether the NSA, a unit of the Department of Defense, is the proper agency to handle the job for civilian agencies. Its role in aiding the private sector is also being questioned.

"In my view, it is critical that Congress re-establish civilian control over the federal computer security program," said U.S. Rep. Jack Brooks (D-Texas). Brooks is pushing legislation that would transfer the center's work with civilian agencies to the National Bureau of Standards [CW, March 2].

Robert H. Courtney Jr., a computer security consultant in Port Ewen, N.Y., was highly critical of the center's efforts to help the civilian agencies that do not handle classified national security information.

Courtney said that because the center is embedded in the intelligence community, it tends to

Continued on page 80

MANAGERS ON THE MOVE

Shipping firm pilots new customer systems

BY DAVID A. LUDLUM
CW STAFF

Among the tasks facing **Ronald L. Olive** as the newly appointed vice-president of information resources at **American President Companies Ltd.** is testing systems for interacting with customers.

The customer systems are now in a pilot phase and could be operational by summer, Olive said. They reflect the growing use of automation for customer outreach among shippers following similar moves by airlines, he said. "Electronic interface is going to be very much a part of the transportation industry."

Olive, a former IBM executive, declined to elaborate on the new systems. "I'm not sure we're really ready to expound on those publicly. For competitive reasons, we're keeping that a little bit close to our vest," he said.

Following a restructuring of American President in January,

Continued on page 83

Data View

Spending levels

Information systems spending as a percent of total revenue

Industry	*Percent*
Agriculture/Mining/ Construction	1.0
Nondurable Manufacturing	1.3
Durable Manufacturing	1.6
Transportation/Utilities	1.6
Wholesale/Retail	0.6
Insurance	1.8
Other Financial Services	2.6
Health Services	2.3

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CW CHART

Standard rates for MIS urged

BY DAVID A. LUDLUM
CW STAFF

A major association of management accountants has recommended that information systems organizations generally charge their internal users standard rates or amounts for information systems services.

The recommendation from the National Association of Accountants, which claims a membership of 90,000, is contained in six pages of guidelines called "Allocation of Information Systems Costs," one in a series of statements on accounting principles and practices issued by the Montvale, N.J.-based organization.

Unless a general accounting policy dictates otherwise, information systems costs should generally be charged to users at fixed rates or amounts because line managers should not be responsible for variations in costs beyond their control, the association says. Only the costs that line managers can control should be charged, the guidelines say.

The charges can prompt line managers to talk with information systems managers about how best to achieve their goals, encourage efficient allocation of resources and encourage the MIS organization to control costs, the association says.

With the proliferation of in-

Continued on page 80

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Unrestricted topology		●	
High-performance X.25		●	●
Integrated 802.3 access		●	●
Speed conversion		●	●
Detailed management reports	<4 thousand	>50 thousand	>50 thousand
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Fed security

CONTINUED FROM PAGE 79

focus more on preventing the disclosure of classified data than on preventing the alteration of data at civilian agencies.

"It is important that those developing security measures for federal agencies understand that the security problems of many agencies more closely resemble those of J. C. Penney than they do those in [the intelligence community]," Courtney testified.

Cheryl W. Helsing, vice-president and deputy director of corporate security at Bank of America in San Francisco, who testified for the American Bankers Association, expressed concern that the NSA favors solutions that are too stringent and expensive for the private sector.

As an analogy, Helsing said if a client could travel on a motorcycle, in a truck or in a tank, the NSA would choose the tank over the other two methods of transportation. "The danger in doing this is that the road to be traveled might not accommodate a tank, or the traveler might not be able to afford the price tag. Thus, the trip might not be taken at all," she said.

Center opposes legislation

The NSA's Odom said the National Computer Security Center, with a staff of more than 300, has the expertise to help the civilian agencies and opposed Brooks' legislation.

Odom said the center's standards and programs "are equally useful in both the defense and non-defense sectors of the U.S."

He added that one of the center's most extensive contacts has been with the Department of State, which recently issued a request for proposal for a five-year, $400 million contract for DP systems.

The department worked with the center to analyze the sensitivity of its information and the hostile environments of several of its DP sites, Odom said.

Must meet security level

After that analysis, the department decided it would require DP systems that meet the B-2 level of security.

NSA certifies computer operating systems as "trusted systems" by ranking them on a security scale that ranges from C-2 up to A-1.

Odom said that other major projects undertaken by the National Computer Security Center include the following:

- Helping the U.S. Customs Service design DP systems for investigations of drug trafficking.
- Working extensively with the Department of the Treasury on computer security policy, including a request for proposal for a $600 million minicomputer contract calling for security levels ranging from C-2 through B-2.
- A one-year commitment to help the Federal Aviation Administration improve its computer security, particularly for the next-generation air-traffic control system, which will get a C-2 level of security.

Standard rates

CONTINUED FROM PAGE 79

formation systems in business, financial managers are increasingly concerned with issues such as the impact of the costs of technology on the profitability of business segments and specific products, says Robert G. Weiss, vice-president and controller of Schering-Plough Corp. and chairman of the association subcommittee that issued the guidelines.

The association acknowledges that charging users, particularly charging them full costs, might not be a good idea in some circumstances. The circumstances include:

- When it would discourage development or use of systems, perhaps because the systems are not widely shared.
- When charges are difficult to explain to users or even to establish, such as when the costs of establishing them might outweigh the benefits of collecting them.
- When the use of systems to collect charges is a less than optimal one or the charges excessively complicate an already complex accounting system.

'Poor system worse than none'

"A poor chargeback system may be worse than none," says William Ihlanfeldt, assistant controller at Shell Oil Co. in Houston and chairman of the association's Management Accounting Practices Committee.

Lack of a chargeback system could result in squandering of resources, but overly rigid or inappropriate systems may encourage users to buy services from outside suppliers in a manner that is not cost-effective, Ihlanfeldt says.

The guidelines list four general approaches to setting charges, which are aimed at different goals. Charging full cost can restrict use of heavily used systems, while charging something less than full cost can encourage use of underutilized systems.

As alternatives, charging a market price or one based on cost plus a fixed profit margin might help ensure adequate returns on information systems investments.

These charges might be in the form of fixed fees for recurring services — such as payroll, billing and general ledger accounting — or regular rates, the association says. The rates might be based on labor time, particularly for labor-intensive tasks such as development; on machine time, especially for operations work; or a combination of the two, according to the association.

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Because of the familiar architecture, personnel trained in IBM mainframe use will be at home with 9370s. With new prepackaged software, novices will soon feel at home as well. And 9370s will likewise be at home in many roles: as host systems, departmental systems or remote extensions of existing mainframes.

As your needs grow, 9370s can grow with them—with larger processors and more storage that's affordable and easy to install. Giving you a five-fold power range in the 9370 line—and a hundred-fold span of computing power within the 370 family from the entry-level 9370 to IBM's biggest mainframe.

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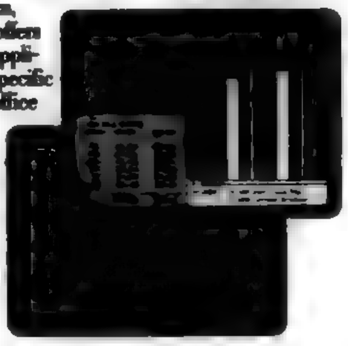
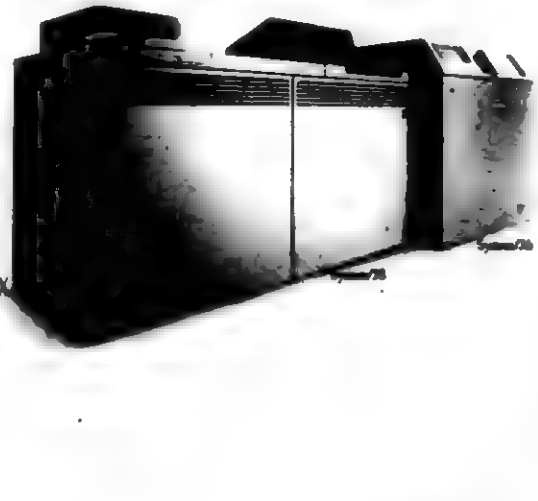
For growth, the System/38 provides a built-in relational data base (allowing you access to data on your own terms) as well as a toolbox of programming aids to help you, in a remarkably short time, custom-design applications that fit the job at hand.

The System/3X family members function equally well

Here.





Warranties

CONTINUED FROM PAGE 79

ers routinely sold their products "as is." In other words, they seldom bothered to accompany their programs with formal, written warranties.

If an application failed to work as expected, its vendor often had no contractual duty to set the problem right.

To no one's surprise, the widespread absence of software warranties led to a growing chorus of user complaints, which in turn triggered a nationwide spate of proposed legislative remedies, including AB 1507.

ALARMED at the prospect of being forced into legislative straitjackets, many vendors put their own houses in order before lawmakers had the chance to do the job for them.

Alarmed at the prospect of being forced into legislative straitjackets, many vendors acted quickly to put their own houses in order before lawmakers in various states had the chance to do the job for them.

ADAPSO guidelines

Accordingly, last April, vendors' trade group ADAPSO drafted and issued a set of suggested warranty guidelines and urged its members to comply with the recommendations voluntarily.

In essence, the guidelines call on software developers to make sure that their products "perform substantially" in accordance with their advertising claims, documentation and specification sheets.

If an application is found to be genuinely deficient, ADAPSO advises its members to choose one of three courses of corrective action — remove the faulty product's bugs, replace it with a functional equivalent or offer a refund.

Proposals find support

During the 10 months since they were promulgated, ADAPSO's warranty guidelines have been put into practice by some 50 software developers, including leading players such as Ashton-Tate, IBM and Lotus Development Corp.

The proposals' widespread acceptance accomplished the same end as the passage of AB 1507 and made the once-desirable bill no longer necessary.

Molina's subsequent move to scrap the legislation, at least for the time being, was hailed by ADAPSO as a triumph of industry self-regulation and voluntary compliance over government intervention.

Users win out

The main beneficiaries of the vendors' recent efforts to improve their software warranties will be home and small-business users, who typically buy in low volumes and without formal contracts.

But even MIS organizations, most of which are already covered by warranties that they negotiate individually with their suppliers, may profit from AB 1507's death.

Under Molina's bill, developers would have been held legally liable for all misrepresentations of their products by authorized dealers.

Heading off lawsuits

Inevitably, the vendors would have faced an increased number of user lawsuits and would have been forced to pass the additional expense along to their customers in the form of higher software prices.

Even MIS executives, with their familiar volume discounts, would have felt the impact.

For software buyers who sued their vendors successfully, AB 1507 would have provided substantial compensation: If found guilty of selling an inadequate product, a developer would have been ordered to pay damages plus the disgruntled user's legal fees.

The company would have also been forced to refund the customer an amount equal to twice the disputed product's purchase price.

Faced with such stiff potential penalties, most developers would have had a strong financial incentive to not contest even the most patently baseless complaints against their products.

Vendors washing their hands

Rather than defend themselves in court and run even a small risk of losing, they could have opted simply to give the user a refund and thereby wash their hands of the entire matter.

Again, the result would have been increased vendor overhead, with all consumers ultimately bearing the burden.

So for MIS managers in California at least, the industry's voluntary effort to upgrade its software warranties and the recent demise of AB 1507 are probably reasons for a modest celebration. Moreover, to the extent that the bill's fate may influence the course of like-minded legislation now being considered in other states, the outlook may have also brightened just a bit for systems executives all over the U.S.

Beeler is a *Computerworld* West Coast correspondent.

the mid-range in where you need most:

as the largest computers in a business or as departmental computers in large companies. And to provide you with the communications and growth options your business needs, the System/3X family was recently enhanced to provide even smoother peer-to-peer communications, greater host and PC connectivity, and stronger networking with IBM 370 mainframes and PCs.

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A Fitting Conclusion

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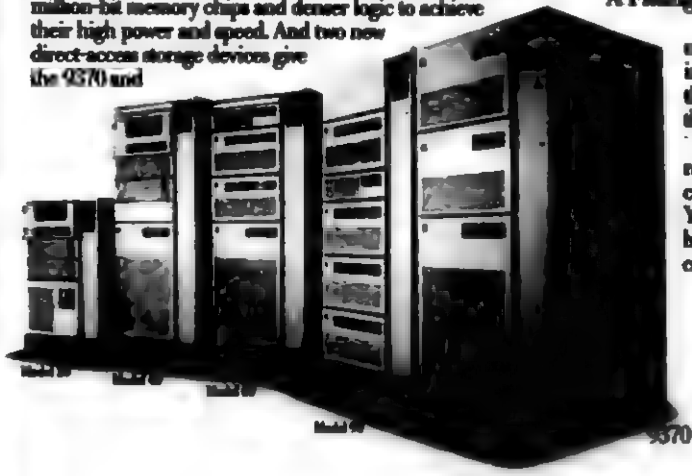

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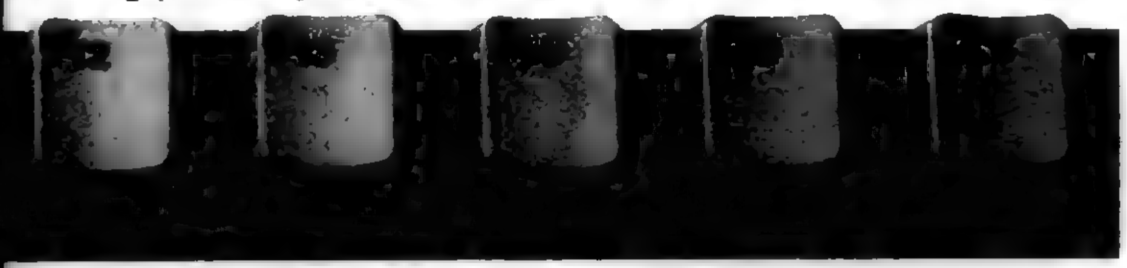

TELEVIDEO 905 VS. WYSE WY-30		
FEATURES	TELEVIDEO 905	WYSE WY-30
Programmable function keys	32	4
Tilt and swivel standard	Yes	No
High contrast super dark Matsushita screen	Yes	No
WordStar® mode	Yes	No
Full-size keyboard	Yes	No

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CALENDAR

MARCH 22-28

Electronic Computing Health Oriented Spring Meeting. Hot Springs, Va., March 22-25 — Contact: Daniel J. Carlton, St. Luke's Samaritan Health Care, Inc., 3000 W. Montana Ave., Milwaukee, Wis. 53215.

NCGA Computer Graphics '87: Applications for Excellence. Philadelphia, March 22-26 — Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

Managing the Information Resource. Los Angeles, March 22-27 — Contact: Suite 2381, Office of Executive Education, University of California at Los Angeles Graduate School of Management, Los Angeles, Calif. 90024.

Sixth Annual International Spectrum U.S.A. '87. Las Vegas, March 23-25 — Contact: International Data Base Management Association, Suite 104, 9740 Appaloosa Road, San Diego, Calif. 92131.

National Capacity Planning Conference. Washington, D.C., March 23-26 — Contact: National Capacity Planning Conference, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

Walker Inter/Actions Users Conference. Denver, March 23-26 — Contact: Walker Interactive Products, 100 Spear St., San Francisco, Calif. 94105.

17th Conference on Computer Audit, Control and Security. Boston, March 23-27 — Contact: EDP Auditors Foundation, Inc., P.O. Box 88180, Carol Stream, Ill. 60188.

Datacon '87. St. Louis, March 24-25 — Contact: Datacon, P.O. Box 1401, St. Louis, Mo. 63188.

I/O Interface '87. Gaithersburg, Md., March 24-25 — Contact: William E. Burr, National Bureau of Standards, A216 Technology Building, Gaithersburg, Md. 20899.

Optical Information Systems West '87. Los Angeles, March 24-26 — Contact: Conference Management Corp., P.O. Box 4990, 200 Connecticut Ave., Norwalk, Conn. 06856.

Third International Conference on Computerization of Medical Records. Chicago, March 24-27 — Contact: Registrar, Institute for Medical Record Economics, 121 Mt. Vernon St., Boston, Mass. 02108.

ASM Upgrade '87. Hartford, Conn., March 25 — Contact: Upgrade '87, c/o Computer Assistance, Inc., 200 Park Road, West Hartford, Conn. 06119.

1987 SIM Institutional

Continued on page 86

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Shipping firm

FROM PAGE 79

Olive is heading an information resources organization that has expanded its scope from focusing on the company's international container shipping to include domestic rail and truck operations, some of which were acquired last year. He will oversee both day-to-day operations and long-range development of the Oakland, Calif., company's computer, telecommunications and data base systems.

Robert M. Menar

Olive previously served as director of production services in the information resources department, which he joined in 1981 after holding marketing and management positions with IBM for 20 years.

Tony Salmon has been appointed director of management information systems at **International Telecommunications Satellite Organization** (Intelsat).

Salmon, a British citizen, will be responsible for software development, computer center operations, telecommunications, text processing, records, printing and reprographics.

Before joining the 112-nation satellite communications cooperative, he served as head of Information Services for Central Television in Birmingham, England.

William C. Wimer has been appointed director of MIS at **The Interface Group, Inc.**, a Needham, Mass.-based conference-management and travel services firm.

Wimer will be responsible for both the company's MIS operations and its telecommunications.

He has nearly 30 years' experience in corporate information systems management and previously served as vice-president of MIS for Fanny Farmer Candy Shops, Inc. in Wakefield, Mass.

Carter Hawley Hale Stores, Inc. has announced the promotion of Carter Hawley Hale Information Services Chief Executive **R. Vincent Conant** to the post of chairman and the appointment of Executive Vice-President **Robert M. Menar** to succeed Conant as president.

Menar, who had been in charge of systems services, will also serve as chief operating officer.

The Information Services organization, based in Anaheim, Calif., provides systems and communications services to all divisions of Carter Hawley Hale Stores.

R. Vincent Conant

Joseph R. Beauchamp has been named vice-president of systems at the **Compuserve, Inc.** headquarters in Columbus, Ohio. Beauchamp, formerly director of systems, is in charge of the information and communications services firm's operating system, languages, utilities and network software.

Bruce MacNaughton, formerly manager of Compuserve's Monitor Software group, has been named director of Computer Operations and Monitor Software.

Perry Hanson has been appointed director of Administrative Information Systems at **Wellesley College** in Wellesley, Mass., where his duties will include developing campus networks.

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8:30 A.M. ◆ TOKYO, JAPAN

IDG's International Data Corporation managing director **Yugi Ogino** is stopped in his tracks by a flash report on the company's International News Service. *Digital News* has just spotted a potential challenge to IBM's grip on the professional PC market: DEC has announced their Local Area VAX Cluster. Ogino sets up a conference call with *Computerworld Japan* editors to brief them on his analysis.

8:40 A.M. ◆ SYDNEY, AUSTRALIA

At almost the same moment 4,300 miles to the south. *Computerworld Australia* publisher **Susan Coleman** sees the DEC story on her news wire. She calls in **Peter Scott**, her editor, to plan editorial coverage for their market.

11:00 A.M. ◆ HELSINKI, FINLAND

Halfway around the world, **Timo Tolsa**, editor of IDG's Finnish computer newspaper *Tietoviikko Ky*, faxes his comments on the pending story to **Dieter Echbauer**, editor of *Computerwoche* in Germany, who appoints an editorial team to file a comprehensive story for use by all five IDG publications in Germany.

10:10 A.M. ◆ BUENOS AIRES, ARGENTINA

Ruben Argento, the head of IDG's *Computerworld* newspaper in Argentina uncovers a new wrinkle in the rapidly unfolding story–and alerts Doane Perry, senior market consultant at IDC in Framingham, Massachusetts: a DEC competitor in South America is developing a similar cluster product.

has just changed again.

10:30 A.M. • BOSTON, MASSACHUSETTS

IDG reporter **Kathryn Esplin** files a VAX Cluster story for *Digital News*. Her back-up analysis is sent to all publication offices around the world on the company's news wire.

2:00 P.M. • FRAMINGHAM, MASSAC TTS

Perry meets with **Bill Ford**, IDC Information Industry Services Chief, to plan a global research report on computer clusters and their potential impact on business users.

4:45 P.M. • PALO ALTO, CALIFORNIA

IDC Research Director **Jean Yates** faxes detailed schedules of the report requirements to IDC research centers in 16 other countries. Deadline: 1 week. Overnight mail announcements of the pending report are mailed to IDC's top 1,000 customers around the world.

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Pictet International Ltd
Scrimgeour Vickers & Co.
J. Henry Schroder Wagg & Co. Limited

MANAGEMENT

Continued from page 83

Member Conference. Miami, March 25-27 — Contact: Society for Information Management, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

12th West Coast Computer Faire. San Francisco, March 26-29 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

MARCH 29-APRIL 4

EFTA Expo. Las Vegas, March 29-April 1 — Contact: Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

The Inevitable Partnership: Leaders Achieving Business Goals Through Technology. New Orleans, March 29-April 1 — Contact: Life Office Management Association, 5770 Powers Ferry Road, Atlanta, Ga. 30327.

Management Information Systems for Strategic Advantage. Philadelphia, March 29-April 3 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104. Also being held September 20-25 in Philadelphia.

Interface '87. Las Vegas. March 30-April 2 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

1987 National Conference on Data Processing Quality Assurance. Chicago, April 1-3 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

1987 Computer Dealers & Lessors Association Spring Meeting. Orlando, Fla., April 1-4 — Contact: Computer Dealers & Lessors Association, 1212 Potomac St. N.W., Washington, D.C. 20007.

Networking: The Large Organization Perspective. Melbourne, Fla., April 2-3 — Contact: Harris Briefing Center, 1025 W. Nasa Blvd., Melbourne, Fla. 32919.

APRIL 5-11

Human Factors in Computing Systems & Graphics Interface 1987. Toronto, April 5-9 — Contact: Wendy Walker, CHI & GI '87 Conference Office, Computer Systems Research Institute, University of Toronto, 2002-10 Kings College Road, Toronto, Ont., Canada M5S 1A4.

1987 Facsimile and Image Communications Conference. Boston, April 6-8 — Contact: Jean O'Toole, CAP International, One Snow Road, Marshfield, Mass. 02050.

1987 Eastern Simulation Conferences. Orlando, Fla., April 6-9 — Contact: The Society For Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

The Comten Users' Exchange Spring Conference. Washington, D.C., April 6-10 — Contact: Dave Beran, NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Fourth Annual International Conference on Technology and Education. Fort Worth, Texas, April 7-9 — Contact: Jimmie Thompson, ICTE, 1400 One Tandy Center, Fort Worth, Texas 76102.

New Directions in Information Management. New York, April 8-9 — Contact: The Conference Board, 845 Third Ave., New York, N.Y. 10022.

Sixth Annual Conference on Trends in Technology for Education and Industry. St. Paul, Minn., April 8-9 — Contact: Combase, Inc., Suite 890, 333 Sibley St., St. Paul, Minn. 55101.

California Educational Computing Consortium. San Jose, Calif., April 9-10 — Contact: Alexia Devlin, San Francisco State University, Accounting Data, NADM-358, 1600 Holloway Ave., San Francisco, Calif. 94132.

Satellite Communications Status '87: Technology, Applications & Markets. New York, April 9-10 — Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

APRIL 12-18

COACH Conference XII. Toronto, April 12-15 — Contact: The Canadian Organization for Advancement of Computers in Health, No. 1200, 10460 Mayfield Road, Edmonton, Alta., Canada T5P 4P4.

Long Range Information Systems Planning. Atlanta and San Francisco, April 13-16 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Commercial Crime Conference. Hong Kong, April 13-17 — Contact: Nelson P. C. Tse, Computer Services, Hong Kong Productivity Council, 12th Floor, World Commerce Centre, 11 Canton Road, Tsimshatsui, Kowloon, Hong Kong.

Software Panorama. Atlanta, April 14-16 — Contact: Data Processing Management Association, Atlanta Chapter, P.O. Box 34, Atlanta, Ga. 30301.

Optica '87 (First International Meeting for Optical Publishing and Storage). Amsterdam, April 14-16 — Contact: Jean Mulligan, Learned Information Ltd., Woodside, Hinksey Hill, Oxford, England OX1 5AU.

APRIL 19-25

Standards: The Ties That Bind. New York, April 22-23 — Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114.

The Artificial Intelligence and Advanced Computer Technology Conference and Exhibition. Long Beach, Calif., April 22-24 — Contact: Tower Conference Management Co., 331 W. Wesley St., Wheaton, Ill. 60187.

Bar Coding Seminar Series. New York, April 23-24 — Contact: Automatic Identification Manufacturers, Inc., 1326 Freeport Road, Pittsburgh, Pa. 15238. Also being held May 18-19 in Chicago and June 8-9 in Atlanta.

APRIL 26-MAY 2

National Workshop & Computer Systems Demonstrations. Kansas City, Mo., April 26-29 — Contact: Management Systems Committee, American Trucking Associations, 2200 Mill Road, Alexandria, Va. 22314.

Cinteract '87. San Diego, April 26-30 — Contact: Cincom Systems, 2300 Montana Ave., Cincinnati, Ohio 45211.

BMC Software User Group's Second Annual Meeting. Houston, April 29-May 1 — Contact: Marianne Levandoski, AT&T, 30 Knightsbridge Road, Room 50-51A40, Piscataway, N.J. 08854.

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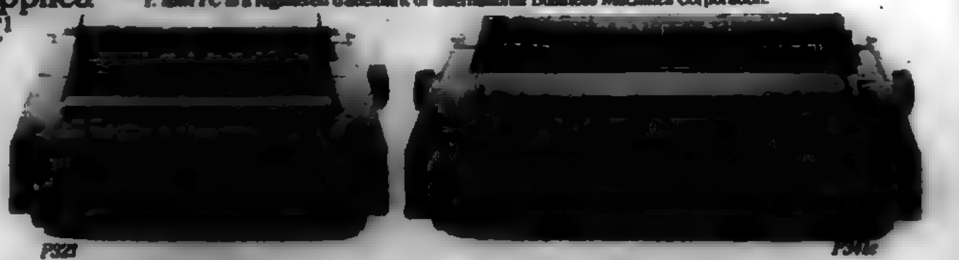
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INDUSTRY INSIGHT

Clinton Wilder

U.S. lagging in OSI race

Amid the hoopla and sheer size of the world's largest international computer trade show, Cebit '87 — formerly a part of West Germany's Hannover Industrial Fair — one major theme stood out: multivendor connectivity.

In the data communications area, the recent extravaganza was a showcase for the International Standards Organization's Open Systems Interconnect (OSI) model capabilities from a host of vendors, including IBM.

What was apparent at Cebit was that despite the efforts of the U.S. fledgling, the Corporation for Open Systems, the U.S. still lags far behind Europe in attempts to move toward intrasystem compatibility.

In demonstrations that ranged from practical applications to rather gimmicky displays, at least four exhibits featured multivendor connections. These exhibits included the following:

- IBM's new X.400 message-transfer facility and X.400 Distributed Office Support System (Disoss) connection. In another push for multivendor environments, IBM's demonstration of the VM version of Open Systems Transport and Session Service and Open Systems Network Support included a Digital Equipment Corp. VAX system and a Compagnie des Machines Bull terminal linked to a Bull data base in Paris.
- The initial results of a document-exchange research project from Esprit, the European computer vendors' research consortium. The demonstration featured the transfer of text and graphics among four vendors' systems through Office Document Architecture, an OSI-compatible protocol.

Esprit will conduct further research on similar standards for digital data and voice exchange between incompatible office computer systems. This makes one wonder why the U.S.'s Microelectronics and Computer

Continued on page 104

IBM recruits Syntelligence

BY JAMES A. MARTIN
CW STAFF

SUNNYVALE, Calif. — IBM, showing further signs of competitive pressure from other hardware vendors, announced last week a cooperative marketing agreement with Syntelligence, Inc., a 105-employee vendor of expert systems software for insurance underwriting and commercial lending.

It is the second such Industry Marketing Assistance Program (IMAP) agreement for IBM this year in the insurance industry and reflects Big Blue's determination to climb out of its current slump by offering more complete systems, not just hardware.

Last month, IBM agreed to cooperatively market Policy Management Systems Corp.'s insurance market applications software under an IMAP deal [CW, Feb. 16].

"Other hardware vendors have been more forthcoming in the past about forming joint ventures with software companies because they had to compete with IBM," said David Thomas, associate software and services analyst for Hambrecht & Quist, Inc. in New York. "But the tables have been reversed, and IBM has to compete like everyone else now, especially in selling mid-range systems."

Under the terms of the IMAP agreement, Syntelligence and IBM sales representatives will locate and visit potential customers together, but IBM will not actually sell Syntelligence products.

"The main thing for IBM is still selling hardware," explained Sharon Poole, manager of com-

Continued on page 103

GTE, Fujitsu tie PBX, switches

BY CLINTON WILDER
CW STAFF

SAN JOSE, Calif. — Marking another retreat from the commercial telecommunications business, GTE Corp. last week merged its private branch exchange (PBX) and digital switch business into a joint venture that will be 80% owned by Fujitsu America, Inc.

GTE's Tempe, Ariz.-based Business Systems Division will form the basis of the new company, called Fujitsu GTE Business Systems, Inc., which will remain in Tempe. The GTE unit had revenue of more than $100 million in 1986 and employs about 900 people.

The venture will begin operations April 1. The deal marks Stamford, Conn.-based GTE's third major withdrawal from direct participation in a telecommunications market within the past two years.

GTE spun off its transmission equipment business last year in a similar 80%-20% joint venture with West Germany's Siemens AG, which holds the controlling interest.

And in a highly publicized 1986 move, GTE merged its struggling Sprint long-distance business with United Telecommunications, Inc.'s U.S. Telecom service to form U.S. Sprint Communications Co.

"GTE is getting out of product lines that aren't making money," said Mike Kennedy, a telecommunications analyst with the Gartner Group, Inc. in Stamford. "They will concentrate on defense contracts, local phone service and electronics products."

Sales of GTE's Omni series

Continued on page 104

Cullinet buys tool, adds CIM

BY ROSEMARY HAMILTON
CW STAFF

WESTWOOD, Mass. — Continuing on its recent spending spree, Cullinet Software, Inc. purchased a nonexclusive license to a financial software package from Computer Associates International, Inc. last week.

Cullinet also announced its first marketing agreement in the computer-integrated manufacturing (CIM) arena since introducing a major CIM strategy earlier this year.

The Computer Associates fixed assets accounting package, which cost Cullinet $440,000, will be tailored to run with Cullinet's mainframe data base management software and is scheduled for availability in a year.

"They came to us, liked what

Continued on page 104

Inside

- Iomega reduces work force, faces two lawsuits. Page 92.
- AT&T adds Computer Sciences to government bid. Page 90.

CONFERENCE NOTEBOOK

Commercial use seen fueling rapid supercomputer growth

BY ALAN ALPER
CW STAFF

NEW YORK — The supercomputer's ability to reduce corporate costs and development time associated with bringing new products to market will propel its growth for commercial applications, according to vendors and analysts at the second annual conference on supercomputing sponsored by Piper, Jaffray & Hopwood, Inc. here last week.

The Minneapolis brokerage house projects that supercomputer vendors' revenues will grow from approximately $800 million last year to more than $2.5 billion by 1990.

For years, supercomputers — large-scale processors optimized to speedily handle mathematics-intensive problems — have been the domain of scientific/engineering firms and university research centers. They are now finding use in pharmaceutical, biotechnology and chemical business.

Cray Research, Inc. in Minneapolis, which has installed about two-thirds of the 244 supercomputers in use worldwide, is expected to maintain its market share lead in the near term. The firm is expected to unveil new members of its X-MP family and next-generation Cray 3 during the next three years, which should assure its performance leadership position.

"A large market share is self-perpetuating," noted Jack Worlton, president of supercomputer consultancy Worlton & Associates and a Laboratory Fellow at Los Alamos National Laboratory in New Mexico. "A computer with a large market share guarantees that people will develop software for it and that more people using it in a similar market will collaborate on software," he said.

Analysts, however, are becoming increasingly alarmed by alleged predatory pricing moves made by Japanese supercomputer suppliers Fujitsu Ltd., Hitachi Ltd. and NEC Corp. In addition, both the U.S. government and domestic supercomputer firms contend that Japan has closed its market to U.S. vendors.

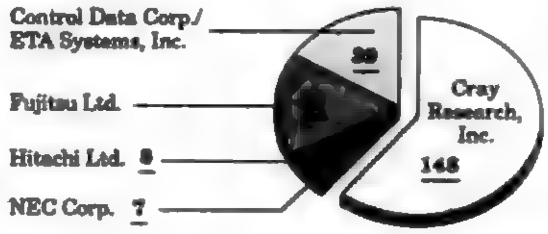
"The Japanese are taking advantage of their vertical integration — particularly their ability to produce high-speed components — and their financial power to underprice people like Cray," Worlton said.

Highlights from supercomputer vendors' presentations included the following:

Cray. "We sell on our merits — we don't compete on price," said Bob Ewald, vice-president of commerical marketing. "If other competitors want to, that's fine, but there is a reason others have to give their com-

Continued on page 103

Cray still dominates
Supercomputers worldwide installed base, December 1986



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HEWLETT PACKARD

Business Computing Systems

Shake-ups, lawsuits force job cuts at Iomega

BY ALAN J. RYAN
CW STAFF

ROY, Utah — Iomega Corp., a manufacturer of cartridge-based disk mass storage products for desktop computers, has found itself hit with hard times and two lawsuits.

With a losing quarter ahead, as predicted by the company and industry analysts, Iomega announced last week it would make a 183-employee permanent reduction in its work force. Earlier this year, Iomega President and Chief Executive Officer Gabriel Fusco resigned from his positions, but he remains president of sales.

Iomega, which patented the Bernoulli storage technology, announced in December that nearly 150 employees had been let go. Most worked in management, according to company spokeswoman Linda Dalton.

Last week's 183 permanent cuts — which represent more than 25% of the company's professional, managerial and indirect employees — were accompanied by the temporary layoff of 182 people in the direct labor force. Dalton said Iomega intends to bring the laid-off workers back once business is stable.

Making adjustments

"In early 1986 and through 1985, things looked wonderful," Dalton said. "The company was a new, young company. We were growing by leaps and bounds, and we were hiring like crazy, building buildings and expanding. By the end of 1986, it was apparent that we needed to do some adjusting, and that's pretty much what we're doing."

Although Dalton maintained that the company is continuing to see consistent sales of its products, analysts said the falling prices of Winchester disk drives spell trouble for Iomega's future.

"The real thrust of this is that the price of computers and Winchesters are coming down so fast that everybody now buys a computer, for the most part, with a Winchester in it," said Kenneth Leung of Smith Barney, Harris Upham & Co. "That's why Iomega's potential market share is not growing."

"The company is restructuring to a size which is more appropriate to the current sales level," said analyst James Stone of Shearson Lehman Brothers, Inc. "Some of their previous forecasts may have been exuberant. I think they're now taking a little more realistic approach as to what can happen."

For its fourth quarter of 1986, Iomega reported earnings of $427,000, an 84% decrease from earnings of $2.7 million reported in the year-earlier quarter. Sales for the 1986 quarter of $30.7 million represented an 8% drop from year-earlier levels.

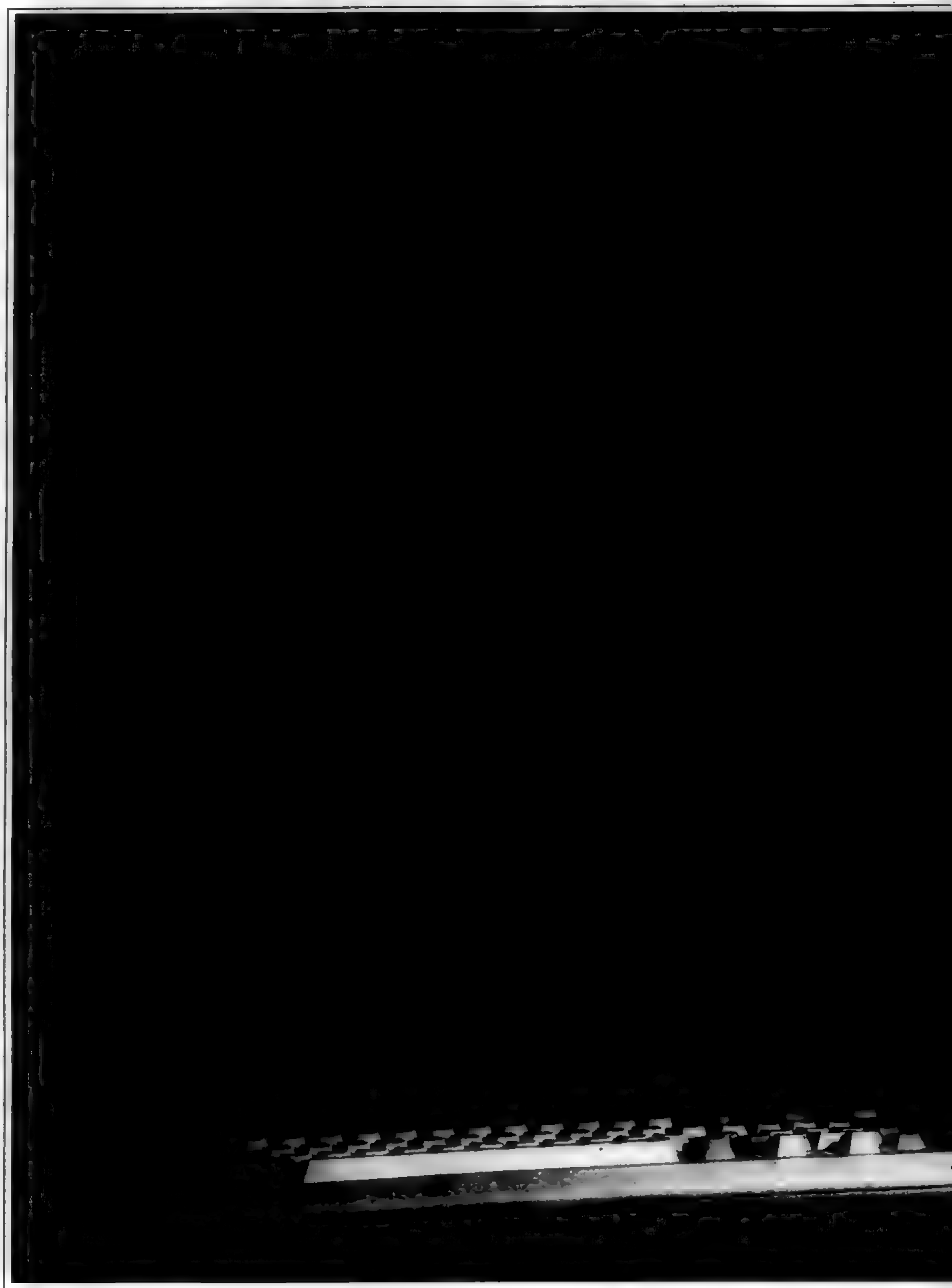
For fiscal 1986, the company recorded profits of $6.4 million, a 57% decrease from 1985.

Leung predicted that in the first quarter ending March 31, Iomega will report a 50 cent per-share loss. He said that by the second quarter, the company may register a reduced loss of 10 cents per share.

To help the firm's ailing finances, Leung said, Iomega should continue to cut costs on the 5¼-in. Beta 20 product to make it competitive with other drives in the industry.

"They're running out of time here because they've got to get this 5¼-in. product into a design-in position," meaning that an OEM will put the Iomega product rather than a Winchester drive into his computer, Leung continued. He said this is crucial as the industry seems to be moving toward 3½-in. drives.

The two lawsuits stem from a shareholders meeting last April in which Iomega's management predicted that sales would continue to grow, Iomega's Dalton explained.



Lanier weathers acquisition storm

BY ALAN ALPER
CW STAFF

ATLANTA — Shortly after Harris Corp.'s late-1983 acquisition of Lanier Business Products, Inc., storm clouds shrouded Lanier's headquarters, located here. Diverging cultures and management styles of Harris and Lanier executives created rifts over the way the office automation products vendor should be operated.

But during the last two years, tranquil skies seem to have emerged. Having been brought into the corporate fold, Lanier now operates semiautonomously as one of Harris' five business sectors. Importantly, Lanier's management has stayed intact and learned how to coexist with its diversified parent.

"It's three years going on four and I'm still here," says Wesley E. Cantrell, president of Lanier and a senior vice-president of Harris. "We've been through some hard things, but Harris management's pride is not so great that they're not unwilling to change if things don't work out."

Despite the lingering slump in capital expenditures for office-automation equipment, Cantrell says he is pleased with Lanier's performance. While revenue has been flat for the first six months of fiscal 1987, the firm has remained profitable.

"With growth slowing on an industrywide basis, I'm proud that we're profitable," he says.

Like most computer industry firms, Lanier is operating in a cost-containment mode, Cantrell adds, stretching resources and limiting expenditures to maintain a healthy bottom line. For fiscal 1987, Cantrell says he expects financial performance to approach last year's profit of $18.4 million on revenue of $425 million.

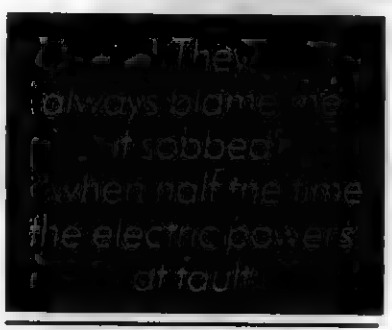
Wesley E. Cantrell

"No one expects a bubble up in the economy or increased industry growth," Cantrell comments. "Since we don't see a recovery in the business, our goal is to at least beat the growth rate of the businesses we are in."

To do that, Lanier is restructuring its sales force to address specific key markets while maintaining its traditional market-driven approach to product development. The firm is confining itself to serving the office worker — primarily executives and secretaries — by offering a mix of workstations, dictation and telephone equipment and vertical-market application software requested by its customer base. This plan has helped the firm

Continued on page 99

CONFESSIONS OF A DOWNED COMPUTER.


"They always blame me," it sobbed, "when half the time the electric powers at fault."

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Export rules cost U.S. billions

BY KATHLEEN GOW
SPECIAL TO CW

WASHINGTON, D.C. — A recent report from the National Academy of Sciences (NAS) has blamed the U.S.'s stringent export regulations for the loss of $9.3 billion worth of trade and 188,000 jobs in 1985.

"For years, our companies have realized that many export controls are costing us billions of dollars without really increasing national security," said Vico E. Henriques, president of the Computer and Business Equipment Manufacturers Association (CBEMA), based here.

"We force customers in Western countries to go through so much red tape to buy computers and business equipment from us that they are turning to vendors in other countries," the CBEMA chief maintained.

Both CBEMA and the Washington, D.C.-based American Electronics Association supported the findings and recommendation made in the NAS report, entitled, "Balancing the National Interest: U.S. National Security Export Controls and Global Economic Competition."

Armed with research conducted during an 18-month period, the NAS panel found that recent changes in U.S. export policy may be "overcorrecting" previous weaknesses by failing to promote both military security and economic vitality. It also found that export control policies lack proper direction and affirmative leadership at the executive branch level.

The panel concluded that the complex export control system unnecessarily hinders high-technology exports to other non-Communist Bloc countries and directly affects relations with members of the Paris-based Coordinating Committee on Multilateral Export Controls (Cocom).

The $9.3 billion figure was broken down as follows:

- Administrative costs to firms: $500 million.
- Lost West-to-West export sales: $5.9 billion.
- Lost West-to-East export sales: $1.4 billion.
- Reduced research and development: $500 million.
- Actual value of licenses denied: $500 million.
- Lost profits on export and foreign sales: $500 million.

The loss of jobs was figured at 25,800 jobs for every one billion dollars of exports lost.

The congressional Joint Economic Committee also supported the NAS findings, reporting that 1986 was the first year the U.S. posted a deficit for high-technology trade, with exports dropping to $2.6 billion less than imports. In 1980, U.S. exports exceeded imports by $27 billion.

The NAS study recommended the following policies be instituted:

- Elimination of licensing requirements for products that contain low levels of technology.
- Elimination of re-export controls on products destined for shipment within Cocom countries.

Continued on page 99

MCC elects TI exec Dove to head firm

BY ALAN J. RYAN
CW STAFF

AUSTIN, Texas — Grant A. Dove, a 28-year veteran of Texas Instruments, Inc., has been elected chairman of the board and chief executive officer of the Microelectronics and Computer Technology Corp. (MCC) research consortium.

The election, held earlier this month by the MCC board of directors, places Dove in a consulting position to the 20-member consortium until his retirement from TI in July. At that time, Dove will assume full responsibility of MCC. He replaces Admiral Bobby R. Inman, who vacated the post in December. Joseph Boyd, chairman of the board of Harris Corp. will continue to serve as MCC's interim chairman and CEO until July 6.

"MCC's concept of obtaining substantial leveraging of individual shareholder's R&D investments is still a relatively new one for the U.S.," Dove said. "I consider it very important that we prove this concept to be a viable approach to improving our competitiveness.

"I am excited about the challenge of creating and transferring first-rate technology to a diverse group of leading U.S. corporations," Dove added. MCC is owned by 20 U.S. technology corporations.

Dove, who joined TI in 1959, is currently executive vice-president of the company. His duties have included managing the company's geophysical exploration service, data systems group and industrial systems division.

"Dove was the superior choice to guide MCC through its continuing maturation and evolution," said John Lacey, executive vice-president of Control Data Corp., who headed up the selection committee for MCC.

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Lanier

FROM PAGE 93

make inroads in the legal- and medical-office markets.

"We run all of it through a screen and find out what products we need," Cantrell says.

"This approach allows us to go out and acquire products we are not developing internally," he adds.

Using that approach, the firm successfully penetrated the telephone market by procuring less costly dictation and telephone equipment from Japan, Cantrell acknowledges.

Lagging behind

One area where Lanier apparently lags behind is desktop publishing systems.

The firm, however, says it intends to make amends.

"It's a natural market for us in that it is an evolution of a word processing application," Cantrell explains. "We're close to making a decision on what we should do."

Export

FROM PAGE 96

- Legislation to speed the process of determining foreign availability, or whether a product is available on the international market outside the U.S. from non-U.S. sources. If so, the U.S. product would be granted a license within 20 days.
- The application of bulk distribution licensing procedures for shipment to the People's Republic of China.
- Procedures to cut average license processing time by one-third — to 14 days.
- Improvements in the way disputes are handled between the three controlling agencies, which are the departments of State, Commerce and Defense.

'Gone too far'

Secretary of Commerce Malcolm Baldrige, who recently announced an 11-point plan to initiate a less-restrictive policy, agreed that "we've gone too far" with controls that were originally intended to safeguard national security.

Baldrige noted that as much as 40% of U.S. merchandise shipped to allies now requires an export license.

Baldrige maintained that the plan will reduce license applications by 20% from their present level of approximately 120,000 a year.

This, the administration hopes, will help reverse the trend of foreign customers moving away from U.S. products, a process Baldrige has termed "de-Americanization."

Gow is editor of the CW Communications International News Service.

AT&T picks partner in FTS bid

Computer Sciences proposes billing system for government service

EL SEGUNDO, Calif. — AT&T has enlisted Computer Sciences Corp. to join in its bid for the federal government's $4.5 billion Federal Telecommunications System (FTS) 2000.

Computer Sciences' role will be for the design, development and maintenance of a software system to handle billing of FTS 2000 customers for AT&T's network services. The contract, to be issued by the General Services Administration, is for a digital telecommunications system to replace the U.S. government's existing FTS.

Computer Sciences is a major supplier of computer and communications systems and services to the federal government, deriving more than $600 million in revenue annually from the government, the company said.

The coveted contract, also receiving bids from teams led by MCI Communications Corp. and U.S. Sprint Communications Co., is expected to be awarded by the end of this year.

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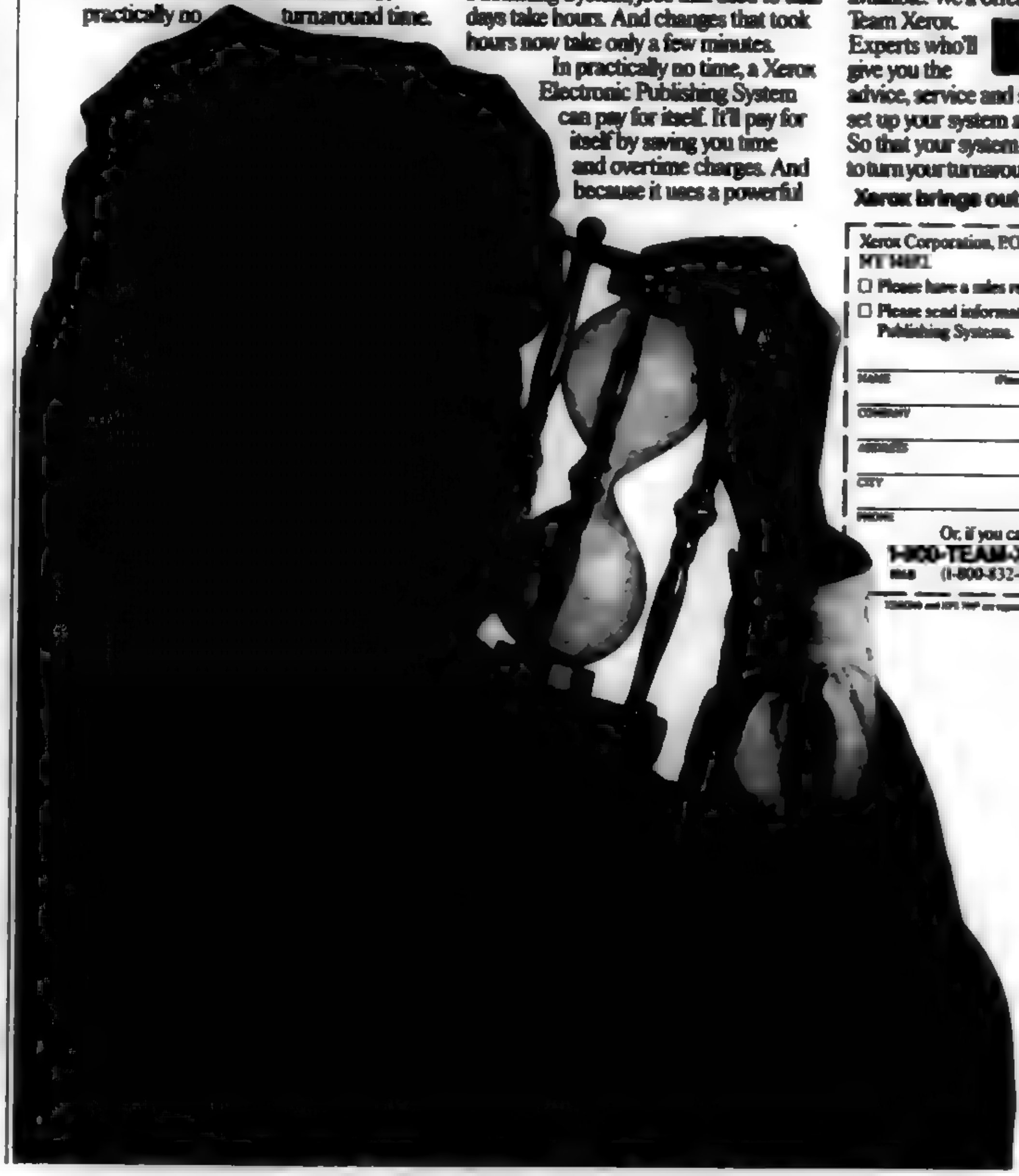

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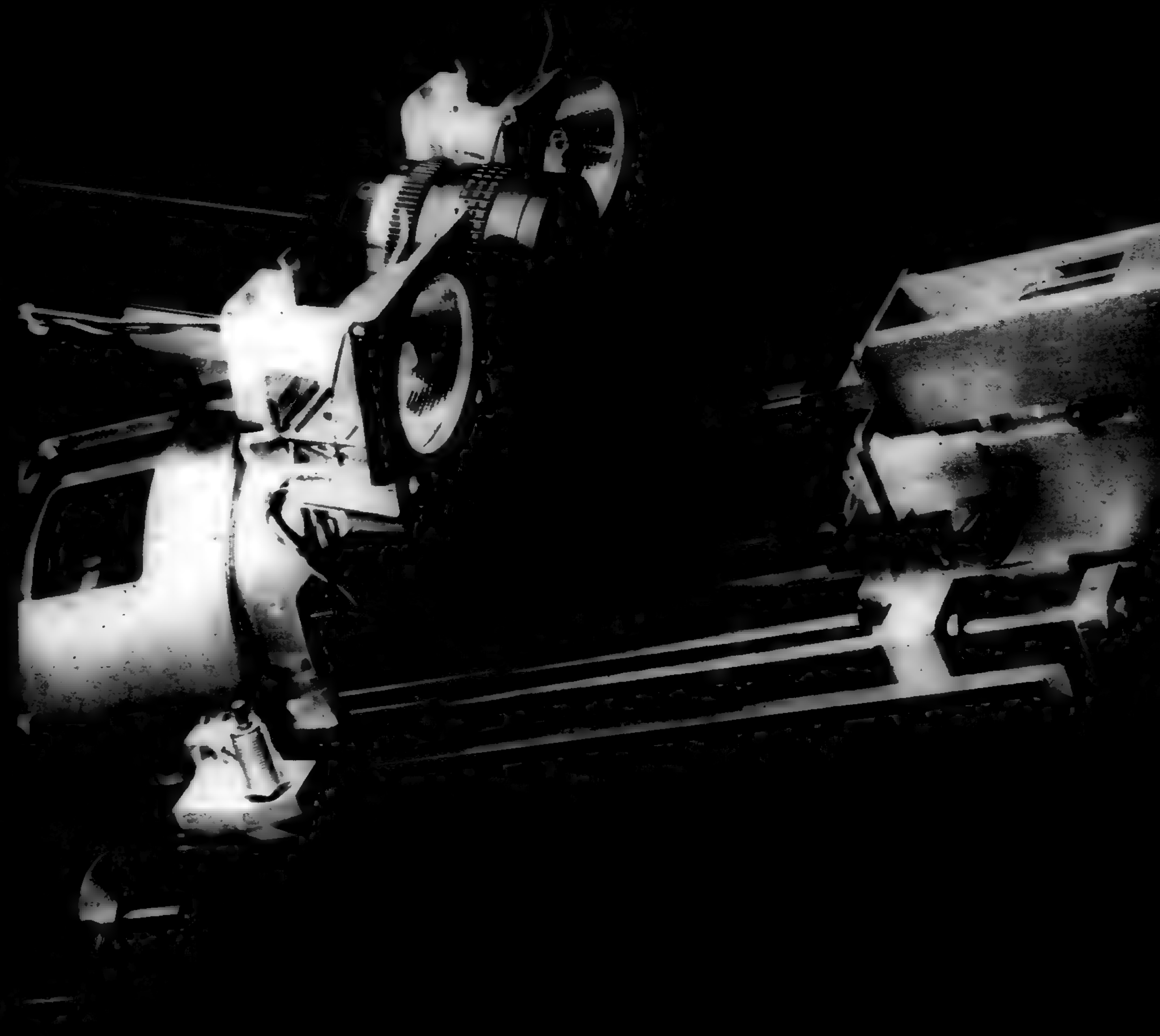

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Until today, managers deciding how to store information were faced with uncomfortable compromise rather than effective choice.

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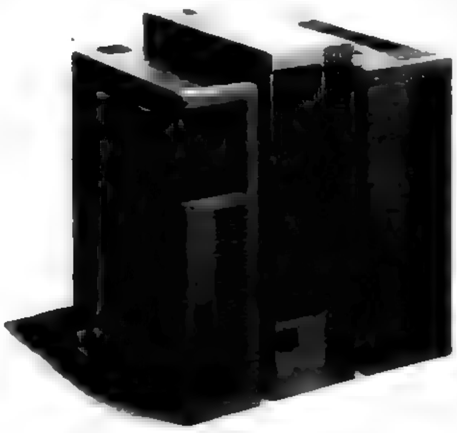

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IBM recruits

CONTINUED FROM PAGE 89

plementary resources for IBM's insurance industry group in Valhalla, N.Y. "But our customers need good, solid applications, and Syntelligence has tremendous ones."

Syntelligence, founded in 1983 in Sunnyvale, is a private company with a sales force of 10. The firm offers two artificial intelligence software products, The Underwriting Advisor for the insurance industry and The Lending Advisor for financial institutions. Both will be jointly marketed by IBM and both run on IBM's MVS/XA mainframe operating system.

The Underwriting Advisor utilizes cooperative processing betweeen the mainframe and the IBM 3270 Personal Computer workstations. Introduced in October 1986, the system is in use at American International Group, The St. Paul Companies and Fireman's Fund Insurance Co.

IBM is feeling competitive pressures from mid-range computer vendors such as Digital Equipment Corp. and does not have a strong applications software presence in the insurance and commercial lending markets, analysts said. In addition, Syntelligence claims to have the only full-function expert system IBM mainframe application, providing Big Blue with a strong application solution to offer customers and potential hardware buyers.

"IBM would like to sell more hardware, and we have applications that go into areas they haven't sold much in before," said Sheldon Breiner, president of Syntelligence. "We'll help them sell hardware, and their name will get us audiences we wouldn't have otherwise."

In addition, small firms like Syntelligence do not have the marketing clout or channels of distribution of an IBM. IBM, in exchange, is seeking to enter various vertical markets, and joint marketing agreements offer an inexpensive means to do so. The IMAP agreements with Syntelligence and Columbia, S.C.-based Policy Management do not limit the two companies to an exclusive IBM relationship and allow them to maintain individual marketing rights.

By contrast, IBM signed a more binding OEM agreement last year with Dallas-based Hogan Systems, Inc. [CW, May 12, 1986], under which Hogan forfeited domestic marketing rights to IBM in return for royalty payments.

Just how much these agreements will help both parties remains to be seen, however. Jointly marketing Syntelligence software will make little impact on IBM's bottom line, while the level of Big Blue's energies in these agreements has been questioned by some analysts.

"But no matter what," said Patricia Laupheimer, vice-president of reseearch at Shearson Lehman Brothers, Inc. in New York, "it certainly doesn't hurt a company like Syntelligence, which sells software only to IBM customers, to have IBM's stamp of approval."

Commercial use

CONTINUED FROM PAGE 89

puters away."

Cray has installed seven supercomputers in Japan in commerical businesses. The firm has not had any success in cracking the government and university markets there because of its inability to respond quickly to the specific technical requirements of those institutions.

Ewald was emphatic that if a U.S.-Japan trade agreement is not reached, U.S. protectionism may be the only answer. "Either the Japanese are going to have to open up their market or we'll have to close down the U.S. market," he said.

Amdahl Corp. Amdahl, which remarkets Fujitsu-built supercomputers in North America and Europe, has had difficulty penetrating the domestic market, according to Wayne McIntyre, director of scientific systems. The firm, which has maintained strict compatibility with IBM 370 architecture, has shipped only four supercomputers, all to European firms in petroleum industry-related businesses.

The firm has had a hard time making the adjustments necessary to sell supercomputers in the U.S., he said. In the IBM plug-compatible mainframe business, Amdahl deals with personnel who make computer acquisition decisions. In selling supercomputers, scientists and researchers make the systems choices.

"We're still going through the learning process," McIntyre said. "We've done some things recently which should lead to some success here."

ETA Systems, Inc. The Control Data Corp. supercomputer spinoff cancelled its presentation at the conference, citing "a last-minute business change," analyst Gary Smaby of Piper, Jaffray said.

Sources said the firm's absence coincided with moves to bring ETA back into the CDC corporate fold and reports that the firm would not reach its projected goal of shipping between 10 and 14 of its ETA-10 next-generation systems this year.

Steve Hemping, ETA's vice-president of administration, said the firm did not appear at the conference because its president, Lloyd Thorndyke, was in Europe working with five customers.

Hemping declined comment on this year's projected shipments of the ETA-10, saying the St. Paul, Minn., firm has never publicly presented a delivery schedule. "We shipped our first computer to Florida State University in December. By mid-year that system should be fully operational. Then we'll talk about projections and orders and so on," he said.

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U.S. lagging

CONTINUED FROM PAGE 89

Technology Corp. never thought of developing a cooperative research program on communications protocols.

- Multinet, a Cebit-sponsored, mix-and-match network of products from 19 computer and communications vendors linked by the Transmission Control Protocol/Internet Protocol communications standard. Participating vendors included Apollo Computer, Inc., DEC, Data General Corp., Hewlett-Packard Co., Bull, Unisys Corp. and Siemens AG.
- A notably IBM-less electronic mail demonstration by the OSI Electronic Mail X.400 Group, which included several of the same vendors as Multinet. The group's purpose is to promote practical office applications of technical standards developed by Europe's Standards Promotion and Application Group.

As always seems to be the case when the initials IBM and OSI appear together, corporate politics reared its ugly head when IBM did not join the OSI electronic mail demonstration. Some IBM spokesmen said Big Blue wasn't invited; other vendors disputed that. "I wonder why IBM chose to do it this way," said Klaus Kemmler, marketing manager of DEC in West Germany. "They didn't do themselves a favor."

Nonetheless, most European computer executives feel that U.S. computer vendors will ultimately embrace OSI communications standards.

"I think they will have to, because of market and customer pressure," said Bull President and Chief Executive Officer Francis Lorentz, whose Paris-based firm will finalize the terms of its acquisition of controlling interest in Honeywell, Inc.'s computer business by the end of this month.

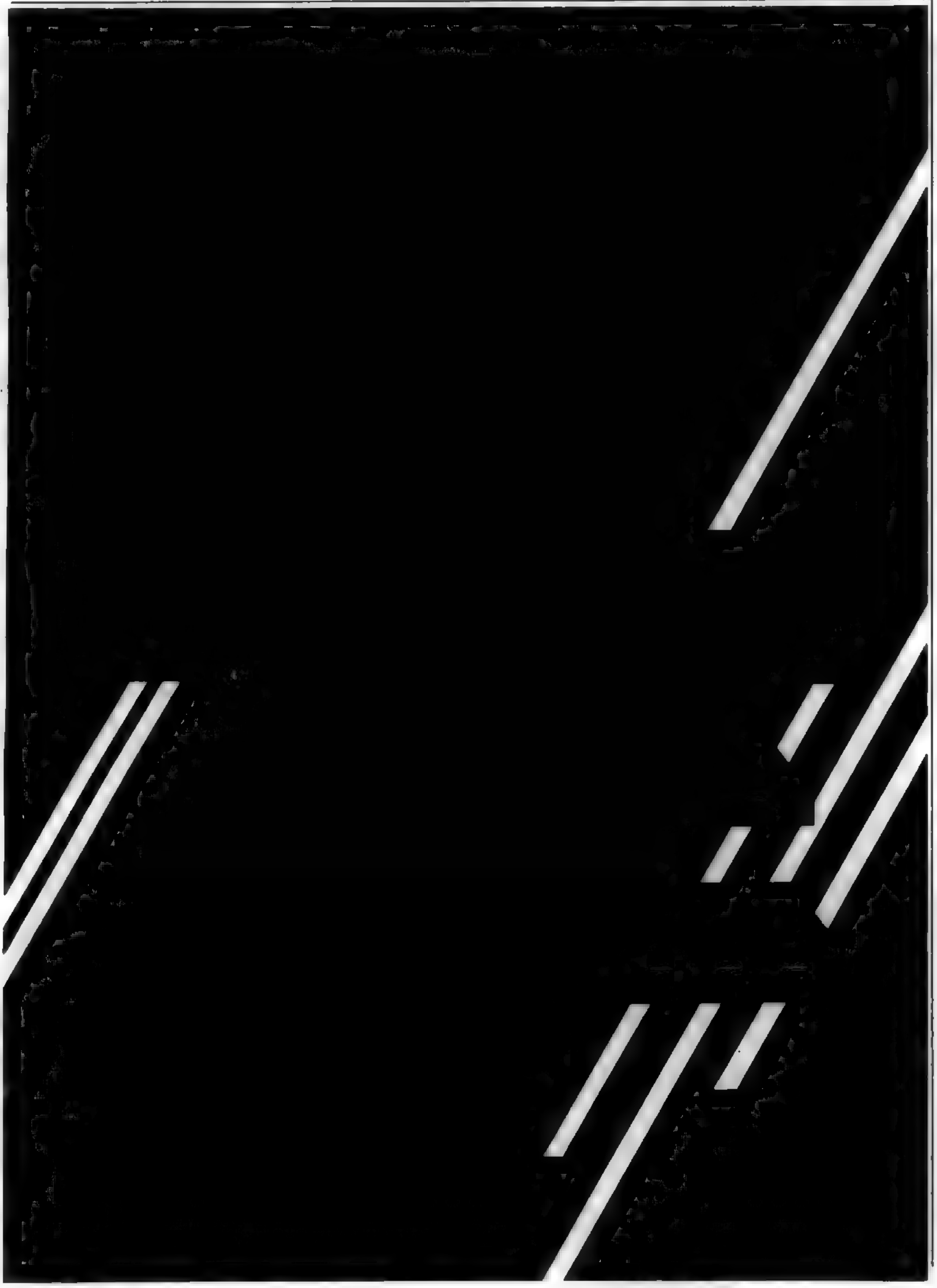
"Users are playing a much bigger role, and it is becoming an important issue to work with international standards," Lorentz continued. "Users do not want to be stuck with one manufacturer's standard. They cannot afford to take that risk. IBM's Systems Network Architecture won't disappear, but IBM will have to develop gateways to OSI, and they won't be as efficient as native implementations," he added.

Lorentz theorized that fourth-generation languages and data base standards such as the SQL interface will become much more prominent as users move to distributed software applications. "In five years, the user may no longer know or care what mainframe or what operating system the application is running on," he said. "It's like comparing cars — the gas and the gearshifts are the same, even though the engines are different."

Because of the peculiar characteristics of the European computer market — with many vendors dominant in their native country and not even a market factor in others — it has historically made a lot of sense for European computer makers' products to talk to incompatible machines made by others. And admittedly, even in Europe, standards like OSI still have a long way to go.

But large U.S. computer users, awash in a sea of incompatibility, have a lot in common with their European counterparts who have been victimized by a fragmented industry. U.S. vendors would do well to take a lesson from across the Atlantic and get the connectivity standards ball rolling much faster than it is now.

Wilder is *Computerworld's* senior editor, computer industry.



GTE, Fujitsu

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PBX in the U.S. have been slowed by fierce competition and lackluster growth of the market, Kennedy said. The Gartner Group estimates that the U.S. PBX market is only growing 5% annually, and AT&T, Northern Telecom, Ltd. and IBM's Rolm Corp. control about 70% of it. "All the majors have lost money in the PBX market, and it doesn't look like things will get better," Kennedy said.

For Fujitsu, the GTE venture continues the firm's recent flurry of activity to expand its U.S. market presence. Fujitsu America has three divisions, five U.S. subsidiaries and five U.S. manufacturing plants.

"It looks like Congress may get very aggressive on limiting Japanese imports," Kennedy said. "Japanese companies can get around that by buying into U.S. firms to make or distribute their products here. NEC Corp. has also done that very successfully."

Cullinet

CONTINUED FROM PAGE 89

they saw and didn't want to spend the time developing it," said Stefan Bothe, president of Computer Associates's application software division.

According to Bothe, the agreement stipulates that Cullinet will sell the fixed assets system in conjunction with its software only. Computer Associates is expected to continue to sell the package with its other financial software programs or as a stand-alone offering, which Cullinet is not allowed to do.

Separately, Cullinet will work with data collection equipment vendor Epic Data Corp. to bundle and jointly market Cullinet's CIM software and Epic Data's hardware.

EMPLOYMENT TODAY

Employers want MIS degrees

But there's room for experienced professionals without college education

BY ROSE MULA
SPECIAL TO CW

If you did not have the means or the foresight to obtain a degree in data processing or the good fortune to choose the right company early in your career, all is not lost.

Many companies are looking for MIS professionals with solid on-the-job experience, even if they do not have formal training.

"Sure, an employer's first choice is a candidate with a computer science or MIS degree, in addition to three to five years experience; but when pressed, they will give equal consideration to nondegreed applicants with equivalent experience," says Patricia Perrilo, a consultant for R. F. Hammond & Associates, a Lexington, Mass., placement firm.

That's the good news. The bad news is that "equivalent experience" usually means two years of work for every year of college.

"Like everyone else, we prefer a mix of education and experience," says Nan Heisler, human resources manager for North American Life & Casualty Co. in Minneapolis. "But, if we have to choose between a recent college graduate and a nondegreed, experienced candidate, we generally choose the person with experience and then take responsibility for developing his or her education through comprehensive, in-house training and tuition reimbursement."

North American Life & Casualty does not necessarily require DP experience, Heisler says. "Again, if we have to make a choice between two candidates, we prefer a general business background over programming experience," she adds.

Another company that looks for a business background as well as DP experience is Digital Equipment Corp. According to John Hopkins, DEC's strategic planner for human resources management, "in the future, the best information systems will be those that are designed, developed and implemented by users who understand computer science, as opposed to computer scientists who have no firsthand knowledge of the user environment.

"A technical or business degree is a definite asset, but even more important is an attitude of lifelong learning," Hopkins adds.

To be successful, MIS professionals should understand changing technologies and the merger of diverse technologies in the future. The only way to keep abreast of these developments is to continue to learn and broaden your skills, Hopkins suggests.

In the health industry, professionals with a mix of education and experience are also in demand. Advanced System Applications, Inc. (ASA), a Bloomingdale, Ill., developer of software systems for the industry, recruits between 50 and 75 people a year from colleges, as well as a number of nondegreed people with three to five years of experience, according to Trudy Norman, the company's director of corporate recruitment.

Although ASA employees get first crack at new openings before a search is extended, there are many slots that are filled by outsiders.

"In any given year, one-third of our employees are promoted to higher levels," Norman says. "But because we've been growing at a rate of 50% annually, it's impossible to fill all new openings internally."

For managerial slots, from the director level on down, ASA looks for people with people handling skills as well as several years of experience in either group health or DP. In cases in which the applicant does not have formal training, Norman says, she tends to weigh experience more heavily than a degree.

Despite the attitude of employers like ASA, many other companies still regard a degree as the passport to consideration for job applicants, according to Steven Comstock, a Denver DP instructor who conducts seminars for companies worldwide.

"Today, in most cases, you need a degree just to get hired. That's too bad, because I've met a tremendous number of extremely competent programmers and managers who don't have degrees; but it's getting harder and harder to get your foot in the door without one," Comstock says.

The reason for this situation is that the market is becoming saturated with people with bachelor and advanced degrees, says Dennis Hill, chairman of the Milwaukee School of Engineering's Computer Science and Engineering Department.

"Because of this saturation, nondegreed individuals new to the job market will have a very difficult time getting placed; and those already working will find themselves stratified at lower levels or even displaced," he says.

> "PEOPLE in dead-end jobs should not resign themselves to their fate, justifying their nonaction by moaning, 'It's no use; I don't have a degree.' Education is an ongoing process. It doesn't have to stop at 21."
>
> DENNIS HILL
> MILWAUKEE SCHOOL OF ENGINEERING

To avoid that fate, MIS professionals can either go back to school full-time or attend continuing education classes, Hill adds.

"People in dead-end jobs should not resign themselves to their fate, justifying their nonaction by moaning, 'It's no use; I don't have a degree.' Education is an ongoing process. It doesn't have to stop at 21," Hill says.

Hill recommends pursuing courses of study that address both hardware and software development. "Our placement records show that companies are seeking candidates who can offer that flexibility," he says.

R. F. Hammond & Associates' Perrilo also advises nondegreed people to take continuing education courses, with the emphasis on MIS.

"MIS specialists aren't dependent on any particular industry," she says. "If one goes into a slump at any time, you can switch to one that is prospering."

Mula is a Waltham, Mass.-based freelance writer.

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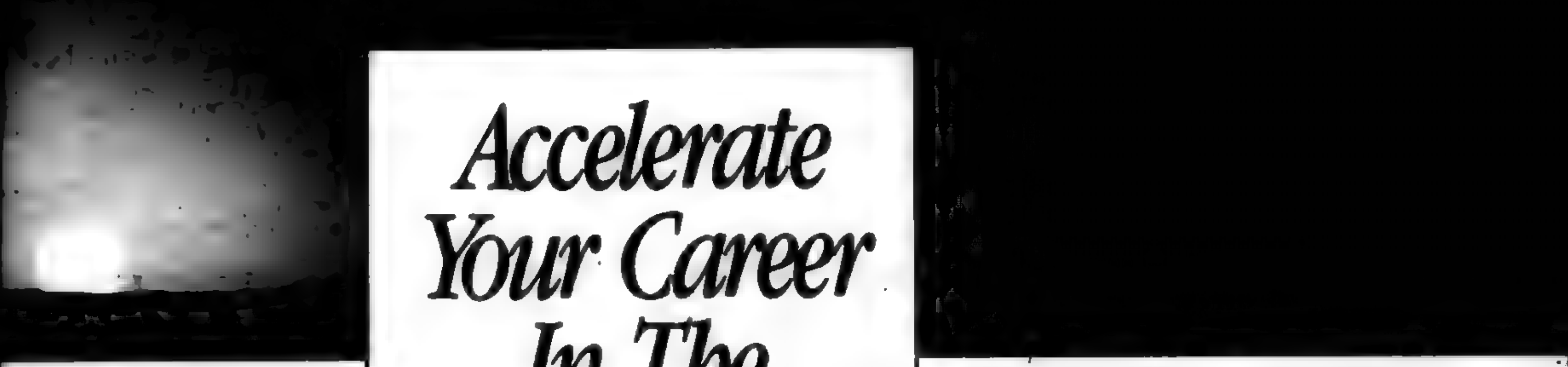

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Programmer/Analysts New data center with extensive new development is seeking Programmer/Analysts with strong exposure to COBOL or PL/1 and ADABAS. Ground floor opportunity. ***To $37,000.***

Colorado

Programmer/Analyst—Insurance Develop new systems in an on-line data base environment. Denver-based corporation seeks skilled professionals with a desire to join a fast-paced organization working with IMS and CICS. Life insurance applications experience preferred.
To $32,000.

CAD/CAE Software Engineers Automation firm seeks talented, ambitious professionals for the development of operating systems, LANs and color graphics. Three years block structured language experience in a commercial environment desired. PASCAL, C, UNIX and hardware design preferred. ***To $45,000.***

VAX COBOL—New Development Two years VAX COBOL experience with a strong preference for layered products: DBMS, TDMS ACMS desired. Advancement and career growth are determined by your performance and initiative. ***To $37,000.***

DB2—Multiple Openings Growing multi-billion dollar corporation seeks professionals with DB2 and/or IMS/DC experience in a large-scale IBM MVS environment. Be a part of a long-term development project. ***To $50,000.***

VAX Technical Support Expanding organization has opportunities for VAX DBAs and Software Specialists. Heavy user interface. Advance your technical skills in this state-of-the-art environment. ***To $50,000.***

Software Engineer—Aerospace Join a small development team and work with large data base systems. Environment includes IBM, DEC VAX systems with multiple software tools. Security Clearances (EBI, SBI) highly desirable.
To $55,000.

Programmer/Analysts—IBM Expanding Denver-based corporation seeks multiple Programmer/Analysts to support and develop on-line and data base systems in an IBM MVS environment. Financial, inventory and order processing applications experience preferred.
To $40,000.

Technical Support—Data Base Highly successful DBMS vendor seeks a motivated professional to provide pre-sales product support. Will interface extensively with people which includes seminars, demonstrations, benchmarks and installations. Regional travel to 30%. VAX/VMS expertise and five years of large-scale data base design desired.
To $40,000 plus bonus.

IMS—New Development Large, Denver-based financial services firm seeks professionals for a major development effort. This is a stable, well-managed company with good career growth opportunities. Three years of IMS DB/DC programming and design experience sought. ***To $32,000.***

Test Engineer—Software Several openings exist due to an exciting, long-term project. Three years of validation and verification experience sought. VAX experience a plus. EBI, SCI or SBI Clearance highly preferred.
[illegible]

Systems Programmers One of Denver's most advanced data centers has exciting projects for System Programmers with a background in any of the following: MVS, VTAM and/or CICS.
To $47,000.

Southern California

Project Manager—Loans Suburban San Diego company seeks a manager to supervise the modification and installation of a major loan system. ***To $60,000.***

Software Engineer—High-Technology Major manufacturer located in suburban San Diego seeks motivated Microprocessor Software Engineers with three years of real-time software design experience on Intel 8080, Z-80 or Motorola using Assembler, C or PLM. BSEE or Computer Science degree considered a plus.
[illegible]

Analyst—Communications Growing San Diego government consulting firm needs people experienced in secure communications or [illegible]

Real-Time Control Programmers—San Diego firm has a multi-year project to create real-time control systems to monitor nuclear energy facilities. Experience with drivers/handlers, data acquisition and control systems on 16-bit microcomputers using assembler language desired. ***To $45,000.***

Systems Analyst—IDMS Major San Diego MIS group needs an Analyst to support IDMS applications. Heavy interface with data base support group. ***To $38,000.***

On-Line Programmers—OS Environment Major San Diego-based organization has several openings for On-Line Programmers to participate in a system utilizing a large network of terminals and in one of IBM's largest computers. Selected candidates will work in an OS/MVS CICS, IMS environment.
To $40,000.

DEC VAX System Programmer Northern San Diego software company seeks a professional to manage and tune their VMS system. Will interface with Applications Programmer and assist in training. ***To $45,000.***

Analysts—Insurance Due to expansion, a San Diego-based insurance company seeks twelve Analysts and Senior Programmers. Outstanding facilities. ***To $40,000***

Texas/Oklahoma

Office Automation Consultant Gulf Coast employer seeks a professional with a background in end-user computing and experience with office automation or word processing products. Will work in an information center environment and be exposed to the latest 4th generation products on micros, minis and mainframes. Good verbal and written communication skills and a 4-year degree desired.
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PICK Programmers—New Development Team Expanding Houston-based organization is experiencing an increase in business, creating a need for experienced professionals with three or more years of Basic Programming in a Pick operating environment.
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Software Engineers Your five years of technical experience and extensive knowledge of a DEC VAX environment will qualify you for this outstanding opportunity. Hands-on experience with any of DEC's layered products and a systems management background desired. ***To $55,000.***

Systems/Analysts—Multiple Positions Fortune 100 company headquartered in Houston seeks several Systems/Analysts for project leadership roles. Four years applications development experience in a business environment sought. Strong COBOL or PL/1 coding skills with IMS, a degree and the ability to interface with users desired. ***To $45,000.***

Software Engineers World leader in the design and manufacture of energy management and SCADA Systems seeks several Software Engineers to help in the development of new projects. Two or more years of power system development utilizing FORTRAN in either IBM or Sperry environments desired. New Houston facility. ***To $45,000.***

Data base Administration Specialist Outstanding firm located on the Gulf Coast seeks a professional to take charge of the entire data base function. A thorough understanding of data modeling, data structures, control procedures and excellent communication skills are desired. This is your chance to set-up the data base function your own way.
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Financial Programmer/Analyst New Orleans financial institution seeks an individual with two years COBOL programming experience in either loans or banking applications in an IBM mainframe environment.
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Senior System Analysts OS/MVS/XA data center located in Alabama seeks two Senior Systems Analysts with solid CICS and COBOL programming skills for project leadership positions. Manufacturing and/or financial applications development experience would be a plus. ***To $36,000.***

Data Center Expansion—Multiple Positions Increased business demand necessitates an upgrade to an IBM mainframe data center, creating the need for Programmer/Analysts, Systems/Analysts and a Technical Services Manager. Houston location.
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Software Engineer Technology Leader Dallas office of a Fortune 500 firm seeks a Software Engineer to develop microcomputer software on PC's for programmer productivity. Development will be done in C. New facility in a campus-like setting. ***To $41,000.***

Programmer/Analysts—IMS DB/DC Projects Corporate staff of a rapidly expanding Dallas Fortune 500 organization seeks experienced professionals with strong OS/COBOL backgrounds. All application projects are new and involve IMS DB/DC development.
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CAD/CAM—Software Developer North Dallas manufacturing firm which develops VAX and Micro CAD/CAM systems for new products seeks a software professional with PASCAL or C and VAX exposure. ***To $33,000.***

Data Base Analysts Corporate Headquarters of a national financial leader in Dallas seeks a management-oriented IMS DBA Analyst for long-term development projects. Data modeling experience highly desired.
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Lead Systems Programmer—CICS or IMS Major Dallas-based energy firm seeks an OS/MVS Systems Programmer with either CICS or IMS expertise to supervise a small group of technical support software people. New facilities and excellent growth potential.
To $44,000.

Programmer/Analysts—On-Line Project [illegible] project is moving into the coding and implementation phase creating a need for Programmer/Analysts. Good CICS skills preferred. COBOL acceptable. Dallas location.
To $42,000.

Information Center Manager Growth-oriented organization in Dallas seeks a Manager with information center experience and expertise in PC's and LAN's. The ability to work with personnel is a must. ***To $45,000.***

Programmer/Analyst—Industry Leader This Oklahoma-based company is number one in its field and is undergoing rapid expansion. Two or more years of COBOL experience combined with either IMS or IDMS desired. Excellent promotional opportunities.
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Senior Edp Auditor Tulsa-based corporation needs a highly motivated Edp audit professional with five or more years experience. Company offers a high quality working environment and exceptional benefit package.
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Data Base Analyst—Major Data Base Expansion. Your [illegible] of IDMS experience will allow you to move into management due to rapid expansion. This is a highly visible data base environment. Excellent relocation package. ***To $45,000.***

Systems Programmer—Conversion Outstanding opportunity to be on the ground floor of a new IBM Systems environment. Following the conversion from Univac you will be able to use your NCP/VTAM or Univac background to impact the future direction of this growing organization. ***To $40,000.***

Programmer/Analysts—Major Expansion Tulsa corporation seeks professionals for new development projects. One or more years experience programming in COBOL or PL/1 and IMS DB/DC desired. ***To $40,000.***

Programmer/Analysts—IMS DB/DC Projects Data Center of a rapidly expanding Tulsa Fortune 500-organization seeks experienced professionals with accounting application experience using IMS DB/DC.
To $40,000.

Programmer/Analysts—Multiple Positions Successful Tulsa firm seeks a professional with knowledge of C or PASCAL on a VAX/VMS system. Candidates with programming experience using C on PC's will be considered. ***To $40,000.***

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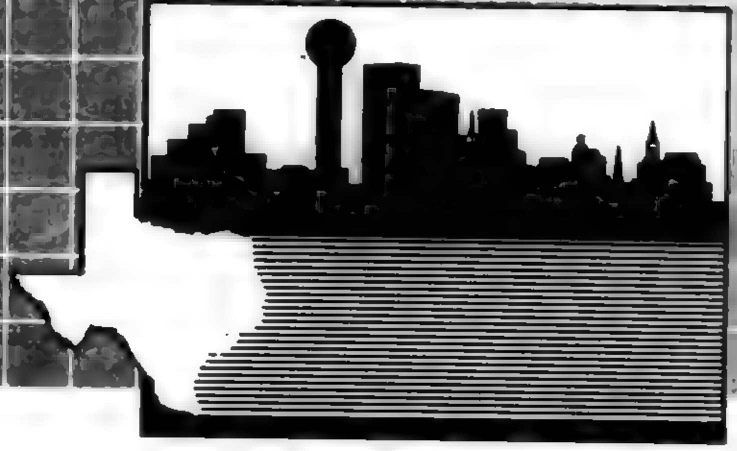

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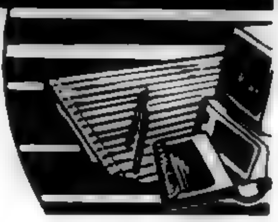

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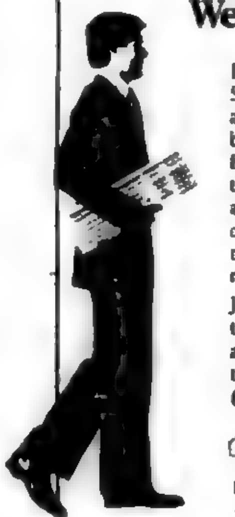

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This position will be responsible for various software package modifications and installation in a chemical manufacturing and distribution environment. Requirements include a minimum of seven (7) years of data processing experience, one to three (1-3) of which must have involved project lead responsibilities for analysis, design, development and project control. System experience should include at least three (3) of the following: sales order processing, inventory control, purchasing, engineering records, production scheduling/control, MRP and product costing.

In addition to the above experience, this position requires knowledge of COBOL (PL/1 acceptable), TSO/SPF, IMS DB/DC, BTS, LIBRARIAN, and a college degree emphasizing a strong academic performance

We offer you an exceptional career setting in the $1.5 billion chemical-products division of Fortune 50 leader, Ashland Oil, Inc. Compensation includes competitive salary and broad benefits coverage. For confidential consideration, send resume or letter of qualifications, including salary history to **Ms. Uffa M. Brown, ASHLAND CHEMICAL COMPANY, P.O. Box 2219, Columbus, OH 43216.**

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The Larkin Trust Company, a diversified financial services giant, is expanding its data processing centers in New York City and Beverly Hills. Our state of the art computing environment consists of multiple IBM CPU's, OS/MVS/XA, TSO/ISPF, CICS, IMS DB/DC, DB2, FOCUS, COBOL, ASSEMBLER and other 4th G/L's linked to our international headquarters in London.

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DALLAS

SYSTEMS ANALYST AND ANALYST/PROGRAMMER

Simpson Paper Company, a progressive pulp and paper manufacturer whose Corporate MIS group is located in Northern California has multiple vacancies for Systems Analyst and/or Analyst/Programmer. Duties include design, development of systems and procedures and implementation of a full range of applications on IBM 4361 under DOS/VSE-SP and CICS with multiple decentralized IBM System 36s running Batch and RJE. Positions require 5 years proven successful track record in COBOL and RPGII as well as Bachelor's Degree in Computer Science or Business or equivalent experience. Must have solid CICS experience and working knowledge of Total/Mantis a plus. These positions offer opportunity to participate in all phases of MIS functions and may involve travel to various manufacturing locations. Send confidential resumé to:

Director of MIS
Simpson Paper Company
P.O. Box 637
Anderson, CA 96007

CAREER OPPORTUNITY

Senior-level VAX/VMS system manager for site with VAX cluster and multiple MicroVAXes. DECnet local and wide-area network management as well as knowledge of high-level programming languages required. Unix, X.25, and TCP/IP experience a plus.

Excellent salary and benefit package. Interested candidates should forward resume to:

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Please reply in confidence to:

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Guthrie CLINIC, Guthrie Square,
Sayre, PA 18840, Attn: Personnel Director

Programmer Analysts

Rewarding career opportunities await individuals possessing two years of solid programming experience and good analytical skills. Experience with VAX/VMS and VAX/COBOL is required. A background in insurance would be helpful. You will be located in one of the more desirable small college communities in the entire country. Within easy driving distance to several metropolitan areas. We offer a very competitive salary and benefits package. Send resume and salary expectations to

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Grinnell, Iowa 50112

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- PROJECT LEADERS
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3-5 years Manufacturing, Insurance or Banking experience & IBM 43XX DOS/VSE, 30XX OS/MVS, COBOL, BAL, BASIC, CICS, IDMS, S/36 RPGII, S/38 RPGIII, HP3000, DEC, Datacomm, Lifecomm, Vantage. Fee paid. Salaries $18 to 45K plus relocation assistance.

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Assistant Data Processing Manager

Assistant Data Processing Manager responsible for coordination of new and existing systems, manufacturing and financial. Knowledge of System 38 hardware, RPG III programming, S/38 CPF and 5 years experience. Send resume with salary history to:

Personnel Department
Chicago Faucet Company
2100 South Nuclear Drive
Des Plaines, IL 60018

PROGRAMMER/ANALYST I - Entry level for business applications programmer to write and test programs. Must have working knowledge of COBOL, flow charts, pert charts, data base design charts and schemas and MPE commands. Four year degree in Business Information Systems, Computer Science or related field required; experience with HP/3000 helpful. Appropriate experience may be substituted. Apply to: New Mexico Institute of Mining and Technology, Personnel Department, Socorro, NM 87801. EO/AAE.

Computer System Engineer - Analyze, plan and modify transaction processing facility (TPF) systems including communication hardware and software. Provide support for communication protocols and message switching areas including 3705 Assembler. Requires travel to client job sites and a Bachelors Degree and/or equivalent education and experience in systems analysis or data processing. $50,000 per year. 40 hours per week. 4 years experience required. Education and experience will be found acceptable if applicant has the minimum of a high school diploma and in access of 1000 hours of professional development courses (equivalent to at least 2 years of US college level studies) in addition to 8 years of work experience at a professional level in systems analysis or data processing. Contact Oklahoma State Employment Service, 3105 E. Skelly Dr., Tulsa, OK 74105. JO # 090844

PROGRAMMER: Assists in the review & analysis of previously defined program specs. Prepares program flowcharts & codes program instructions. Assists in the prep of test data. Tests & develops programs. Prepares program documentation, JCL & helps the client put jobs into production. Works on several phases of programming w/specific direction. Estimates tasks assigned & reports progress against schedule to project leader. Must have 2 yrs exp in job or 2 yrs exp as Computer Operator/Programmer. Must have exp using PL1 w/JCL & IBM hardware. 40 hrs/wk, $33,560/yr. Send resume to: Illinois Dept of Employment Security, 401 South State St. 3 South, Chicago, IL 60605, Att: Joan Haight, Ref #5763H, An Employer Paid Ad.

Systems Engineer for manufacturer located in southern Ohio to work on computer-based monitoring system designed to monitor electronic devices. Duties include software and hardware design, design of testing criteria, testing and debugging, integrating software programs and codes with hardware and monitoring product field test installation to resolve software bugs and inconsistencies. Requires M.S. degree in computer engineering and one undergraduate course in programming language Micro 80, 85 and one academic graduate course each in: Data Structure, coding theory, Computer Architecture, Operating Systems, Microcomputer Hardware Design, Computer Graphics and Compiler Design. No experience required. 40 hrs/wk. $30,000 yr. Qualified applicants reply immediately with resume to: M. Rush, J.O. #0685653, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216.

Programmer Analyst - analysis of procedures to refine and convert data to programmable form, determine output requirements, evaluate system effectiveness, upgrade systems, develop and implement new systems and programs, problem solving and system correction. Duties involve work with IBM mainframe computers, COBOL, CICS, VSAM and JCL under MVS. B.A. Degree in computer science, math or engineering and 2 yrs. in job offered or 2 yrs. combined experience as Programmer and Programmer Analyst working with hardware, languages, software and operating system listed above. D.O.T. 012167066. 40 hrs/wk. $32,000/yr. Send resume to: NYS Job Service, Order #8007111, 97-45 Queens Blvd., Rego Park, NY 11374

– UNIVAC – –

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The successful candidate should possess a minimum of 10 years MIS experience with two years recent experience in the administration of ACF2 security software controlled systems: must have systems development and/or technical support experience on large scale IBM computers, must have working knowledge of CICS, TSO, OS/MVS and COBOL, and must have well developed oral and written communication skills.

The incumbent will supervise the protection of the privacy and confidentuality of associated databases. In addition, the Administrator will develop and ensure the enforcement of the standards and procedures pertaining to all phases of computer security

Qualified candidates should send resumes in confidence to:

KERR McGEE CORPORATION

DIRECTOR, INFORMATION SYSTEMS
MARY BALDWIN COLLEGE, STAUNTON, VIRGINIA

This position is responsible for all administrative and academic information systems activities on campus. The Director will be responsible for applications planning, development and implementation and MIS policies, procedures, budgeting and staffing. The Director will be responsible for the selection and implementation of a new administrative information system.

Current systems include an internally developed administrative system operating on a Data General MV 8000 and a packaged financial accounting system operating on an IBM System/36. Several academic packages also operate on the Data General computer.

Experience in systems development, computer operations, microcomputer selection and installation is required. A demonstrated ability to develop policies and procedures for an entire information systems organization is also required. The Director must be able to effectively communicate with both academic and administrative users, as well as the senior executive staff of the College. Knowledge of data base management and word processing systems is desirable.

Mary Baldwin College is a prestigious, private women's college of 1,000 students located in the beautiful Shenandoah Valley of Virginia. The College offers a competitive salary and liberal benefits package. The college overlooks the picturesque city of Staunton which has a hospitable climate and provides a semi-rural environment with a very reasonable cost of living.

Send resume and salary history to: Coopers & Lybrand, 7th & Franklin Building, Richmond, Virginia 23219, Attn: Mr. Robin Scott (804) 643-0234.

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We are a well-established software development firm specializing in on-line financial systems for HP3000 and DECVAX computers. We seek a skilled project manager with heavy exposure to the following systems:

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Mitchell Humphrey & Co.
2020 Woodland Parkway
St. Louis, MO 63146

Programmer Analyst: Participate in the design and implementation of health care related computers based information systems for IBM mainframe computers including IBM S/38 computer and utilizing RPGII and RPGIII operating systems. coordinate systems specifications and user customization requirements. direct technical training programs with reference to IBM mainframe computers and operating systems software including RPGII and RPGIII operating systems 4 yrs. college. B.S. in Mechanical Engineering or Computer Science 1 yr. experience in position or 2 yrs. experience as a Systems Engineer or Data Processing Business Representative. Experience in related occupation must include responsibility for installation, use, and programming of IBM S/38 mainframe computers and RPGII and RPGIII operating systems. Applicants should send resumes to Job Service of Florida, 3421 Lawton Road, Orlando, Florida 32803, Attn Phil Bard, Reference #FL5725484. AN EMPLOYER PAID AD

SR. SYSTEMS ANALYST – Respons for sys analysis, using structured analysis techniques & sys design to produce sys specs & design docs. Respons for mgmt of project sched & developm. superv of programming team, liaison with end-users & ensuring that sys meets u/user requirements. Req knowl of all stages of sys implementation & project life-cycle, including establishment of the test environment, planning & executing the test & training client staff in sys test methodology. 5 yrs. or 5 yrs. rel exp. – Systems Analyst/Programmer. Must know COBOL, CICS, RPGII, DATATREVE, VAX-VMS/FMS/UNIFILE, IBM System/36, VAX-11 hardware & IBM 4300. Must know test environments and methodology, systems analysis and design, and structural programming techniques. $44,000/yr. 37½ hrs/wk. CAP Information System, Inc., 521 Fifth Avenue, 34th Floor, New York, NY 10175. Send resume.

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- ● ADABAS/NATURAL
- ● IMS
- ● CICS

Send resumes to:

METRO
Information Services, Inc.
Attention: Kathy Baxter •
Seven Parkway Plaza, Suite 140
Charlotte, NC 28217

Software Design Engineer

- Design and develop linguistic software for syntactic and semantic analysis of natural languages. Evaluate adequacy and applicability of output and need to reformulate models. Design and test program logic. Programming is to be done in the C programming language working under the UNIX operating system. $30,000 per year, 40 hrs/wk, 8am-5pm. Requires MS requirements completed with strong mathematical background (at least 8 courses or 20-25 credits in college level math), experience in software development related to automated deductive systems, under the UNIX operating system and Master's thesis or comparable independent work in software design and development. Send resume to Job Service of Florida, 105 E. Broward Blvd., Ft. Lauderdale, FL 33301, ATTN: Job Order # FL5201959.

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Position opened until filled. Targeted screening date April 5, 1987. Florida law requires all applications be subject to public review. Please submit your resume to:

Human Resources Dept.
CITY OF GAINESVILLE
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MSU System Services, Inc.
P.O. Box 61000
New Orleans, LA 70161
1-800-231-4421

In Louisiana call collect (504) 569-4960

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Location will be Istanbul/Turkey with a highly attractive salary and fringe benefits.

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ACP/TPF

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Director, Information Resources Management Department GM-334-15

Salary Range: $53,830 - 69,976

The Pension Benefit Guaranty Corporation, a federal Corporation of about 500 employees, with financial assets under management of about $2.3 billion, is seeking a Director of its Information Resources Management Department. The Corporation insures about 112,000 pension plans and processes benefits to about 94,000 individuals. This individual will serve as the Corporation's senior information resources official and as advisor to the Executive Director. The Corporation's information resource needs, include financial accounting, decision support, word processing, micrographics, and telecommunication systems.

This position requires a background that demonstrates experience or knowledge in management and operations of information resources and technical expertise.

Applicants are to submit a SF-171, Application for Federal Employment, by COB April 9, 1987 to the address below:

Pension Benefit
Guaranty Corporation
Personnel Office, Room 3700
2020 K Street, N.W.
Washington, D.C. 20006-1806
RE: 87-37

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The PROJECT LEADER will be responsible for the MSA General Ledger, Accounts Payable, Medical Records applications, and new Healthcare application development activities. This position supervises 3-4 programmer analysts, performs systems analysis activities, and will be required to do moderate program development work. The successful candidate will have a BS degree in Computer Sciences and 10 years progressively responsible programming experience. Cobol, VSAM, VM/CMS, DOS/VSE and a healthcare application background is required. Knowledge of the Datacare Patient Care System, Medipac Patient Accounting System, MVS or Command Level Cobol is highly desired.

PROGRAMMER/ANALYST must have 3 to 5 years progressively responsible programming experience. Specific knowledge of the Medipac Patient Accounting, or Datacare Patient Care software is required. Must be proficient in structured systems analysis and design, Cobol, VSAM, VM/CMS and DOS/VSE. B.S. degree in Computer Sciences, MVS or Command Level Cobol is highly desirable.

AMI offers competitive compensation and benefit packages. Please send resume, salary history, and references, in confidence, to Manager of Recruitment, AMI/Rocky Mountain Healthcare System, 1601 East 19th Ave., Denver, Colorado 80218.

EOE M/F/H

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FOR APPLICATION forms contact (509) 963-1202 or Personnel & Benefits, CWU, Ellensburg, WA 98926
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AA/EOE/Title IX employer

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- HP 3000, TRANSACT
- HONEYWELL DPS 8 GCOS, COBOL

For more information, contact: **Marie Clark at 1-800-521-2144 or send your resume to: M.I.S. INTERNATIONAL, Corporate Headquarters, 23300 Commerce Drive, Farmington Hills, MI 48024.**

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CHIEF PROGRAMMER/ANALYST: Work on Securities Process. Syst. project for major client of firm using IBM 3090 hardware in TSO/ISPF & IBM DB/DC environmt. Prep of prototypes & subsequent presentation to user & DP personnel. Involves analysis & use of TSO Dialogue Mgmt Svcs (DMS). Write specs of IMS trans. for programmers to code. Develop on-line programs using TELON (a COBOL applic. generator) which invol. a lg amt of native COBOL & DL/1 work. Write scripts for testing indiv. programs & entire components. Design, spec & code IMS Fast Path randomizer routines, written in Assembler w/heavy use of macros for error checking & table generation. Respons. also for developing the syst's interface to other bank systs which are primarily CICS DL/1 or IMS DB/DC. Must know: COBOL, CICS, EDF, IBM JCL, ACF2, TSO/ISPF, IBM Assembler, NATURAL/ADABAS, IMS DB/DC, DL/1, DMS, Fast Path randomizer routines, TELON & IBM 30XX mainframes. Reqs: Bachelor's in Data Process or Computer Sci. 4 yrs exp or 4 yrs rel programming exp w/at least 2-3 yrs exp as Sr. Programmer/Chief Programmer. $50,000/yr. 40 hrs/wk. Send resume to: ACSIS, Inc., 110 William St. NYC 10038. (Indicate RR-400).

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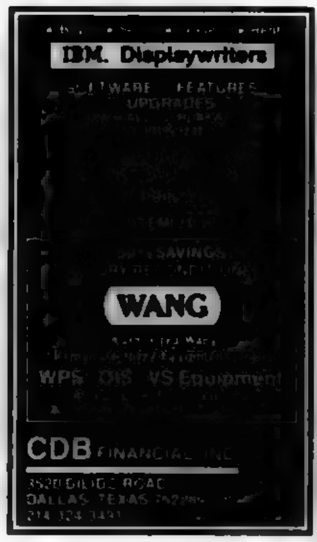

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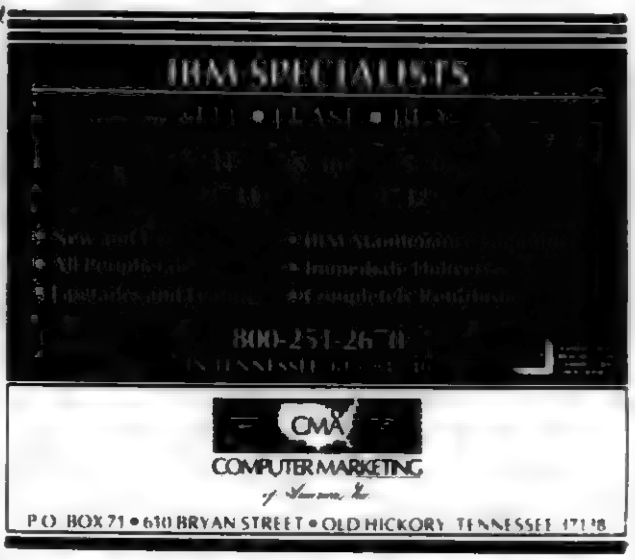

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RECRUITMENT ADVERTISING National Recruitment Sales Director/John Corrigan, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

RECRUITMENT ADVERTISING SALES OFFICES
New England Recruitment Manager/Al DeMille
375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

New York Recruitment Manager/Mary Ellen Hessler
Paramus Plaza 1, 140 Route 17 North, Paramus, NJ 07652 (201) 967-1350

Midwest Recruitment Manager/Kevin Johnson
2600 S. River Road, Suite 304, Des Plaines, IL 60018 (312) 827-4433

Western Recruitment Manager/Barbara Murphy
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RECRUITMENT TELEMARKETING ACCOUNT EXECUTIVES
New England, New York/Jay Novack, **Mid-Atlantic**/Pauline Smith
Midwest/Ellen Casey, **Western**/Nancy Percival
Toll Free: 1-800-343-6474 or (617) 879-0700

FOREIGN EDITORIAL/SALES OFFICES

Argentina: Ruben Argento, CW Communications S/A, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-5583. Telex: (390) 22644 (BAZAN AR).

Asia: Euan Barty, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong. Phone: (011) 852 5 861 3238. Telex: (780) 72827 (COMWOR HX).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 61 2 4395133. Telex: (790) AA74752 (COMWOR).

Austria: Manfred Weiss, CW Publikationen Verlagsgesellschaft m.b.H., Josefstadter Strasse 74, A-1080 Wien, Austria. Phone: (011) 43 222486 5910. Telex: (847) 115 542 (SOV A)

Brazil: Ney Kruel, Computerworld do Brasil, Rua Alcindo Guanabara 25-11 andar, 20.031 Rio de Janeiro, RJ Brasil. Phone: (011) 55 21 240 8225. Telex: (391) 21 30838.

Denmark: Preben Engell, Computerworld Danmark A/S, Tovegade 52, 1400 Copenhagen K, Danmark. Phone: (011) 45 1956 686. Telex: (855) 31566.

France: Jean-Louis Rendon, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, France. Phone: (011) 33 14 747 1272. Telex: (842) 613234 F.

Hungary: Dezso Futasz, Computerworld Informatika Co., Ltd. H-1536 Budapest, Pf 386, Hungary. Phone: (011) 36 1 228 458. Telex: (861) 22 6307 (KSHP H).

Italy: Dr. Bruno Fazzini, Computer Publishing Group S.R.L., Via Velle 7, 20127 Milano, Italy. Phone: (011) 39 02 2613432. Telex: (843) 335318.

Japan: Mr. Shujo Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (011) 81 3 551 3882. Telex: (781) 252-4217 (Computerworld Japan only)

Steven Yamada, Tokyo Representative Corp., Sanshin Kogyo Jimbocho 3F Chiyoda-ku, Tokyo 101, Japan. Phone: (011) 81 3 230-4117/4118. Telex: (781) J26860 (reps for all CWCI publications except Computerworld Japan).

Mexico: Henry Morales, Computer Mexico S.A. de C.V., Oaxaca 21 2, Mexico City 7 D.F. Colonia Roma, 06700 Mexico. Phone: (905) 514-4218 or 6309. Telex: (383) 177 1300 (ACHAME).

The Netherlands: Wout Berends, CW Communications B.V., van Eeghenstraat 84, 1071 GK Amsterdam, The Netherlands. Phone: (011) 31 20 646426. Telex: (844) 18242 (CWCOM NL).

New Zealand: Reg Bechtold, CW Communications Ltd., 13 Maidstone St., Grey Inn, Auckland 1, New Zealand. Phone: (011) 64 9 789 993. Fax: (011) 64 9 780 244.

Norway: Morten Hansen, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Toyen, 0608 Oslo 6, Norway. Phone: (011) 472 647725. Telex: (856) 76476 (CW NOR N).

People's Republic of China: Chen Minghan, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Phone: (011) 47 814 6174. Telex: (716) 222214 (CCW CN).

Spain: Francisco Zabala, Computerworld Espana, Rafael Calvo 18 4B, 28010 Madrid, Spain. Phone: (011) 34 1 419 4014. Telex: (831) 47884 (CW E).

Sweden: [illegible], CW Communications AB, [illegible] Hamnvagen 22, S-115 41 Stockholm, Sweden. Phone: (011) 46 8 67 91 80. Telex: (854) 14904 9 (NOACW).

Switzerland: [illegible], CW Publikationen AG, [illegible] konerstrasse no. 15, Postfach 253, CH 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (845) 816 710.

Taiwan: Leona Wang, ACE Media Agency Co. Ltd., P.O. Box 26-578 Taipei, Taiwan, R.O.C. Phone: (011) 02 751 3636. Telex: (785) 14142 (ACE GROUP). (Representative for all CWCI publications).

London: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WC1 8UT, United Kingdom. Phone: (011) 44 1 831 9252. Telex: (851) 262346

United Kingdom: Euan Ross, Beans Hobson & Associates, 34 Warwick Road, Kenilworth, Warwickshire, CV8 1HE United Kingdom. Phone: (011) 09 26 512424. Telex: (851) 311951 (BEEHOB). (Representative for all CWCI publications).

Venezuela: Kalman von Vajna Nagy, CW Comunicaciones, C.R.L. Torre Maracaibo, Piso 13, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 58 2 72 76 30.

West Germany: Eckhard Utpadel, CW Publikationen Verlagsgesellschaft mbH, Rheinstrasse 26/28, Postfach 40 0429, 8000 Munchen 40, West Germany. Phone: (011) 49 89 360860. Telex: (841) 5215350 (COMW D)

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Computerworld Headquarters, 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: (617) 879-0700, Telex: 95-1153, FAX: (617) 875-8931

SALES Vice President/Display Sales, Edward P. Marecki. National Recruitment Sales Director, John Corrigan. Display Advertising Manager, Carolyn Novack. Classified Operations Manager, Cynthia Delany.
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ADVERTISERS INDEX

Adobe	64
AGS	PS 7
Alex Brown & Company	86
Apollo Computer	23-25
Applications Development Systems	49
Applied Management	39
Artificial Intelligence	48
AT&T	92-93
Avatar	74-75
BASF	27
Bell Atlantic	83
Bl Moyle Associates	19
Business Recovery Systems	83
Business Software Technology	30
Cincom	83
[illegible]	41
Compuserv	52
Computer Corp. of America	18
Computer Management Research	13
Computer Technology Group	73
Concurrent Computer	67
Cullinet	9
CW Ad Revenue	118
[illegible]	77
CW Circulation	70
CW DIAL INQ	PS Cover3
CW Germany	77
CW May Focus	97
CXI	PS Cover4
D & B Computing	94-95
Data General	44
Data Group	13
DataGram	78
Develcon	79
Digital Communications Associates	PS 4-5
Digital Equipment Corp.	[illegible]
Duquesne	14,26,104
Epson America	46-47
Exide Electronics	123
Flagstaff Engineering	93
Forthright Systems	PS 6
4G Data Systems	PS 8
Hewlett-Packard	76,90-91
Hughes Aircraft	42
IBM	38-39,80-81
ICCP	6
Informix	57
Innovation Data Processing	5
Interface Group	103
International Data Group	84-85
International Data Corporation	61
ITT	36-37,55
KMW Systems	60
Language Processors, Inc	22
Lawson Associates	40
Macmillan Book Clubs	68
McDonnell Douglas	32
MicroSoft	34-35
Mitron Systems	15
MSA	124
MTI Systems	12
National Advanced Systems	45
NEC	58-59
Novell	102
On-Line Software International	28-29,43
Oracle Corp.	11
Quadram	PS Cover 2
Radio Shack	72
Rapid System Development	10,35
Relational Technology	50
Realia Inc	54
SAS Institute	30,51
SearchLink	86
Software AG	88
Software Technology & Research (STAR)	21
SPSS	57
[illegible]	87
Storage Technology	100-101
Syncsort	3
Teleview Systems	82
Telex	88
Toshiba	89
Uccel Corp.	21
Unibase	96
Unisys	62
VM Personal Computing	66
VM Software	7
Wyse	65
Xerox	99

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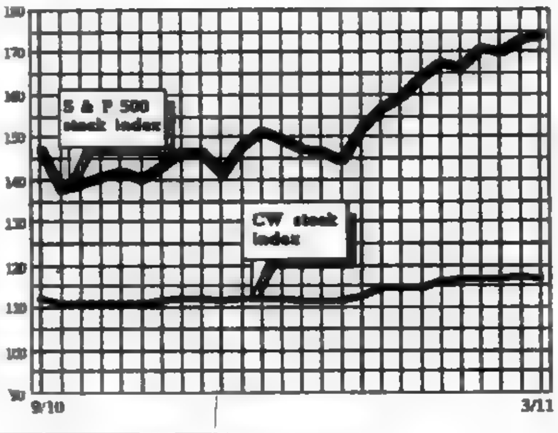
UPCOMING COMPUTERWORLD SPOTLIGHT SECTIONS

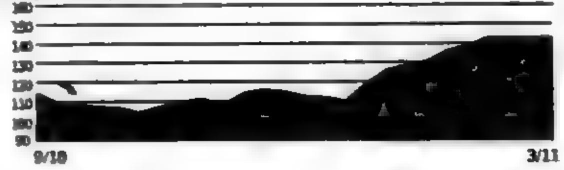
Issue Date	Topic	Ad Closing Date
April 13	Desktop Publishing Systems	March 27
April 27	T1 Equipment/Multiplexers	April 10
May 11	DEC-Compatible Software	April 24
May 25	PCs — IBM & Compatibles	May 8
June 8	LANs	May 22
June 22	Printers — Line & Character	June 5
June 29	Accounting Software	June 12

STOCK TRADING INDEX



Indexes	*Last Week*	*This Week*
Computer Systems	142.2	**142.4**
Supplies & Accessories	162.0	**159.9**
Software & DP Services	131.5	**132.8**
Semiconductors	110.0	**108.2**
Peripherals & Subsystems	129.8	**132.2**
Leasing Companies	122.2	**119.6**
Composite Index	117.3	**117.2**
S&P 500 Index	172.6	**173.6**

Computer Systems



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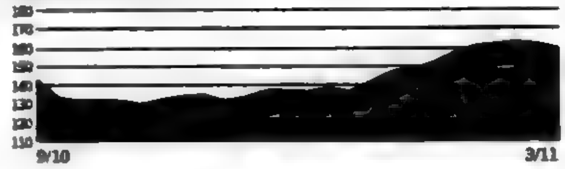

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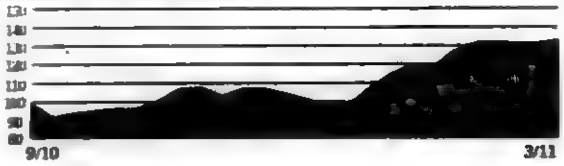
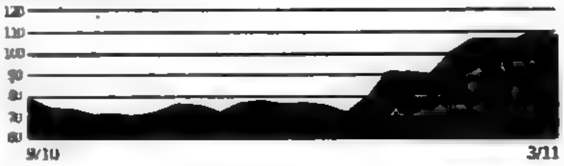
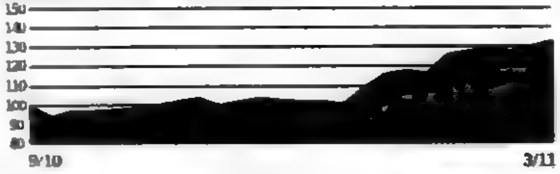


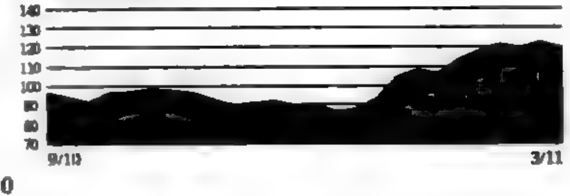
Semiconductors



Peripherals and Subsystems



Leasing Companies



Stock trading summary

CLOSING PRICES WEDNESDAY MARCH 11, 1987

Computer Systems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 11 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4 56	-0.3	-6.4
O	ALTOS COMPUTER SYS	19	10	15 75	-0 4	2.3
A	AMDAHL CORP	41	14	40 25	+2.6	+7 0
O	APOLLO COMPUTER INC	23	9	19 25	0 1	-0.6
O	APPLE COMPUTER INC	71	24	66.25	1 4	2 0
N	AT&T	28	22	24 00	+0 9	+3 8
O	C P T CORP	6	3	3.88	-0 4	-8.8
N	COMPAQ COMPUTER CORP	35	12	33 00	+1.8	+5.6
A	COMPUTER CONSOLES INC	12	7	8.63	0 8	-8.0
O	CONCURRENT COMP CORP	23	11	15.75	+0 4	+2 4
N	CONTROL DATA CORP	31	20	27 00	1 3	-4 4
O	CONVERGENT TECH	12	4	10 63	0.3	-2 3
N	CRAY RESH INC	133	65	131 50	+11 3	+9 4
O	DAISY SYS CORP	15	8	11 25	0 3	-2 2
N	DATA GEN CORP	45	25	35.00	1 5	4 1
N	DATAPOINT CORP	9	4	5 13	+0.0	+0.0
N	DIGITAL EQUIP CORP	173	76	168 25	+2 0	+1 2
N	FLOATING POINT SYS INC	46	11	14 50	0 9	-5 7
N	GOULD INC	29	15	18 25	0.9	4 6
N	HARRIS CORP	40	27	36 50	1 4	3.6
N	HEWLETT PACKARD CO	60	36	54 38	0 9	1 6
N	HONEYWELL INC	84	58	70 00	+0 5	+0 7
N	IBM	162	116	141 75	+1 9	+1.3
O	IPL SYS INC	4	2	2 75	+0 3	+10.0
N	ITT CORP	68	43	64.00	1 0	1 5
N	M A COM INC	19	12	14 25	-0.4	-2.6
N	MATSUSHITA ELEC INDL LTD	136	71	119 50	+1 0	+0.8
O	MENTOR GRAPHICS CORP	29	11	28 25	+1 1	+4 1
N	NBI INC	14	8	10 13	-0.5	-4 7
N	NCR CORP	67	40	65 63	0 1	-0.2
N	PRIME COMPUTER INC	26	16	20 50	1 3	-5 7
O	STRATUS COMPUTER	37	17	34 75	+2 8	+8.6
O	SYMBOLICS INC	15	4	4 63	+0 7	+17 4
O	TANDEM COMPUTERS INC	73	22	69.50	+4.4	+6.7
N	TANDY CORP	56	31	51 50	1 9	3.5
N	TEXAS INSTRS INC	170	103	167 25	+0 5	+0 3
A	ULTIMATE CORP	35	13	24 25	+0 3	+1 0
N	UNISYS CORP	113	58	102 00	2 4	2 3
A	WANG LABS INC B	22	11	15.88	+0.4	+2.4
A	WANG LABS INC C	22	11	15.81	+0.1	+0 4
N	XEROX CORP	75	49	73 25	+0 3	+0 3

Supplies & Accessories

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 11 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	29.50	-0.5	1 7
N	BARRY WRIGHT CORP	25	14	17 50	0 3	1 4
A	DUPLEX PRODS INC	23	18	21 75	0 3	-1 1
N	ENNIS BUSINESS FORMS INC	34	22	32.00	+0.5	+1 6
N	3M CO	140	97	124 75	2.1	-1 7
N	MOORE LTD	28	20	23.63	+0.1	+0 5
O	STANDARD REGISTER CO	53	32	49 00	0.8	-1 5
N	WALLACE COMPUTER SVCS	50	37	44.88	2 4	-5.0

Software & DP Services

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 11 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	4.50	+0 3	-5.9
N	ADVANCED SYS INC	21	12	21 25	+1 6	+8 3
N	AGS COMPUTERS INC	40	17	38 25	+0.5	+1 3
O	AMERICAN MGMT SYS INC	33	13	31 25	+2 5	+8.7
O	AMERICAN SOFTWARE INC	27	10	26.25	+1 3	+5 0
N	ANACOMP INC	8	3	7 13	+0 0	-0.0
O	ANALYSTS INTL CORP	11	4	10 38	+0 1	+1 2
O	ASHTON TATE	30	10	27 00	+0.6	+2 4
O	ASK COMPUTER SYS INC	17	9	15 63	0 4	2 3
O	ASTRADYNE COMP IND	3	1	1 78	+0 0	-0 0
N	AUTOMATIC DATA PROC	47	29	45 63	+2 4	+5 5
O	BOOLE & BABBAGE INC	11	4	10 00	+0 0	+0 0
N	COMPUTER ASSOC INTL INC	44	17	39 38	0 9	2 2
O	COMPUTER HORIZONS CORP	15	10	14 25	+0 8	+5.6
O	COMPUTER NETWORK TECH	10	4	4 50	+0.1	+1 4
N	COMPUTER SCIENCES CORP	54	30	51 88	0 6	1 2
N	COMPUTER TASK GROUP INC	19	11	15 63	-0 5	3 1
O	COMPUTONE SYS INC	6	0	0 19	+0 0	+0 0
O	COMSHARE INC	16	10	15 00	+0 8	+5 3
N	CULLINET SOFTWARE INC	16	6	10 63	+0 4	+3 7
O	CYCARE SYS INC	17	7	8 75	0.4	-4.1
O	DUQUESNE SYS INC	26	9	25 75	+1 5	+6 2
N	GENERAL ELEC CO	108	71	107 00	+1 3	+1 2
N	GENERAL MTRS CORP	50	24	38 38	0 8	1 9
O	HOGAN SYS INC	16	7	15 50	+2 9	+22 8
O	INFORMATION SCIENCES INC	4	1	1 31	0 2	12 5
O	INFOTRON SYS CORP	18	7	8.75	+0 3	+2 9
O	KEANE INC	16	5	8.75	+0.1	+1 4
N	LOGICON INC	38	22	25 50	0 6	2 4
O	LOTUS DEV CORP	25	8	21 50	0 6	2.8
O	MANAGEMENT SCI AMER	21	11	19 63	+0 4	+1 9
O	MCI COMM CORP	13	5	6 38	+0 5	+8.5
O	MICOM SYS INC	19	10	15 00	+0 3	+1 7
O	MICRO PRO INTL CORP	6	2	4 75	0.2	3.8
N	MICROSOFT CORP	86	26	85 50	+5 8	+7 2
O	NATIONAL DATA CORP	27	16	25 13	+0 9	+3.6
O	ON LINE SOFTWARE INT	23	10	22 25	+1 0	+4 7
O	ORACLE SYS CORP	44	13	39 50	2 0	-4.8
N	PANSOPHIC SYS INC	42	25	37 00	1 6	-4 2
O	POLICY MGMT SYS CORP	30	15	27 00	1 0	3.6
O	PROGRAMMING & SYS INC	13	8	11 25	0.5	4.3
O	REYNOLDS & REYNOLDS CO	42	27	36 50	+0 8	+2 1
O	SCIENTIFIC COMPUTERS INC	8	4	7 50	0 3	3.2
O	SEI CORP	26	15	25 75	+1 0	+4 0
O	SHARED MED SYS CORP	53	30	36 38	+2 0	+5 8
O	SOFTWARE AG SYSTEMS INC	22	10	12 13	3 4	21 8
O	SOFTWARE PUBG CORP	16	5	15 13	+0 9	+6 1
A	STERLING SOFTWARE INC	21	10	13 38	0 1	0 9
N	SUNGUARD DATA SYSTEMS	20	10	19 25	0 5	2 5
N	UCCEL CORP	34	17	32 50	0 5	1 5
N	URS CORP	22	13	21 13	+0 3	+1 2
O	VM SOFTWARE INC	39	12	35.75	0 3	0 7

Semiconductors

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 11 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	34	13	20 63	0 6	2 9
N	ANALOG DEVICES INC	25	14	20 63	+0.0	+0.0
O	ANALOGIC CORP	14	10	11 88	+0 0	+0 0
N	APPLIED MAGNETICS CORP	29	13	26 25	1 8	6.3
O	AVANTEK INC	23	14	18 00	0 6	3.4
O	HADCO CORP	6	3	5 13	0 1	2.4
O	INTEL CORP	39	16	36 75	0 8	-2 1
O	MICRO MASK INC	7	2	6.25	+0.3	+4 2
N	MOTOROLA INC	52	34	50 25	+1 8	+3 6
N	NATIONAL SEMICONDUCTOR	16	8	14 88	0 9	5 6
N	TERADYNE INC	30	16	22 63	0 8	3 2

EXCH N = NEW YORK, A = AMERICAN, P = PACIFIC, B = BOSTON,
L = NATIONAL, M = MIDWEST O = OVER-THE COUNTER: S = SPLIT

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(1) TO NEAREST DOLLAR

Peripherals & Subsystems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	8.88	+0 3	+2.9
A	ANDERSON JACOBSON INC	4	1	3 00	+0 0	+0.0
O	AST RESH INC	23	11	20 75	1.0	-4 6
O	AUTOTROL CORP	10	5	7 50	+0.0	+0.0
O	AVANT GARDE COMPUTING	7	3	3 75	0.3	-6.3
O	BANCTEC INC	13	6	10 38	0.4	-3.5
N	BOLT BERANEK & NEWMAN	60	37	56 25	+1 5	+2 7
A	CETEC CORP	9	5	5 88	-0.3	-4 1
A	COGNITRONICS CORP	6	2	3 38	+0.4	+12 5
N	COMPUGRAPHIC CORP	26	16	22 25	+0 3	+1 1
N	COMPUTERVISION CORP	23	10	20 00	0 9	-4 2
N	CONRAC CORP	20	12	19 63	+1 6	+9 0
A	DATAPRODUCTS CORP	18	11	13 50	0 5	3 6
A	DATARAM CORP	18	7	8.25	+0.6	+8.2
O	DATA SWITCH CORP	9	5	6 75	-0.3	-3.6
O	DATUM INC	7	4	5.88	0 1	-2 1
N	DECISION INDS CORP	15	8	10 25	-0.6	5 7
O	ENDATA INC	9	5	8 88	+0 3	+2 9
O	EMC CORP	34	11	27 25	+0.0	+0.0
O	EVANS & SUTHERLAND	39	20	38.00	+0 5	+1 3
N	FLOATING POINT SYS INC	46	11	14 50	-0.9	5 7
O	GANDALF TECHNOLOGIES	9	5	8 38	0.1	1 5
N	GENERAL DATACOMM IND	15	8	12 13	-0.8	-5.8
N	HAZELTINE CORP	30	16	29 75	+0 0	+0.0
O	ICOT CORP	13	8	12 25	+0.9	+7 7
O	INFORMATION INTL INC	18	13	15.75	+1 3	+8 6
O	INTECOM INC	7	3	3 00	+0.0	+0.0
O	INTERLEAF INC	15	8	9 63	+0 1	+1 3
O	MEGADATA CORP	7	2	5 63	+0.4	+7 1
A	MSI DATA CORP	16	10	15 75	+1.8	+12 5
N	NASHUA CORP	30	20	28 88	-0.3	-0.9
O	NETWORK SYS CORP	19	10	16 38	0 6	3.7
N	NORTH AMERN PHILIPS CORP	48	35	40.75	-1 3	-3 0
N	NORTHERN TELECOM LTD	45	27	41 75	0.6	1 5
O	NOVELL INC	45	15	44 50	+2.3	+5 3
N	PARADYNE CORP	11	4	7 25	+0 5	+7 4
A	PENRIL CORP	8	4	4 25	0 3	-5.6
N	PLESSEY PLC	39	24	38.50	+0 5	+1 3
O	PRINTRONIX INC	15	10	10 75	0.6	-5.5
N	QMS INC	18	11	16.38	+6.3	+61 7
O	RAMTEK CORP	7	3	5 00	+0.0	+0 0
N	RECOGNITION EQUIP INC	27	10	22 63	+1 0	+4 6
O	SCAN TRON CORP	19	11	13.75	+2 3	+19 6
N	SCIENTIFIC ATLANTA INC	16	9	15.25	-0 1	-0.8
O	SEAGATE TECHNOLOGY	42	9	36 50	-0.1	0 3
N	STORAGE TECHNOLOGY	6	2	4 25	-0.5	-10 5
O	SUN MICROSYSTEM INC	33	11	31 38	+3 1	+11.1
A	T BAR INC	8	5	7 63	+0 0	+0.0
A	TAB PRODS CO	19	12	18.50	0.1	-0.7
O	TANDON CORP	8	2	3 50	-0.3	-6.7
A	TEC INC	7	3	3 50	-0.3	-6.7
N	TEKTRONIX INC	43	27	39.25	+0.1	+0 3
O	TELEVIDEO SYS INC	4	2	2 50	+0 1	+5.3
N	TELEX CORP	102	52	88.75	3.3	-3.5
N	TIMEPLEX INC	41	14	39 38	+4 4	+12 5
N	TITAN CORP	12	6	7 75	+0 3	+3.3
O	VISUAL TECHNOLOGY INC	1	0	0 44	+0.0	+0 0
O	WYSE TECH	30	13	28 13	-0.1	-0.4

Leasing Companies

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 4 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	29	15	27 13	+0 1	+0 5
N	CONTINENTAL INFO SYS	14	7	13.13	+0.0	+0.0
O	FINALCO GROUP INC	5	2	2 88	-0.0	+0.0
O	PHOENIX AMERN INC	8	3	5.75	1.0	14.8
O	SELECTERM INC	12	5	5 63	-0 1	2.2
N	U.S. LEASING	52	38	52 13	+1.9	+3 7

IBM leads the pack

Big Blue's stock gets investors' nod; Compaq, Apple post drops

Despite its profit declines and product-line shortcomings, IBM continues to be a leader on Wall Street.

During a roller-coaster week for the Dow Jones industrial average, Big Blue jumped almost five points in the first four days of trading to close Thursday at 144¼. Although the analyst community is still widely mixed on IBM's earnings prospects this year, its status as a blue chip has continued to fuel a bullish performance since the stock plummeted to 115 earlier this year.

IBM's four-point surge in Tuesday's trading helped lead the Dow up almost 20 points. IBM was one of nine U.S. stocks reportedly recommended recently by Japan's Nomura Securities Co., the world's largest brokerage firm, which said it will invest $10.4 billion in U.S. and other non-Japanese securities.

Other computer stocks had a less successful week. Compaq Computer Corp. dropped 2⅞ to 30⅛ Thursday, possibly due to speculation about more proprietary architecture in IBM's next generation of microcomputers. Apple Computer, Inc.'s recent boom eased a bit, as the stock dropped two points in four days to 65¼.

CLINTON WILDER

DBMS

FROM PAGE 1

it is a high-profile, leading-edge technology with which both want to be identified. Neither hesitates to undercut the other's distributed products.

"It's unbelievable how these two companies hammer each other in a huge market," says John McCarthy, research manager at Forrester Research, Inc., after a dinner recently with Relational Technology officials.

Many observers say they believe the rivalry will benefit the industry, pushing distributed data base technology forward at a faster pace than it would go if left to a single, dominant supplier.

'Helping, not hindering'

"It's helping the relational data base market rather than hindering it," says Michael R. Davidson, manager of systems development at Toronto's Nestle Enterprises Ltd., a user of Relational Technology's Ingres.

At the moment, the discussion is not about lofty technical gains so much as the urbane figure of Tierney, 42, a 16-year veteran of IBM, who for three years functioned as a spokesman for Relational Technology.

Oracle's Ellison

Industry sources report that Relational Technology officials say one thing about the circumstances of Tierney's departure for the record and another in casual conversation, particularly after he resurfaced at archrival Oracle. For the record, Relational Chairman Gary Morgenthaler says Tierney "left of his own volition."

Tierney says he did not have the Oracle job lined up when he decided to leave Relational Technology. He says he found himself in a position where his first move was to explore venture-capital firms in the Silicon Valley, until Oracle Chairman Larry Ellison called him a month later.

"I never thought we would get the chance to hire Peter. I expected him to become president of Relational Technology," Ellison says. "We felt he was really the leader in that company."

Oracle's Tierney

Tierney pushed out?

Tierney was viewed differently within Relational Technology. Morgenthaler says his company has "some growing to do in marketing" and that it was looking for "new and more effective leadership" when it promoted Seashols to vice-president of sales and marketing and directed Tierney to report to him.

"I like Pete. We're friends. But I frankly wish he had somewhere else to go. One can wish . . . enough said," Morgenthaler says.

Ellison, for his part, is taking the high road. Relational Technology is just one of several companies that Oracle competes with, and some of that competition is more upscale, he implies. "We just do not see Relational Technology in the marketplace as often as IBM or Digital Equipment Corp.," he says.

When talking to a *Fortune* magazine reporter last fall, however, Oracle officials were more specific in how they viewed Relational Technology. Oracle was growing by leaps and bounds, while Relational Technology was "fading fast," they were cited as saying in the Sept. 29, 1986 issue.

"They told me they no longer considered Relational Technology a factor," the *Fortune* reporter says.

While Oracle's revenue growth has spurted ahead of Relational Technology's during the last two years, the two companies still compete intensely in the DEC VAX market, where both derive a large share of their bread-and-butter business.

Oracle, for example, earned $31 million of its $55 million 1986 revenue from DEC customers, while Relational Technology earned $22 million of its $28.1 million from the same source, according to Technology Financial Services, Inc., a market research firm in Chelmsford, Mass. Oracle may not see Relational Technology salesmen very often, but DEC spokesmen say they see them frequently. DEC, with its RDB relational system, competes directly with Oracle and Relational Technology.

Figures from Computer Intelligence, the La Jolla, Calif., market research firm, show Relational Technology's share of this market dropped from 43% to 36% last year, Oracle's share dropped from 25% to 22%, while DEC's RDB rose from 21% to 28%.

Oracle stretches lead

Two years ago, the revenues of Oracle and Relational Technology, $23 million and $17 million, respectively, were much closer than the $55 million vs. $28 million with which they closed 1986. The gap is expected to widen as the firms close fiscal 1987, with Wall Street analysts expecting the publicly held Oracle to top $120 million. Relational Technology officials say they expect to reach $45 million to $50 million this year and $100 million in 1988. Ellison at Oracle, which is currently growing at a rate of 140%, is reluctant to predict that this expansion will continue indefinitely but says he sees his company topping $200 million in 1988.

In the personal computer market, Oracle has gained a wide lead, with 16,000 installed systems, having brought out a product two years ago. Relational Technology issued the PC version of Ingres a month ago, saying 1,000 customers were already using it. The revenue difference is not significant since the PC products sell in the range of $1,000, but Oracle's early entry made its higher priced minicomputer and mainframe systems more attractive.

Both Oracle and Relational Technology offer mainframe products as well, but neither firm is believed to have sold heavily in that arena. Oracle declines to break out figures for mainframes from its installed base of 6,000 systems. Relational Technology spokesmen say they have 6,300 systems installed, including 100 mainframe systems.

'Frustrating' revenue gap

Oracle's Tierney claims it was the widening revenue gap that led to the reorganization at Relational Technology. "The frustration associated with that is incredible," he adds.

Despite a larger number of employees, 1,000 vs. Relational Technology's 400, Oracle is also believed to be more profitable than its across-the-bay competitor. Tierney said Oracle clears 20% profit on its revenue. Relational Technology spokesmen say their company clears 7% to 10%.

Gary Morgenthaler

Morgenthaler says the revenue gap can be explained by the fact that Relational Technology was formed three years after Oracle; Relational Technology's skill, particularly its distributed data base approach, will enable it to catch up. So far, Relational Technology has garnered more prominent distributed data base clients, including Carnegie-Mellon University in Pittsburgh, where Ingres beat out Oracle.

One of the technical differences between the two companies was Oracle's early commitment to IBM's Structured Query Language as its data access language. The choice proved the company prescient when SQL won wide acceptance in the marketplace in 1986.

Relational Technology's Ingres uses a proprietary data access language, Quel, which is secondarily interfaced with SQL. In Quel, the SQL SELECT command becomes RETRIEVE, and the SQL INSERT command becomes APPEND. Though the differences may seem semantic, Tierney claims the Quel-to-SQL interface has its shortcomings.

Relational's Seashols

A SORT command in SQL, for example, eliminates all duplicates; Quel does not. "If you say SORT in SQL, you get a list with no duplicates. If the command is translated into Quel, you get something different back," he claims.

Interface seen as liability

The SQL-to-Quel interface "is a drawback for them," says Damion Rinaldi, who followed the Oracle-Relational Technology rivalry in 1986 as a software analyst at International Data Corp., a Framingham, Mass., market research firm.

Other industry sources point out that Oracle appears to be more quickly portable to different environments than Ingres and that the program runs under both IBM's MVS and VM operating systems.

Relational Technology concentrated on the Unix market, in which more than half the company's minicomputer systems are sold, and now finds its margins being nibbled away by new competitors, like Informix Software, Inc.

Counterpunches

Tierney devised effective strategies where he could to counter Oracle, Ellison says. For issues like Relational Technology's Quel data access language, "there was nothing he could do unless he became a C programmer," Ellison adds.

Stewart A. Schuster, vice-president of marketing at Sybase, Inc. in Berkeley, Calif., and former employee of both Oracle and Relational Technology, says, "The problems at Relational Technology go much deeper than what any one person can do. Oracle made some smart early calls, like portability to PCs and mainframes and using SQL."

The two companies' marketing strategies are identical, Schuster says, which favors the larger company in the long run.

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Language tool added to Framework

Ashton-Tate pushes integrated package as development system

BY DOUGLAS BARNEY
CW STAFF

TORRANCE, Calif. — In a move aimed at boosting Framework as a development system, Ashton-Tate last week announced the Framework II Developer's Toolkit.

Unlike most integrated microcomputer software packages, Framework includes a programming language, which is called Fred. The tool kit is designed to assist both corporate and independent software developers in making better use of this programming language.

The tool kit consists largely of chunks of Fred code suited for specific purposes.

"It is a series of frames, really nothing more than Fred code, each with a specific name, and documentation as to what it will do and how to use it," a beta tester and systems developer with a large corporation said.

The tool kit has already helped this beta tester.

"We were developing an automated proposal generator using Framework, in which the user was prompted for inputs. It was a lot of Fred code to write, with a lot of redundancy of code. The tool kit lets a developer not have to reinvent the routines for different modules," the user said.

Included in the tool kit are routines to check the files on a floppy disk and verify that the proper disk is being used, as well as additional functions that turn off menus, clock, desktop frames and status panels and a code that changes desktop characters.

"It can make Framework not even look like Framework," the user said.

Developers need only one copy of the tool kit to service any number of Framework users, the vendor said.

Ashton-Tate expects that 15% to 20% of Framework users will pick up the developer's tools, said Wendy Ruess, Framework product manager.

"We had users that expressed a lot of interest in being able to use customized applications built around Framework," Ruess said.

The product will be available directly from Ashton-Tate. It will sell for $100 until May 30 and $150 after that.

Tandem

FROM PAGE 1

mance levels that surpass even the fastest hierarchical DBMSs, including IMS Fast Path.

During a recent benchmark test that simulated the processing of banking debits and credits, a configuration that included Nonstop SQL and 32 Tandem CPUs executed an average of 220 transactions/sec., Codd noted.

The throughput, which could have gone even higher if the system had contained additional computers, beats the estimated 200 transactions/sec. that IMS Fast Path would probably have delivered under the same conditions, he added.

Codd, who originated the relational model and has seen Tandem's SQL interface in advance, describes the product as a "very dramatic announcement" because it addresses his creation's Achilles heel — its reputed lack of performance.

Relational systems are known primarily for the ability to allow users to query their data bases without having to engage in a lot of procedural coding.

But the very traits that make relational DBMSs easier to use than their hierarchical counterparts have also made them comparatively slow and have contributed to the widespread perception that they are intrinsically unsuitable for production environments. To be optimized for ad hoc queries by casual users, relational data bases have traditionally had to consume large amounts of processor resources, according to Omri Serlin, head of Los Altos, Calif.-based Itom International, Inc.

Encompass, by contrast, has been largely immune from such performance limitations by virtue of its conformence to Tandem's proprietary Nonstop architecture, which was expressly designed for on-line transaction processing.

Unlike IBM mainframes, the largest of which is only a six-way processor complex, Tandem's architecture supports configurations that include dozens, even hundreds, of CPUs. As a Nonstop user's application work load grows, it can enlarge its computing capacity simply by installing additional processors.

Whether the vendor's adoption of the language necessitated any major changes in its DBMS's internal workings has yet to be disclosed. "I suspect they would have had to change the system's insides quite substantially because the addition of a high-level language requires a lot of program development beyond the mere installation of a new compiler," Codd said. But the cofounder of the San Jose, Calif.-based Codd & Date Consulting Group, Inc. could cite no evidence to support his suspicion.

> TANDEM'S interface SQL provides "a higher degree of fault tolerance than any other system I know of in the data base world."
>
> E. F. CODD
> FORMER IBM FELLOW

Tandem, which plans to announce Nonstop SQL today, declined to discuss the product beforehand.

Although the company's SQL implementation apparently adds little to Encompass's performance, the enhancement does benefit the DBMS by supporting nonprocedural data base accesses.

By itself, Encompass's support of SQL is by no means remarkable. Many other DBMS suppliers have also implemented the language to minimize their need for procedural programming.

What puts Nonstop SQL in a class by itself, Codd asserted, is that it couples nonprocedural operation with high transaction processing volumes. No supposedly relational system approaches the Tandem product's performance, and no hierarchical offering rivals its ease of use.

Because of the Nonstop architecture's inherent redundancy, Tandem's SQL interface also provides "a higher degree of fault tolerance than any other system I know of in the data base world," Codd said.

With Nonstop SQL, Tandem has implemented virtually the same version of the high-level language as IBM supports on its DB2.

From a marketing perspective, the company's move probably makes sense. One of SQL's major attractions is that it "allows companies such as Tandem to create an environment that will prove comfortable to people who are already familiar with IBM systems," Serlin said.

But from a purely technological standpoint, the firm's choice of SQL versions may be regrettable. "SQL still suffers from many problems," Codd said. "Unfortunately, Tandem has done very little thus far to correct them. I've urged the company to try to develop its own brand of the language."

Prices and availability dates for Nonstop SQL were unavailable as of press time but are expected to be released today.

INSIDE LINES

Fine orchestration. After a lively and well-received demo of Hal, Lotus's mid-life kicker for the 1-2-3 spreadsheet, Hal author Bill Gross last week told the Capital PC User Group that a Hal companion product is in the works for Lotus's Symphony, as well.

Strange bedfellows. Industry heavyweights, including IBM, AT&T and DEC, are starting up a research center for boosting programmer productivity and software quality, according to a filing made to the Justice Department. The filing, required to obtain antitrust exemptions, says the Industry/University Cooperative Research Center for Software Engineering will be co-located at the University of Florida and Purdue University. Other participants are Computer Sciences Corp., GTE Data Services, Harris, Hewlett-Packard, Magnavox, Racal-Milgo and Modular Systems.

So you want to be in pictures? Computer Memories, Inc., the Chatsworth, Calif.-based provider of the crash-prone hard disks used in many IBM PC ATs, last week announced a letter of intent to acquire the assets and corporate identity of Hemdale Film Corp., which released the highly successful film "Platoon." Computer Memories, which ceased production of its disk drive in June 1986 but holds on to nearly $30 million in cash, will acquire Hemdale through the issuance of new shares of its stock. The new firm will use the Hemdale name.

Now you see it, now it's gone. Softsave Information Services, Inc., the Vancouver, B.C., software rental firm sued by several leading micro software firms in December, has gone out of business. Softsave was allegedly copying, renting and distributing pirated copies of software from firms including Ashton-Tate, Lotus and Lifetree Software, Inc. Softsave's owners recently filed for Canadian bankruptcy protection, claiming a combined $230,000 (in Canadian dollars) in debts.

Rolm, phone home. IBM has done some restructuring at its Rolm Corp. subsidiary in Santa Clara, Calif., in order to bring Rolm closer to home. IBM has combined Rolm's domestic sales, installation and service employees with IBM's information systems group into a new sector, the telecommunications marketing and service organization. That sector will report to Rolm Vice-President Jack Blumenstein; Blumenstein in turn now reports to Edward Lucente, IBM's vice-president for information systems.

They hear the call. The hot market for departmental processors is drawing another entrant in Control Data Corp., which next week is scheduled to announce its first non-computer-room system, the Cyber 930. Aimed at the scientific and engineering markets, the 930 has 8M bytes of memory and replaces the Cyber 810 at the low end of the Cyber product line, where it apparently will be pitted against systems such as the lower half of the DEC VAX family and the IBM 9370. Enhancements to the NOS/VE operating system are said to include shells that allow users familiar with DEC's VMS operating system, the Apple Macintosh and the IBM Personal Computer to utilize comparable commands and features on the 930.

Enter another dimension. IBM seems to be endorsing the Graphical Kernel System (GKS) graphics standard (ANSI X3.124) through a contract with Uniras, Inc., a graphics software company. Uniras, under a contract with IBM's UK operations, has developed an interface to the GKS standard for users of IBM's GDDM mainframe graphics system. "IBM usually, in everything that it does, has proprietary standards," says IDC analyst Victoria Brown. "This means they are accommodating users a bit in the area of two-dimensional graphics."

We now do windows, too. Quarterdeck has built enhanced graphics adapter support into an updated version of its Desqview multitasking windowing environment, which is expected in April. With this addition, Desqview now supports Microsoft Windows, Digital Research's Graphics Environment Manager interface as well as the Topview application interface. The price will be $129.95.

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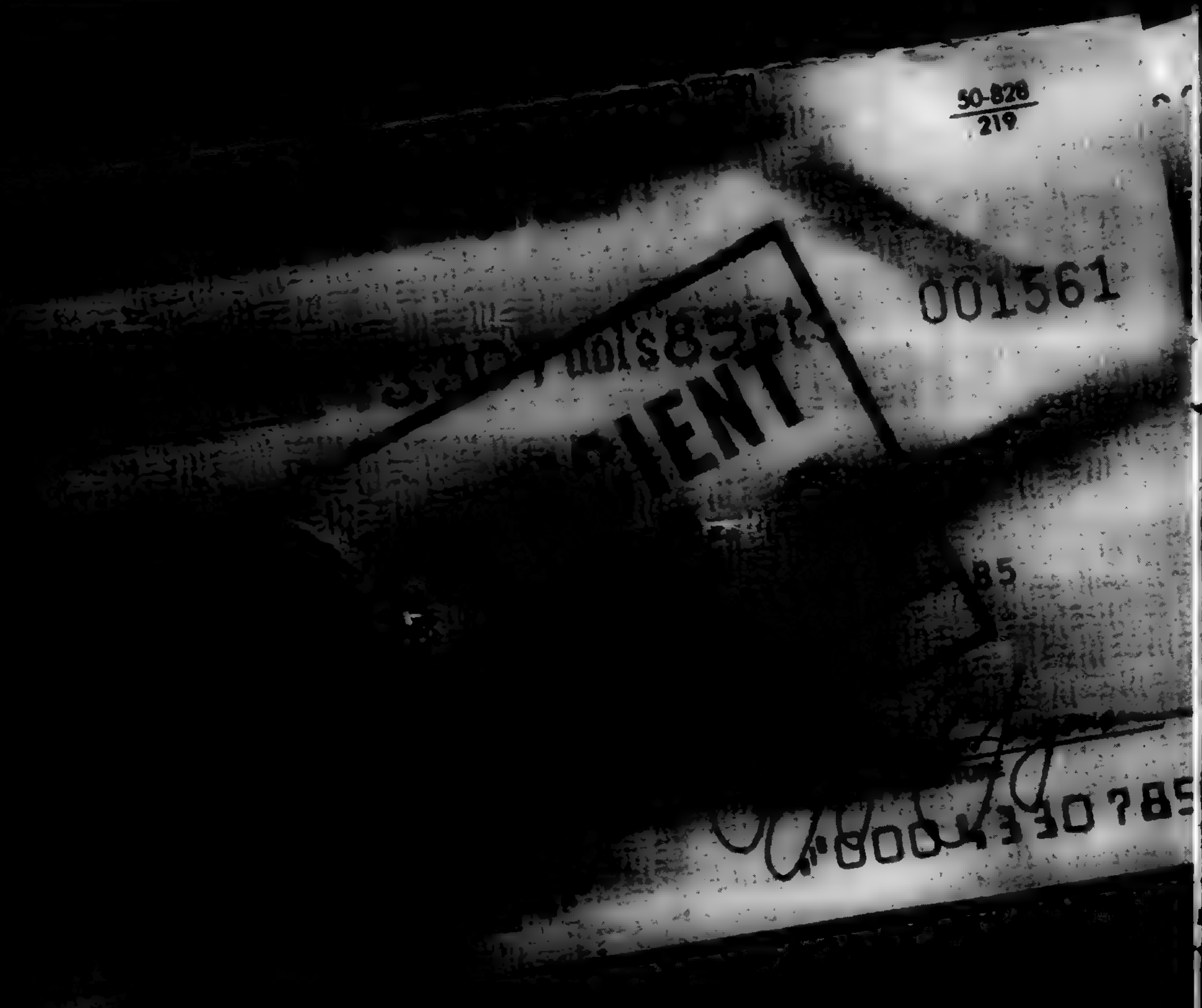

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COMPUTERWORLD

INSIDE

In Depth — Ben Shneiderman on interface design: Putting the user first. **Page 75**

Section Feature — To dream the impossible dream: Can distributed file system protocols bridge incompatible systems? **Page 45**

Ashton-Tate to breathe new life into Multimate with document-oriented version. Page 2.

MIS managers shunning new mainframes. Page 59.

Addressing protected mode under Microsoft's current MS-DOS, Oracle readies powerful PC data base. Page 7.

IBM's expected support of the Graphical Kernel System highlights this week's NCGA conference. Page 15.

Reagan administration backs off plan to regulate unclassified data on commercial data bases. Page 10.

IBM's ability to link two mainframes running VM seen as stopgap measure to support CMS users who need a more functional version of VM/XA. Page 8.

Fairchild Semiconductor and Fujitsu are still tied together despite bowing to buy-out opposition. Page 103.

Portable 80386 machine arrives by mail. Page 35.

IBM end run will skirt PC-DOS limits

BY DOUGLAS BARNEY
CW STAFF

IBM is slated next week to announce support for Microsoft Corp.'s protected-mode DOS and to ease the expected one-year wait for that product with a version of its multitasking 3270 Personal Computer control program that will work with a broader range of PCs.

The new operating system will "let you do with a PC what a 3270 PC can do," a source close to IBM said. Those capabilities include windowing, multitasking and addressing more than 640K bytes of memory by splitting available memory into multiple blocks.

The current 3270 PC control program can address only one block at a time but can switch quickly between blocks, allowing several large applications to run simultaneously. "This is an interim solution and a viable long-term solution," the source said.

Neither IBM nor Microsoft is ready to ship versions of a protected-mode PC-DOS or MS-DOS, respectively. That operating system will exploit the true capabilities of the Intel Corp. 80286 microprocessor. However, IBM will unveil its version of that unfinished operating system as part of a series of strategic announcements, sources said.

The operating system is not expected to ship until the first quarter of 1988. The announcement will be the first formal unveiling of the Microsoft operating system, which that company is calling "New DOS."

IBM's announcement of protected-mode DOS as much as a year in advance of delivery is aimed at educating large end us-

Continued on page 6

SAA lays out distributed framework

IBM maps interfaces for main product lines

BY ELISABETH HORWITT
CW STAFF

IBM last week laid out details of a major new framework that is intended ultimately to pull together its divergent hardware, software and communications products into a coherent distributed processing system.

With the announcement of a statement of direction for Systems Application Architecture, IBM finalized its commitment to provide, during the next few years, a set of common interfaces for communications, user access and applications software that is intended to run across IBM Personal Computer, System/36 and 38, and 370 architectures.

The long-term goal of SAA is "to provide key programming building blocks that will provide high-level interfaces into IBM's communications" products, according to IBM manager of software marketing John Friedline. "Right now, [interfacing with various IBM communications architectures] requires low-level

Continued on page 129

Bigger 3B2 to support LU6.2, Disoss

BY PATRICIA KEEFE
CW STAFF

NEW YORK — In its first major computer announcement in almost a year, AT&T is set to unveil tomorrow the high end of its 32-bit microprocessor-based 3B2 family along with support for IBM's LU6.2 and Distributed Office Support System protocols, according to sources close to AT&T.

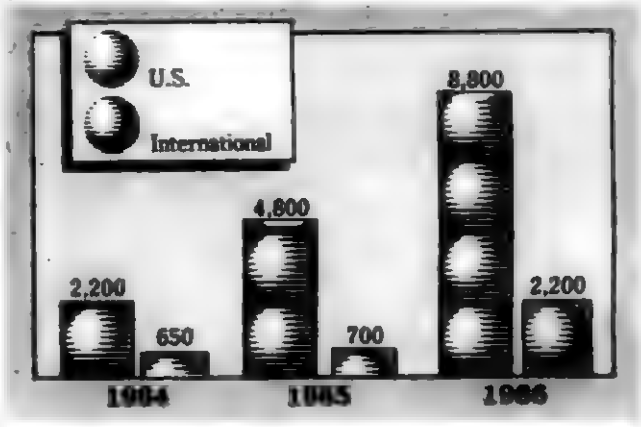
AT&T's 3B line of supermicros and minicomputers is widely held to have been less than a resounding success since the first 3B2 was introduced in 1984. AT&T is hoping the 3B2/600, which insiders claim outperforms any competitor in its class, will change that perception.

"That's an 80% increase in CPU power, a 100% increase in disk storage and a 400% increase in internal random-access memory over the 3B2/400," an AT&T salesman said. "It's going to be easy to go after Digital Equipment Corp.'s Microvax," he added.

The 3B2/600 features AT&T's WE32100 chip, upgradable to the WE32200; AT&T's Unix System V Version 3.1.1; simultaneous support for up to 64 users, with 90 physical ports; 4M to 16M bytes of RAM; 2.7 million instructions per second ; 18 MHz; a small com-

Continued on page 8

One step at a time
Sales of AT&T's 3B2 line have doubled annually since the first systems were installed in March 1984



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CW CHART: MITCHELL J. HAYES

Citing Networker problems, Lotus misses Q1 ship target

BY PATRICIA KEEFE
CW STAFF

CAMBRIDGE, Mass. — Problems with The Networker, Lotus Development Corp.'s network implementation for 1-2-3 and Symphony, will force the firm to miss a first-quarter ship date, Lotus confirmed last week.

The software publisher will not commit to a second ship date. "The Networker will ship later this year at a yet-undetermined date," Lotus spokesman James O'Donnell said.

However, some sources said they have been told The Networker will ship in April. Last week, Greg Lazar, Lotus's director of field support, told the Chicago Association for Microcomputer Professionals that Lotus will announce its networking plans at the end of April. Many Lotus watchers said they expect Lotus to talk about support plans for Microsoft Corp.'s "New DOS" and computers based on Intel Corp.'s 80386.

Lotus spokesman Greg Jarboe denied reports that the project is significantly behind schedule, although one analyst claimed that the product manager had told him last November to expect The Networker in January.

Lotus first revealed plans for The Networker last August. The Networker will reportedly enable 1-2-3 and Symphony to be loaded from the file server without key diskettes at the local workstations. An installation program creates concurrent use counters for 1-2-3 and Symphony to replace key diskettes,

Continued on page 130

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IN THIS ISSUE

Graphically speaking. Highlights of the NCGA Computer Graphics '87 conference should include IBM's interface to GKS for users of its GDDM graphics systems, a Prime workstation with 3-D display and two graphic display families from Ramtek. **Page 15.**

NEWS

4 Tandon touts AT-compatible system as 'a computing environment to go.'

4 Users site reasons for weakened IBM Token-Ring demand.

6 Task force to develop network management standard under TCP/IP.

7 Queue Associates files suit against Ashton-Tate, seeks rights to Dbase.

7 Oracle breaks 640K-byte RAM barrier for PCs.

8 IBM's VM/ISF link seen as stopgap measure to allow MIS support for end users.

8 Software house lauds its VM linking product as VM/ISF alternative.

10 Reagan administration backs off from controversial computer security policy.

12 Tandem Nonstop SQL undergoes beta testing.

12 Nolan Norton joins Peat Marwick's Information Systems Services division.

13 Uccel decision prompts others to woo users with support guarantees.

14 AMD designs 32-bit CMOS micro, claims it can process 17 MIPS.

14 RCA inks pact for Verbex voice recognition technology.

129 IBM's SSA called most significant announcement since SNA.

130 Lotus continues Paperback Software copyright battle.

SOFTWARE & SERVICES

19 IFPS/Plus decision-support system now in 13th release.

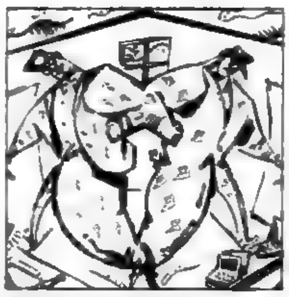
19 Tolerant software development system aimed at federal government.

19 Phoenix Software's 4GL allows programmers to test, debug programs.

MICROCOMPUTING

35 Intel introduces add-on memory boards for PC AT and XT 286 users.

35 Mail-order firm manufactures speedy Intel 80386-based portable.



Development gets a machine of its own. Page 83.

35 Success for IBM may come from changing perspective on users' needs.

35 Centralized MIS control philosophy keeps Safety-Kleen in the black.

NETWORKING

45 Intelligent communications processor links IBM mainframes.

45 Voice server allows increased voice traffic volume without adding T1 capacity.

45 MIS managers search for a standard distributed file system protocol.

SYSTEMS & PERIPHERALS

59 NAS overhaul prompts analysis of IBM's Extended Architecture.

59 EMC moves into IBM mainframe add-on market with host upgrades.

59 HP pits engineering workstation against Sun, Apollo offerings.

59 ITT ups Courier 9000 to 3270-compatible functionality.

Quotable

"*We feel it is deplorable to be forced by government intervention to withdraw.*"

FUJITSU'S TAKUMA YAMAMOTO ON HIS COMPANY'S DECISION NOT TO ACQUIRE FAIRCHILD SEMICONDUCTOR.

MANAGEMENT

89 American Airlines' parent company lands European reservation deal.

89 Emery initiates direct-access dial-in service for customers.

89 Shell Oil solves error-rate problem, saves $5 million in costs.

COMPUTER INDUSTRY

103 Analysts say 3½-in. floppy sales will dominate market by 1990s.

103 Fairchild-Fujitsu merger off.

103 Rabbit, Micro Plus join forces in enterprise networking market.

EMPLOYMENT TODAY

112 The pros and cons of pursuing a position with the federal government.

IN DEPTH

75 User interfaces switch from cute to service-oriented. By Ben Shneiderman.

83 Software developers produce cleaner, faster code with a dedicated machine. By Daniel Nolan.

OPINION & ANALYSIS

17 Lecht explains IBM Japan's superhero status.

19 Firdman suggests using English to sell AI.

35 Zachmann draws a positive conclusion about the Kinetic Graphics System.

45 Keefe fears LAN support services are in danger of attack.

59 Connolly says mainframe market has ground to a halt.

89 Ludlum reports on AFCOM's New Orleans jamboree.

103 Betts educates exporters on expanding their markets.

DEPARTMENTS

16 Editorial

96 Calendar

122 Buy Sell Swap

Rejuvenated Multimate to target document use

BY DAVID BRIGHT
CW STAFF

TORRANCE, Calif. — Ashton-Tate is expected to introduce next month a document-oriented version of its Multimate word processing package for the IBM Personal Computer, according to industry sources.

Once one of the most popular word processing packages for microcomputers, the page-oriented Multimate has lately been surpassed by more modern, document-oriented word processing programs such as Wordperfect Corp.'s Wordperfect and Microsoft Corp.'s Microsoft Word.

With document-oriented programs, users can write continuously and scroll through an entire document, rather than having to stop at each page.

Introduced in early 1983 by Multimate International Corp., the Multimate package attracted a devoted following because of its power, speed and similarities to dedicated word processors from Wang Laboratories, Inc., but the package is in need of rejuvenation, according to one micro manager.

Needs a facelift

As PCs become more powerful and are used for increasingly long documents, Multimate's page orientation is becoming a drawback, according to Bruce Johnson, manager of the PC resource center at Deloitte Haskins & Sells in New York. The company picked Multimate 2½ years ago because of its closeness to the Wang systems.

Since the company now has more than 1,000 employees using the package and may eventually have 8,000 users needing word processing packages, it would be difficult to switch to a more modern package, Johnson says.

In addition, he says he wants to stick with Ashton-Tate because of its staying power as a major software vendor.

Squeaky wheel...

"If I holler loud enough and if I'm constructive enough in how I describe what I need, they'll respond," Johnson says. A change to a document orientation is the single most important change necessary, Johnson explains.

Little more than two years ago, Multimate International was challenging IBM for domination of the microcomputer word processing market. According to IMS America Ltd., an Ambler, Pa., market research firm, Multimate International garnered 12% of the word processing wholesale dollar volume of microcomputer specialty retail stores during the fourth quarter of 1984, second only to IBM's 20% share.

Ashton-Tate bought the company and in the fourth quarter of 1986, Ashton-Tate's share in this sector was 9%, good for fourth place behind Wordperfect, IBM and Microsoft.

Senior Editor Ed Scannell contributed to this report.

Unisys unites family

Sperry, Burroughs Unix systems placed in line

DETROIT — Unisys Corp. last week merged into a single product family the Unix-based systems previously offered by Sperry Corp. and Burroughs Corp. before they joined to form Unisys.

Under the merging, Unisys is renaming the two former Burroughs XE 500 models with the 5000 series nomenclature used by Sperry for the lower half of its Unix product line. Unisys also offers the 7000 series of former Sperry systems at the high end.

"In structuring the Unisys Unix product family, three major factors were considered. First was completeness of product line. We now serve a wide spectrum of customer requirements — up to 240 users.

The second factor was brand recognition. Sperry invested heavily to establish marketplace awareness of their 5000 and 7000 series. The third factor is commitment, both to our customers and OEM vendors," said Jerry L. Petersen, Unisys vice-president and program general manager of entry-level and departmental systems.

Merging XE 500s

With the move, Unisys is incorporating the Burroughs XE 500-4 and XE 500-5 into the middle of the 5000 product line as the 5000/70 Models A and B.

Unisys said the 5000/70 is a loosely coupled architecture best suited for many users running a variety of applications that can be dedicated to individual processors.

Unisys said the products from Sperry and Burroughs use compatible versions of AT&T Unix System V, Version 2 and can use compatible software packages, terminals and printers.

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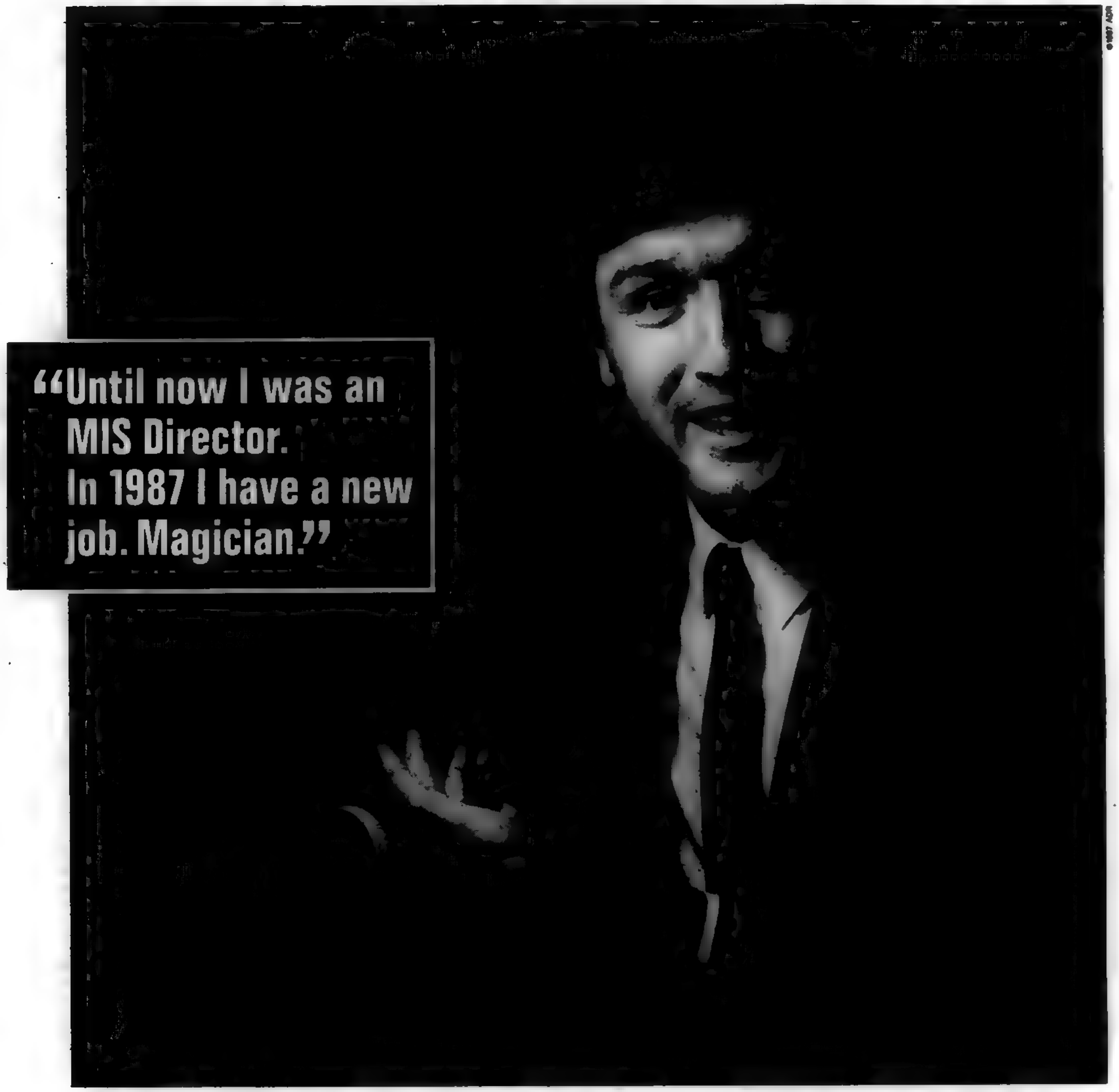
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Shortages soften demand for Token-Ring

BY PATRICIA KEEFE
CW STAFF

Demand for IBM's Token-Ring network has softened, according to dealers, consultants and some users, who cite two reasons. Both the Token-Ring Adapter and Adapter II cards remain in short supply, and major pieces of IBM's strategic network are not slated to ship until the third quarter at the earliest.

Users said they are still interested in the Token-Ring, but many who need to link their computers today — particularly those in multivendor shops — are installing Ethernet instead. Ethernet not only links noncompatible equipment but is available now, observers said.

An IBM spokesman maintained that sales of Token-Ring cards for personal computer networks are going like "gangbusters," subsequently slowing deliveries. Still, the cards are available under a "normal" delivery schedule — two to four weeks, he added.

High demand questioned
Many resellers and analysts questioned IBM's claims of high demand for the Token-Ring.

"When the Token-Ring first came out, there was a panic rush to see if there wasn't something magic there. Users have had a chance to look at things and they've realized that either one [Token-Ring or Ethernet] will do," said David Terrie, editor of Patricia Seybold's "Network Monitor" newsletter.

"They've discovered that Token-Ring does the job, just like Ethernet. But Ethernet has the installed base, the range of media and supports [Transmission Control Protocol/Internet Protocol]. If you want a multivendor solution, Ethernet is really the network to go with these days," he added.

Based on a recent user survey, Terrie said he expects Ethernet to outsell Token-Ring four to one this year. "Bridge Communications, Inc., Ungermann-Bass, Inc. and other token-ring vendors don't expect token-ring sales to total more than 10% of their sales this year." He said he expects Ethernet to outsell Token-Ring for the remainder of the decade.

Although IBM has repeatedly said its Token-Ring network is in high demand, International Data Corp. (IDC), a Framingham, Mass.-based market research firm, estimated that in its first six months on the market, only 1,200 Token-Rings were installed. IBM maintained the Token-Ring began shipping in March, but IDC said it began shipping in volume' in June. "That puts the Token-Ring sixth in 1986 market share, even behind IBM's PC Network," IDC analyst Doug Gold said.

A Computerland Corp. dealer said that although Computerland views the Token-Ring as a strategic product, less than 10% of the franchisees have ordered the network in the last 90 days.

In short supply?
"I have heard the Token-Ring is in short supply in recent meetings with professional groups and clients," added Ronald Brown, a technical consultant for Coopers & Lybrand in Boston.

"You just can't get the cards," added Keith Brown, a partner at Brown & Associates in Belmont, Mass., a network systems integrator. He said just four of his 100 network installations use the Token-Ring.

"They are in terribly short supply," said an executive for another major computer retail chain, adding that he is in a "severe back-order situtation" for the Token-Ring, forcing his franchisees to turn to other networks that they have in stock. He said he has been unable to get any explanation from IBM concerning the cards' availability.

Demand slow to build
Demand for the network has been slow to build, according to Laura Peck, a network analyst with L. F. Rothschild, Unterberg Towbin in San Francisco. "IBM is still telling customers they will have to wait, whereas if you go with Ethernet, you can get all you need today," she said.

And Fortune 1,000 users are having problems with the inability of the Token-Ring to link microcomputers to minis or mainframes, according to a recent report from Forrester Research, Inc. in Cambridge, Mass. Those connections to IBM's mid-range and high-end systems are slated to be released between June and September, according to Claire Fleig, research director for the International Technology Group, a market research firm based in Los Gatos, Calif.

"Demand has outstripped supply because IBM isn't making very many cards," another analyst said. "They are purposely staying behind the demand curve." IBM has talked about a 16-MHz Token-Ring card to replace the current 4-MHz card, which has been criticized for its performance. "IBM probably isn't making many [4-MHz] cards in anticipation," one consultant speculated. Another source said the 4-MHz cards may not be compatible with a 16- or 12-MHz Intel Corp. 80386-based computer from IBM.

IBM is also expected to put a Token-Ring chip on the motherboard of its next generation of computers. Several sources said they have seen a Token-Ring chip on prototypes of IBM's 80386 computers.

LAN batting averages

PC networks shipped in 1986 and total installed base

Vendor	Model	1986 Shipped	Installed	Percent of Shipped Networks 1986	Percent of Installed Networks 1986
Novell, Inc.	Netware	8,700	22,700	19.4	21.0
3Com Corp.	Etherseries	8,200	19,200	18.3	17.7
Corvus Systems, Inc.	Omninet	3,400	15,000	7.6	13.9
Orchid Technology	PC Net	3,150	[illegible]	7.0	8.8
IBM	PC Net	7,500	8,500	16.8	7.9
Fox Research, Inc.	10 Net	[illegible]	8,400	6.5	7.8
Nestar Systems, Inc.	Plan	2,400	5,900	5.4	5.4
Xerox Corp.	Starlan	[illegible]	1,900	4.2	1.8
Santa Clara Systems*	PC Net	600	2,100	1.3	1.9
IBM	Token R	1,300	1,200	2.7	1.1
AT&T	Starlan	900	900	2.0	0.8
Other		3,000	13,325	6.7	12.3
TOTAL		44,700	108,275		

* Now owned by Novell

INFORMATION PROVIDED BY INTERNATIONAL DATA CORP
CW CHART

AT-compatible system boasts removable drives

BY DAVID BRIGHT
CW STAFF

NEW YORK — Promoting "a computing environment to go," Tandon Corp. introduced last week an IBM Personal Computer AT-compatible system that can hold two proprietary, removable 30M-byte Winchester disk drives.

Officials at the Moorpark, Calif.-based company said the firm will also sell the drive subsystem separately as a peripheral for AT systems.

According to Tandon, the 3½-in. Personal Data Pac drives are extremely rugged and can be moved or shipped without damage.

"You can back up 30M bytes in less than three minutes and put an entire corporate data base into your briefcase," President Chuck Peddle claimed.

The shock-mounted drives, each containing four drive heads and two platters in an airtight enclosure, can be dropped from a height of 18 inches without internal damage, according to Tandon officials.

The drives reportedly speed system performance with their relatively fast 40-msec average access time and through the use of data caching.

Includes memory scheme
The Pac 286 system also includes a memory management scheme said to enable both new and existing applications to address the computer's maximum 5M bytes of random-access memory.

Existing applications would require a software driver, officials said.

Tandon said it plans to begin shipping the products by late May or early June.

Prices are not yet firm, but the company said it expects that a Pac 286 system with one 1.2M-byte floppy disk drive and a built-in capacity for two drives will retail for $2,995, along with one Personal Data Pac.

An Ad-Pac 2 subsystem with two drive slots may be priced as low as $500, and each individual 30M-byte Data Pac may cost $350, according to company officials.

CORRECTIONS

"Chasing the bleeding edge of technology" [CW, March 16], incorrectly identified BMC Software as one of the founders of the Microelectronics and Computer Technology Corp.

The correct company is BMC Industries, Inc., located in St. Paul, Minn.

The article "NAS shows 4381 option" [CW, March 9], listed an incorrect U.S. dollar equivalency for the West German price of the NAS AS/VL 50. The correct figure is about $930,000.

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312/827-4433
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CW Communications International News Service
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Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
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Vendors seek handle on TCP/IP

BY JAMES A. MARTIN
CW STAFF

MONTEREY, Calif. — A task force consisting of several data communications network vendors has agreed to pool its resources and work toward the development of a much-needed network management standard under the Transmission Control Protocol/Internet Protocol (TCP/IP).

"Our goal is to provide focused vendor participation to achieve the shortest term, most useful results we can achieve in this area," said David H. Crocker, a software development manager for Ungermann-Bass, Inc. and one of the eight to 10 task force members.

The group held an informal meeting last week at the TCP/IP Interoperability Conference here to discuss an agenda. The task force consists of representatives from competing data communications companies including Ungermann-Bass, Bridge Communications, Inc., Excelan, Inc. and Sytek, Inc.

As the size of data communications networks has grown, so has the number of incompatibilities in hardware and software interfaces, prompting a crucial need for standards in managing those networks, according to Daniel C. Lynch, president of Advanced Computing Environments in Cupertino, Calif.

Lynch is a self-described "catalyst" behind the formation of the network management task force.

Selecting the best

The task force said its objective is to pick and choose among the various proprietary network management protocols offered by vendors and select the best for consideration as a standard.

The group confers with similar developments within the International Standards Organization's Open Systems Interconnect (OSI) protocol to ensure compatibility.

OSI is largely considered to be the next generation protocol beyond TCP/IP but is not expected to be commercially implemented until the early to mid-1990s.

In contrast, TCP/IP is currently supported by more than 100 different systems and is widely used in government and commercial markets.

"We will definitely look at what the OSI thrusts are, although they don't have any networks to manage yet," Lynch said. "We want to make sure not to conflict with what they're doing, even though they aren't very far along."

Cooperate and contribute

Although the OSI model is still in the future, the TCP/IP task force will not necessarily mandate what becomes standard, forcing OSI later to follow. In fact, the goal of the group is to cooperate, follow and contribute in creating a network management standard, Crocker said.

The Department of Defense, which developed the TCP/IP protocol, turned over further standards development to the private sector last summer. However, the DOD will continue to play a role in standards development, albeit an indirect one, observers said.

For example, the DOD is helping to fund several network management research projects, including a gateway standard being developed by the National Science Foundation. That gateway standard could be one of several standards included in the development of an overall network management standard.

The task force has agreed to hold its first formal meeting — open to any interested companies — sometime in May. From that point, a commercial implementation of the standards may take two years to develop, according to Lynch.

This particular cooperation between competitors in developing TCP/IP standards is not the first.

At the conference last week, a similar task force — formed last summer and consisting of competing vendors — announced the development of a standard interface between Netbios, IBM's Personal Computer networking protocol, and TCP/IP.

Eliminating roadblocks

The Netbios-TCP/IP interface standard will eliminate the roadblocks between communicating from a microcomputer on Netbios to previously incompatible hardware systems using the TCP/IP protocol, task force members said.

"If someone had PC Network, IBM's network package running on Netbios, they could only use it on a vendor-by-vendor basis," explained Steven F. Holmgren, president of Communication Machinery Corp. in Santa Barbara, Calif., and a member of the Netbios-TCP/IP interface task force.

"With a standard created in this area," he said, "a PC Network application would be able on Netbios software to talk to other PC Network applications on different vendor hardware systems over the same network."

During a four- to five-month period, the group developed Netbios-TCP/IP interface standards, including how data parameters are determined and the translation of Netbios' naming service feature to an actual TCP/IP address, Holmgren said.

At this point, the standard "needs some time to solidify," Holmgren added. "There will be a four- to six-month period where users can test it out." Once the standard proves to be a workable one, software companies such as Lotus Development Corp. will be free to incorporate the standard Netbios-TCP/IP interface in upcoming software releases.

"Realistically, it would be two to three years before this standard is used commercially," Holmgren said. "It will take a while to bring up distributed applications using the standard on mainframes."

IBM end-run

FROM PAGE 1

ers and helping them plan for the move toward the more complex environment.

IBM executives were not available for interviews as of press time.

The key advantage of the new 3270-style operating system will be multitasking and the ability to run on machines other than the 3270-PC.

"It will become usable for all PCs," a source close to IBM said. "In its first release, it will support six to seven PC-DOS tasks. Each of these applications can talk to each other."

The 3270-style operating system also will reportedly provide virtual capability. For example, if a system only has 640K bytes of random-access memory (RAM), the operating system will treat disks as RAM and thus provide more than 640K bytes of RAM.

IBM's version of protected-mode DOS is semiproprietary in that its graphical user interface will be available only on IBM PCs, a source close to IBM said.

'Dirty windows'

This interface, dubbed "dirty windows," provides windowing and multitasking. If software developers write software to take advantage of dirty windows, the software will run only on IBM machines.

This interface may also serve as the graphical user-interface component of IBM's SAA.

The issue of dirty windows has touched off a behind-the-scenes debate.

'Not proprietary'

A Microsoft official argued last week that IBM's graphical user interface would not be proprietary and would not force software developers to write specifically for IBM machines.

However, Jerry Schneider, who serves as president of the Capitol PC Users Group in Washington, D.C., said the design of the Microsoft operating system provides for proprietary extensions.

"The way ADOS [one name for the protected-mode operating system] is set up is to be a very modular operating system, which allows it to plug in whatever pieces are necessary to customize for the individual OEM," Schneider said.

Customized for OEMs

"Most of your functions and drivers are in call libraries; those call libraries will be specifically customized for the hardware of the OEMs," he continued.

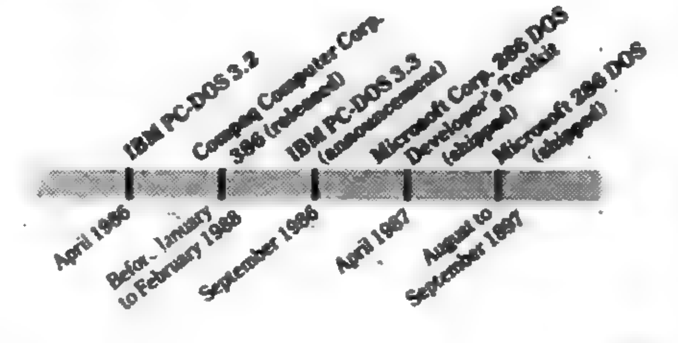
The end-user version of New DOS from Microsoft is expected to be generally available in the first quarter of 1988.

Availability may vary from manufacturer to manufacturer because the manufacturers license the version from Microsoft, New DOS product manager Mark Mackaman said last week at The Chicago Association for Microcomputer Professionals Conference and Vendor Fair.

According to Michael Goulde, an analyst with The Yankee Group, a Microsoft official told him last November that IBM, not Microsoft, would formally announce the operating system. He said the official told him that announcement was expected in the first quarter.

Major DOS developments

1986 to 1988



CW CHART

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Oracle set to leap 640K RAM barrier

BY DOUGLAS BARNEY
CW STAFF

BELMONT, Calif. — Oracle Corp. next month is slated to announce Professional Oracle, which the firm claims will include all the functionality of Oracle Version 5.1, including the ability to run on mainframes and address more than 640K bytes of random-access memory (RAM), but which will still run under IBM PC-DOS and Microsoft Corp. MS-DOS 3.1.

Oracle Professional uses the so-called protected mode available on more advanced personal computers, which allows applications to address up to 16M bytes of RAM. Protected mode has been largely untapped, however, and the industry has been anxiously awaiting a new protected-mode operating system from Microsoft, but that system may be as much as a year away.

Oracle refuses to disclose the means of addressing protected mode while running under the current versions of PC- and MS-DOS, but several schemes are currently available, including Softguard Systems, Inc.'s VM/386, Metaware, Inc.'s C Compiler and Sapien Software Corp.'s Sapien V8. Software recompiled with the Metaware tool can run under MS-DOS.

Other data base manufacturers, including Ansa Software Corp., are looking at ways of running their applications in protected mode without waiting for Microsoft's new operating system.

According to Oracle, Professional Oracle provides the functionality of its mainframe package, including distributed data base capability, a query optimizer, comprehensive security, the clustering of joined tables and high-speed relational sorting.

In addition, the package provides 500K bytes of RAM for users to develop and execute mainframe data base applications using existing PC compilers and software tools. The package is also compatible with IBM's DB2, allowing DB2 applications development to take place on PCs.

Oracle is also scheduled to announce Networkstation Oracle, a product that runs on Intel Corp. 8088-based PCs and connects PCs to departmental and corporate computers. The product allows PCs to serve as distributed applications processors and can execute applications while accessing mainframe data bases.

In addition, Oracle is scheduled to announce Lanserver Oracle, a product that turns Intel 80286- and 80386-based systems into multiuser data base machines, the firm claims.

Dbase suit hits Ashton-Tate

BY DOUGLAS BARNEY
CW STAFF

PACIFIC GROVE, Calif. — The legal battle between Ashton-Tate and Queue Associates, Inc. reached a feverish pitch last week when Queue announced it had filed suit against Ashton-Tate seeking rights to Dbase.

Queue, a software developer, is currently being sued by Ashton-Tate for the alleged misappropriation of proprietary technology.

"This was an anticipated defensive strategy," said Ashton-Tate general counsel Stanley Witkow. As of press time, Ashton-Tate had not been served with the suit.

Queue said its claim stems from a development agreement the firm reached in 1982 with then-Ashton-Tate executives David Cole, Hal Lashlee, George Tate and C. Wayne Ratliff. Under the original agreement, Gary Balleisen, president of Queue, was to develop an integrated software application, but Ashton-Tate instead acquired the rights to sell Framework, an integrated package from Forefront Consulting, Inc., a source close to Ashton-Tate revealed.

Instead of completing the integrated package, Balleisen began work on Shrink, a product that works with Dbase and provides graphics, cross-tabulation, reporting and analysis capabilities.

According to Queue, the software was delivered to Ashton-Tate, and Ashton-Tate failed to respond in what Queue called a "timely manner." Queue argued that the contract stated that if Ashton-Tate did not market the product or acquire Queue within two years of the product's delivery, then Queue had the right to tender an offer in the amount of the product's development cost to obtain the rights to Final Software (a combination of Dbase III and a reporting and analysis Dbase add-on package), including the nonexclusive rights to Dbase.

Queue claimed it offered Ashton-Tate $1.7 million for full rights to Shrink and nonexclusive rights to Dbase III. As a result of Ashton-Tate's refusal to take the offer, Queue claimed that it has a legal, nonexclusive right to market Dbase III and an exclusive right to market Final Software. Ashton-Tate strongly denies that argument.

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VM link called stopgap move

But allows MIS support for swelling CMS sites until VM/XA arrives

BY JEAN S. BOZMAN
CW STAFF

IBM's recent move to link large-scale VM/SP systems together through its VM Inter-System Facilities (VM/ISF) product is viewed by industry analysts as a stopgap measure to allow MIS support for growing numbers of VM/CMS end users. However, it is the only alternative for overloaded CMS sites until a more functional version of VM/XA that includes CMS support is released a year or more from now.

Before VM/ISF was announced in late January with August delivery, MIS managers had no way to support more than 1,000 VM/CMS users under a single copy of VM/SP. Adding more IBM mainframe hardware did not help, since it is the VM/SP operating system that defines the limit of little more than 1,000 virtual machines under VM.

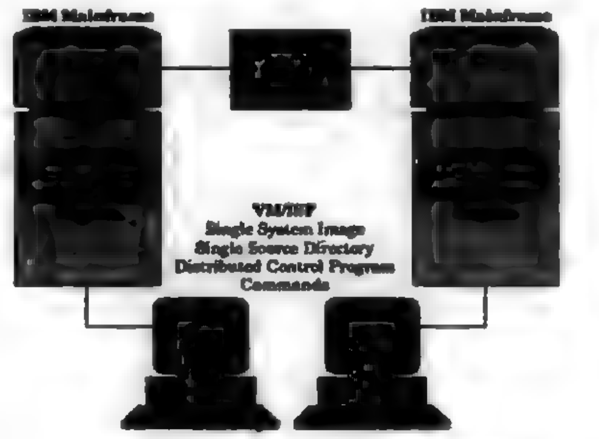
Users supported doubled

With VM/ISF, IBM has effectively doubled the number of users supported. VM/ISF provides a software link between two IBM mainframes under VM/SP HPO Release 4.2 provided the computers are also linked by a channel-to-channel adapter or an IBM 3088 channel communications unit. VM/ISF boosts system support to about 2,000 end users.

In order to reap the benefits of ISF, users must trade some VM functionality in the process, IBM says. The resulting computing complex, company spokesmen say, does not provide a true single-system image. For this reason, important VM applications might not perform well in a VM/ISF environment.

VM single system image

VM Inter-System Facilities links mainframes



CW CHART: SUSAN ALDAM

Among the applications that might suffer performance problems are IBM's Professional Office System, Structured Query Language/Data System and Interactive System Productivity Facility. For such applications, IBM suggests users "must be concentrated on the particular system where the application exists." Also, there are important restrictions on VM/ISF configuration. The machines to be linked are high-end systems from the IBM 4381 up. VM/ISF will not run on IBM 4341s, 9370s or older 370s. Furthermore, only two CPUs may be linked at a time — not three, four or six.

"This product was targeted at users who have already reached the largest possible VM configurations," says Frank Gens, a vice-president and senior analyst at International Data Corp., a Framingham, Mass., market research firm. "But it's just a partial solution for high-end VM users. [The version of] VM/XA [with CMS support] is late even by IBM's own expectations, and VM/ISF is really a gap-filler for large users until VM/XA arrives."

Until that happens — reportedly, a year or more from now — MIS will have to turn to VM/ISF as a practical stopgap measure for VM/SP applications support, observers say. Possible applications for VM/ISF include information center queries and the distribution of shared files over an extended VM network.

It is the kind of relief that IBM's largest VM customers have been demanding for several years, analysts say. "IBM's largest customers forced the announcement out," says Peter Levine, a vice-president at the Gartner Group, Inc. in Stamford, Conn., which specializes in IBM software systems analysis. "But it is only another small step toward a single point of system definition and system management for MIS."

Updates directories

VM/ISF works by updating source directories on either side of the link, IBM says. "Updates to the individual system directories occur almost immediately," an IBM letter to customers states, through use of the VM Inter-System Directory Synchronization feature. For some uses, though, there is apparent single-system image. VM/ISF provides a full directory of all users on the system, the ability to pass files back and forth over the link and the ability to broadcast VM's Control Program commands throughout the system.

Eventually, Levine says, IBM will have to provide single-system image capability for various configurations of multiple systems under VM/XA. In one sense, that would mean IBM would allow users to cluster mainframes in much the same way that Digital Equipment Corp. allows users to cluster multiple VAX systems. That kind of single-system image may be created under future releases of VM/XA, allowing MIS managers to forge a variety of large-scale mainframes into a single complex.

IBM has also indicated that it is aiming to support larger VM/CMS populations in the future. "VM/ISF is a step toward achieving a single, larger system environment for the end-user community," IBM says in a product letter on new VM releases. Comparable single-system image capabilities are not widespread in the IBM world, with the exceptions of single-image data bases under IBM's Airline Controls Program operating system and a system solution from independent vendor VM/CMS Unlimited, Inc. in Boston.

Bigger 3B2

FROM PAGE 1

puter systems interface; support for an enhanced small device interface; and a 60M-byte cartridge-tape backup, AT&T and other sources said. A base configuration is expected to cost between $45,000 and $50,000.

However, several analysts waxed less enthusiastic over the 3B2/600, saying it does not stack up against the competition.

"AT&T has a big psychological investment in the 3B line, so it doesn't surprise me that there's yet another version of that machine," said David Terrie, editor of Patricia Seybold's "Network Monitor" newsletter. "But just what it brings to market is nothing. Who's going to buy a 3B2 when [it is competing] with NCR Corp.'s Tower line?" he asked, suggesting the Tower line provides better price/performance.

A second analyst close to AT&T agreed that the 3B2/600 is too expensive for the performance it provides. He said that the 3B2/300 was a superior machine when it was introduced three years ago with the WE32010O chip. But in the intervening years, the competition has upgraded to Motorola, Inc.'s 68020 and Intel Corp.'s 80286 and 80386 proccessors.

Meanwhile, the analyst claimed, AT&T shipped the 3B2/400 with the same chip, power and speed at a price increase of $20,000. The 3B2/600 will reportedly use the same chip, although it features a faster clock speed. "It's a modest increase from three years ago," he said.

Communications key

Communications is still key for AT&T. LU6.2 compatibility is being provided in direct response to customer pressure, AT&T insiders asserted. Loaded into a 3B2 file server on a Starlan network, LU6.2 could provide users with a gateway to an IBM Systems Network Architecture (SNA) environment.

AT&T will also reportedly take steps to beef up its Starlan marketing efforts, including packaging the 3B1 and/or the 6310 with Starlan as a file server and extending the range of that network, sources indicated.

Also slated for tomorrow's New York press conference are statements concerning AT&T's strategic plans for connectivity and the Intel 80386-based environment, informed sources said.

In addition, AT&T will reinforce its commitment to the computer industry, several relieved AT&T resellers noted. AT&T had no major computer hardware announcments last year, mostly shipping products announced in 1985.

This, coupled with a statement of direction focusing on communications and not standalone computers in the fall, led to speculation that AT&T would pull out of the computer business. "Sales really dipped for a three-month period [at one point]," said one reseller, adding that he lost contracts because users "didn't want to be associated with a loser."

However, in the last month, sales have picked up — in part due to AT&T's February unveiling of the 6310, a true IBM Personal Computer AT compatible, he said.

The 6310 just began shipping this month, but ad resellers said its introduction was buried in a multiple-product unveiling. To focus attention on the 6310, AT&T will include it in tomorrow's announcement.

6310's AT compatibility

The 6310's importance lies in its AT compatibility. AT&T's earlier 80286-based offering, the 6300 Plus, had a different bus structure and could not accept many AT-compatible add-on boards, thereby inhibiting sales.

What users will not see is an AT&T-labeled 80386-based computer, even though AT&T has an 80386 offering under wraps and Ing. C. Olivetti & Co., its supplier of personal computers, has introduced an 80386-based box in Europe.

But AT&T has no plans to introduce an 80386-based computer in the near future. IBM's 80386 plans and the brisk sales of Compaq Computer Corp.'s Deskpro 386 are not issues at AT&T, informed sources said.

AT&T is still working out where the 80386 fits into its product line, especially since it provides 32-bit processing today via its Unix-based 3B line. One option under consideration is to position its 80386 box as a network file server.

"They are being very careful around the 386," the AT&T salesman said. "It hasn't been determined yet what the purpose of that machine will be. What are you going to do with it? It's not worth anything as a multiuser box." AT&T is also trying to decide between two shell products that allow DOS to run under Unix: Locus Computing Corp.'s Merge 386 or VP/IX, developed jointly by Interactive Systems Corp. and Phoenix Technologies Ltd. AT&T's 80286-based 6300 Plus has a customized version of Locus's' Merge 286.

Edwards leaves AT&T

James D. Edwards has bailed out of AT&T's troubled Data Systems division to head up Telwatch, Inc., a Boulder, Colo., communications equipment company.

Edwards' most recent job at AT&T was planning for future delivery systems. He was replaced as vice-president for strategic business and market planning last year by Vittorio Cassoni, formerly of Ing. C. Olivetti & Co., manufacturer of AT&T computer equipment. "The computer division slid after Edwards took it over in '83. You could argue it was going down anyway, but he couldn't turn it around," said Daniel J. Rosenbaum, executive editor of "Wiretap," a newsletter that tracks AT&T.

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Feds drop stormy data security policy

Revamped Reagan administration backs off from controversial Poindexter initiative

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Reagan administration, under pressure from Congress, announced last week it will back off its controversial computer security policy, which is aimed at cutting off foreign access to sensitive data in U.S. data bases.

The surprising turnabout came in response to months of criticism that the administration's policy was a new form of military censorship [CW, March 2].

At a hearing held by Rep. Jack Brooks (D-Texas), administration officials said they will rescind an October 1986 policy memo that triggered the latest round of controversy by broadly defining the new category of "sensitive but unclassified" national security information.

In another reversal, the administration said it will support legislation that would reduce the role of the National Security Agency (NSA) in shaping data security policy.

Despite these moves, the administration's critics were only partly mollified. Spokesmen for the Information Industry Association (IIA) and the American Civil Liberties Union called the changes a step in the right direction but cautioned that the underlying government policy — National Security Decision Directive (NSDD) 145 — is still in effect.

White House change of heart

The conciliatory approach toward Congress was arranged by the new White House staff, particularly Chief of Staff Howard Baker and National Security Adviser Frank Carlucci.

NSDD 145, issued by President Reagan in 1984, gave the NSA, the Department of Defense and the president's national security adviser the key roles in establishing data security policy and standards. It also created the sensitive but unclassified information category.

At recent congressional hearings, critics from many segments of the computer community said NSDD 145 gives the NSA and the military too much power over information policy. The critics included the IIA, the American Bankers Association, the Computer & Communications Industry Association and the Institute of Electrical and Electronics Engineers.

NSDD 145 remains in effect, but the administration said it will support legislation sponsored by Brooks to transfer some authority from the NSA to the National Bureau of Standards (NBS) if certain amendments can be made. Last year, lobbying by the Pentagon helped defeat the bill.

Speaking for the administration at last week's hearing, Secretary of Commerce Malcolm Baldrige said the administration welcomes Congress's interest in computer security and is trying to address legitimate concerns about NSDD 145.

For starters, Baldrige said that the controversial policy memo issued by former National Security Adviser John Poindexter will be rescinded. That memo defined sensitive but unclassified information to include economic, business and scientific information that might harm national security if disclosed and required federal agencies to implement security programs to protect it.

Taking the Fifth

Poindexter, forced to appear at the hearing by a congressional subpoena, refused to answer questions about the computer security policy. He cited his Fifth Amendment right against self-incrimination and, according to his attorney, was concerned that questions might delve into his role in the Iran arms-sale scandal.

A former Poindexter aide, Kenneth de Graffenreid, defended the policy as necessary to keep sensitive data stored in government computers out of the hands of foreign spies. De Graffenreid also said the policy was not intended to affect the private sector.

Baldrige said the administration will review NSDD 145 "to resolve any ambiguities" about the role of the national security adviser. Carlucci went a step further in a letter to Brooks, suggesting that the national security adviser's role be eliminated.

Baldrige said that the challenges of information policy will require broad cooperation among government bodies and the private sector. "It is the intent of this administration to promote and foster that cooperation to the fullest possible extent," he declared.

The administration's new posture increases the chances that Congress will pass a bill similar to Brooks' proposed Computer Security Act of 1987, also known as HR.145.

That act would give the NBS, part of the Commerce Department, the authority to develop security standards for civilian agencies and the private sector, leaving the NSA to handle computer systems in the military and intelligence communities.

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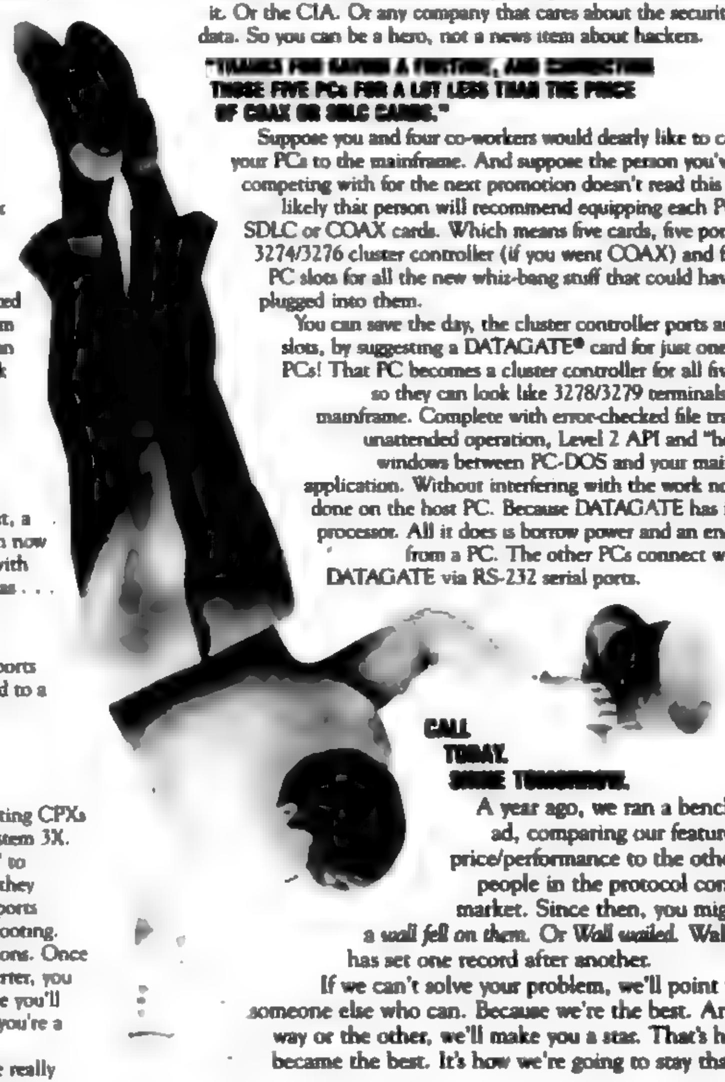

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Tandem DBMS to recover data after system failure

BY JEFFRY BEELER
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc., as expected, last week announced a relational product that allows distributed data base transactions to be recovered following systems failures.

Nonstop SQL, a relational data base management system that supports the Structured Query Language on Tandem's fault-tolerant systems, will not be available until the third quarter, but testing is slated to begin late this month at one of several beta-test sites.

ITI, Inc., a Pennsylvania-based software house, installed the Tandem product last week and will begin tests next week, according to Phil Landau-Smith, ITI software architect.

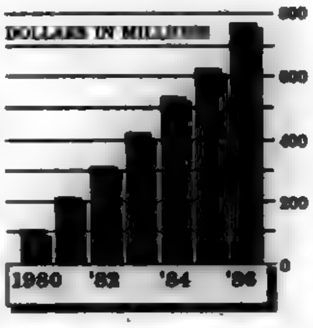
"We expect the Tandem system to reduce significantly our application development and maintenance costs," Landau-Smith said. "With SQL, we won't have to write a separate piece of code every time a particular application needs access to a different file."

According to Gerald Peterson, Tandem's vice-president of marketing, the relational product "is more than a rehash of our existing Encompass data base system."

Tandem said that more than 75 man-years went into developing and testing the file management system, applications generator and other software modules that Tandem wrote from scratch to produce the 700,000 lines of code in the product.

Tandem Computers, Inc. revenue

Fiscal year ended Sept, 30



CW CHART

A chief feature of the product, Tandem pointed out, is its purported ability to update distributed data bases and protect them from systems failures.

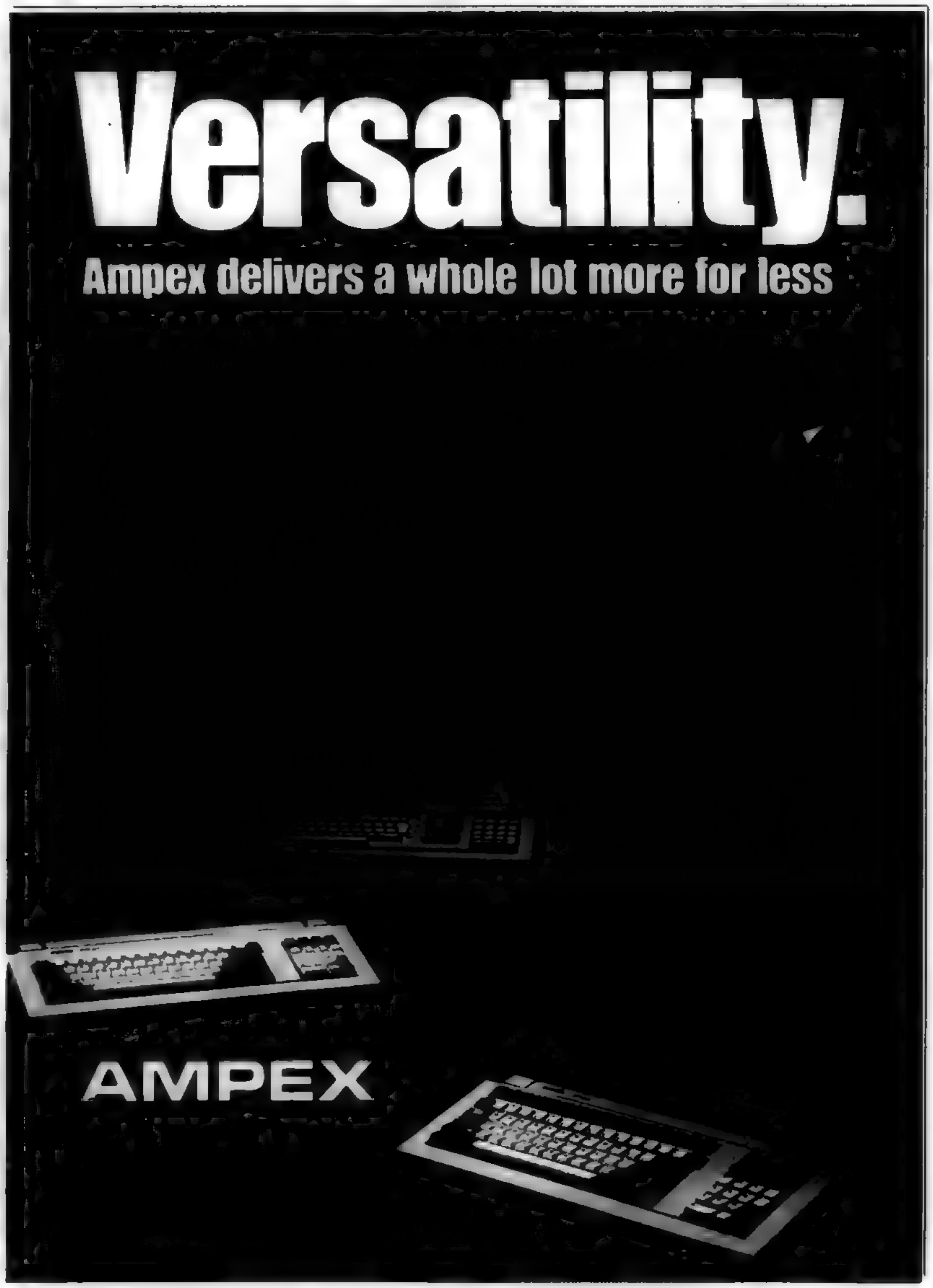
By distributing data bases, financial institutions "could minimize their liability during disasters and improve their local control," notes Charles Savage, operations vice-president for Guaranty Bank & Trust Co.'s data processing organization.

Under Nonstop SQL, the table that forms the basis of all relational systems can reportedly be partitioned and distributed among dispersed sites, with each node in the accompanying network transparently accessible by all of the other nodes.

Tandem's reported ability to recover aborted transactions in distributed data bases has eluded all other relational data base management system and SQL suppliers, according to E. F. Codd, originator of the relational model.

Tandem explained that it overcame this stumbling block by integrating Nonstop SQL with its existing Transaction Monitoring Facility, which automatically keeps track of all processing activities within its systems.

Nonstop SQL is priced from $4,000 to $8,000 per processor for an initial license fee. There is a $375 to $750 monthly charge.



Nolan Norton merges with Peat Marwick

BY DAVID A. LUDLUM
CW STAFF

Peat, Marwick, Mitchell & Co., one of the nation's largest accounting and management consulting firms, has merged with Nolan, Norton & Co., a leading information technology consulting firm.

Under the agreement, signed March 13 and announced last week, Peat Marwick will acquire the assets of Nolan Norton, which will maintain its indentity, leadership and focus, according to officials. The companies did not disclose financial terms.

Nolan Norton, which has more than 100 professionals, will work in partnership with Peat Marwick's Information Systems Services division, which is composed of about 700 professionals. The two units will not compete with each other, said Robert D. Gilges, managing partner of Peat Marwick's Information Systems Services consulting practice.

Nolan Norton cofounder Richard L. Nolan said Peat Marwick's capabilities in systems development will let Nolan Norton extend its services beyond planning to implementation. The 21 principals of Nolan Norton will become partners of privately held Peat Marwick.

Foes fill vacuum created by Uccel support bailout

BY JAMES A. MARTIN
CW STAFF

Although Uccel Corp.'s recent decision to discontinue support for The Cambridge Systems Group, Inc.'s mainframe scheduling package may have been bad news for many users, other software companies are rushing in to woo those disgruntled users with special support guarantees and licensing discounts.

Uccel's action is comparable to an announcement from Lee Iacocca that Chrysler Corp. is "closing all of its repair centers and offering the Chrysler owner an opportunity to exchange his automobile for a Sherman tank," says James P. Williams, president of Southwest Software Services, Inc. in Dallas.

As a result, Southwest Software said last week it is now offering a written guarantee that its products will be supported — regardless of an acquisition or merger — for five years from the date the user signs a contract.

'Bailout' offered

The five-year guarantee is part of Southwest's "ADC2 Bailout Program" and will retroactively affect the installed base of 400 for the firm's Zeke scheduling package. In addition, Southwest Software is offering Automated Data Center Job Scheduling and Production Control (ADC2) users the chance to convert to Zeke for $8,000 a year in maintenance costs for a three-year lease.

Another former ADC2 competitor looking for market exposure is Bennett Software, Inc. The Houston-based software firm is offering, until May 1, a 25% discount and conversion assistance for ADC2 users to switch to its Job Trac scheduling package under IBM's MVS.

Bennett Software is altering its customer sales contracts to state that if the company is acquired or declares bankruptcy, the source code for its products will be placed in the public domain.

"Some of our prospective clients have shown concern because we are a young company and there are acquisition wars under way," says Jerry Bennett, president. "We're assuring our clients and customers that if Job Trac is removed from the marketplace, for whatever reason, the source code goes into the public domain. That way our user group can maintain the product."

Southwest Software's Zeke is said to be similar to Cambridge Systems' ADC2 package in that both IBM mainframe schedulers run under MVS and MVS/XA and offer ease-of-use features. The five-year support guarantee applies to all of Southwest Software's other products as well.

Uccel recently told ADC2's installed base of 130 that support will be phased out by December 1988 so that the merged firms can focus on UCC-7, a package from Uccel [CW, March 9]. Uccel acquired Santa Clara, Calif.-based Cambridge Systems in December 1986.

Uccel said it did not seek to simply eliminate a competitive product when it acquired Cambridge, adding that the firm will also discontinue support of its own UCC-3 mainframe disk-management system in favor of Cambridge's Automated Storage Management package.

Anticipating the ire of users, Uccel is offering ADC2 users a free conversion program to UCC-7 basic or a significant discount for a UCC-7 full-function upgrade until April 30.

"ADC2 and Zeke are state-of-the-art packages designed for an interactive environment," Southwest Software's Williams says. By contrast, he adds, UCC-7 was introduced more than 10 years ago in the "batch processing age." Williams says one of Southwest Software's goals in offering ADC2 user incentives is "the market exposure it will bring us."

Bennett says that although his firm's Job Trac installed base is small — about 30 — the company expects eventually to have a large user group that would be able to support the product should bankruptcy or acquisition occur.

'Firms must appease customers'

"This is all unusual, but it's also a reflection of the flux in the industry today," Maureen Fleming, editor of the "Software Industry Bulletin" in Stamford, Conn., says. "Companies are going to have to appease customers that these kinds of problems will not happen in the future."

The guarantees and offers are not as new as their sudden importance as a marketing concept, according to David B. Sturtevant, senior director of public communications for ADAPSO.

At this point, no one is sure how successful these incentives will be. "If 10% to 20% of current ADC2 users go to another product besides UCC-7, I'd be surprised," Bennett admits.

However, there are devoted ADC2 users who are not so sure they are going to give up, regardless of what Uccel or anyone else offers. "We can run ADC2 until it can no longer run," says Rod Chatfield, specialist for production services at General Electric Co.'s Nuclear Energy Division in San Jose, Calif. "When that happens, then we can decide what to do."

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Firm says 32-bit chip handles 17 MIPS

BY JAMES A. MARTIN
CW STAFF

SAN FRANCISCO — Advanced Micro Devices, Inc. (AMD) announced last week that it has designed a 32-bit CMOS microprocessor that can process an average of 17 million instructions per second (MIPS), a speed which AMD claims will "leapfrog" over all existing 32-bit chips.

The AM29000 is "the most significant product" AMD has introduced this decade, according to Tony Holbrook, president and chief operating officer. Because of its speed, the chip will not compete directly with other 32-bit microprocessors such as Intel Corp.'s 80386, Holbrook said. Instead, the AM29000 will be the first of a new generation of high-speed, reduced instruction set computer microprocessors, and the use of CMOS technology will reduce power consumption of the devices, he added.

The AM29000 will be aimed at vendors specializing in Unix-based engineering workstations, superminicomputers, laser printers, network protocol controllers, network communication switching systems and robotics, among others.

Because the high-speed chip will not be in production until early 1988, Holbrook said it was premature to disclose the nature of any talks with hardware or software vendors interested in designing products around the chip. The AM29000 will include software compilers for C, Fortran and Pascal languages, he added.

'Represents evolution'

AMD's announcement "represents the continuing evolution of the semiconductor industry," said Mel Thomsen, a semiconductor analyst with Dataquest, Inc. in San Jose, Calif. "It shows we are learning more about the architecture of chips, and their announcement is very impressive in terms of speed and performance."

The AM29000 features 192 general-purpose register files, more than any other existing 32-bit microprocessor, the company said. The expanded register file minimizes the cycles required for accessing external data. In addition, the AM29000 offers 40-nsec cycle time and an on-chip memory management unit and supports software for real-time and multitasking operating systems.

AMD, which began designing the chip in 1984, said it expects the AM29000 to generate some $200 million in revenue by 1990. The company desperately needs a strong flagship product, and the AM29000 family will be positioned to be just that. AMD recently reported a net loss of $92.5 million for the three fiscal-1987 quarters reported so far.

"AMD might seem like the last kid on the block with a 32-bit microprocessor," said John East, vice-president of AMD's general logic group. "In reality, we're the first kid, but on the next block."

RCA to spruce voice package

BY ALAN J. RYAN
CW STAFF

MORRISTOWN, N.J. — RCA Corp.'s Advanced Technology Laboratories has signed a pact to integrate Verbex Voice Industries Corp.'s Verbex continuous speech technology in its research and development projects.

RCA engineers will reportedly enhance and extend the technology for voice interface to complex government and military systems applications. "They have a staff of people in the speech lab and in the artificial intelligence lab, and their charter is to develop and enhance the voice recognition as well as other elements of artificial intelligence for various government projects," said John Ferretti, vice-president of sales and marketing at Verbex. Some of those projects are for the National Aeronautics and Space Administration, the Department of Defense and applications that are relevant to the military, he added.

Before formulating the deal, RCA had worked with Verbex's products in its Moorestown, N.J., facility. "They were using it in their AI lab and decided that there was enough in the base technology for their specific applications . . . that they wanted access to the technology itself," Ferretti said.

The Verbex 4000, which is currently marketed by Verbex, is an industrially hardened unit, or one that has been designed specifically for industrial environments, Ferretti explained. It has a maximum vocabulary of 100 words and works on continuous voice recognition but is speaker dependent.

"The algorithm is particularly suited to noisy environments. A great deal of work was done to fine-tune the algorithm to distinguish noise from valid words or utterances," Ferretti said.

The Verbex product is basically an RS-232 peripheral. "It has an asynchronous port which allows it to work with any computer with an asynchronous communications protocol," Ferretti said.

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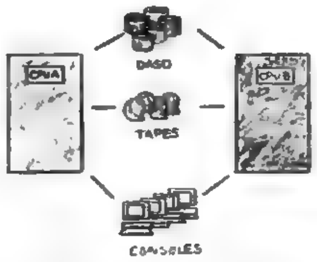

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IBM display interface tops slated graphics show rollouts

BY ALAN J. RYAN
CW STAFF

PHILADELPHIA — In a move that may help establish the graphical kernel system (GKS) as a standard, IBM is expected to announce an interface to that system for users of its Graphical Data Display Manager (GDDM) mainframe graphics system at the National Computer Graphics Association's (NCGA) Computer Graphics '87 conference and exposition here this week.

Developed by Uniras, Inc. in Copenhagen and Dallas and IBM UK Laboratories Ltd., the applications programming interface was first announced by IBM at Cebit '87, the international technology trade show held in Hannover, West Germany, earlier this month.

By using GKS, "I think IBM is perhaps legitimizing it somewhat in the mainframe environment by making it available through GDDM," said Reuel Warkof, a program manager at Uniras's Burlington, Mass., office. Uniras wrote the interface, he said.

The interface allows access to the graphics components of GDDM, Warkof explained. He said GKS, a national and international standard for two-dimensional graphics, is a programming application option to GDDM.

Prime to add 3-D terminal

Also expected to be announced at the NCGA show is a workstation with a three-dimensional display from Prime Computer, Inc. in Natick, Mass.

Prime said the unit will be targeted at discrete manufacturing, automotive and aerospace industries. Prime developed the product with Silicon Graphics, Inc. in Mountain View, Calif., and MIPS Computer Systems in Sunnyvale, Calif.

The PXCL 5500 workstation is Prime's first offering in an engineering/scientific graphics workstation product line, according to spokesman Paul Labelle. He said it employs Prime's implementation of AT&T's Unix System V, Release 3 operating system.

The unit reportedly incorporates a highly optimized reduced instruction set computing processor and is linked to a graphics subsystem based on four custom and three semicustom graphics processors. Its standard configuration "provides maximum 3-D graphics performance by incorporating 37 of these graphics processors in parallel architecture," the Prime spokesman said.

One fully configured workstation can accommodate up to 12M bytes of main memory, 24 color planes that provide a palette of 16.7 million colors, four additional bit planes for window management, pop-up menus, overlay and underlay functions, a 24-bit buffer for hidden surface removal and a variety of input and output devices, the vendor said. In its standard configuration, it sells for $74,900.

Other expected announcements include the 3308 Imageserver XP laser printing system from Imagen Corp. in Santa Clara, Calif., and two graphic display product families from Ramtek Corp., also in Santa Clara.

Imagen's printing system, set to sell for $10,950, includes a laser printer marking engine, performance-optimized Raster Image Processor, host-to-network interface and system software. Shipments are slated to begin this month.

The system, which features 8 page/min throughput, was designed for use in work-group environments of two to four users as a shared print resource, the vendor said. It is claimed to work with a variety of host devices through serial, parallel or network-interface attachments.

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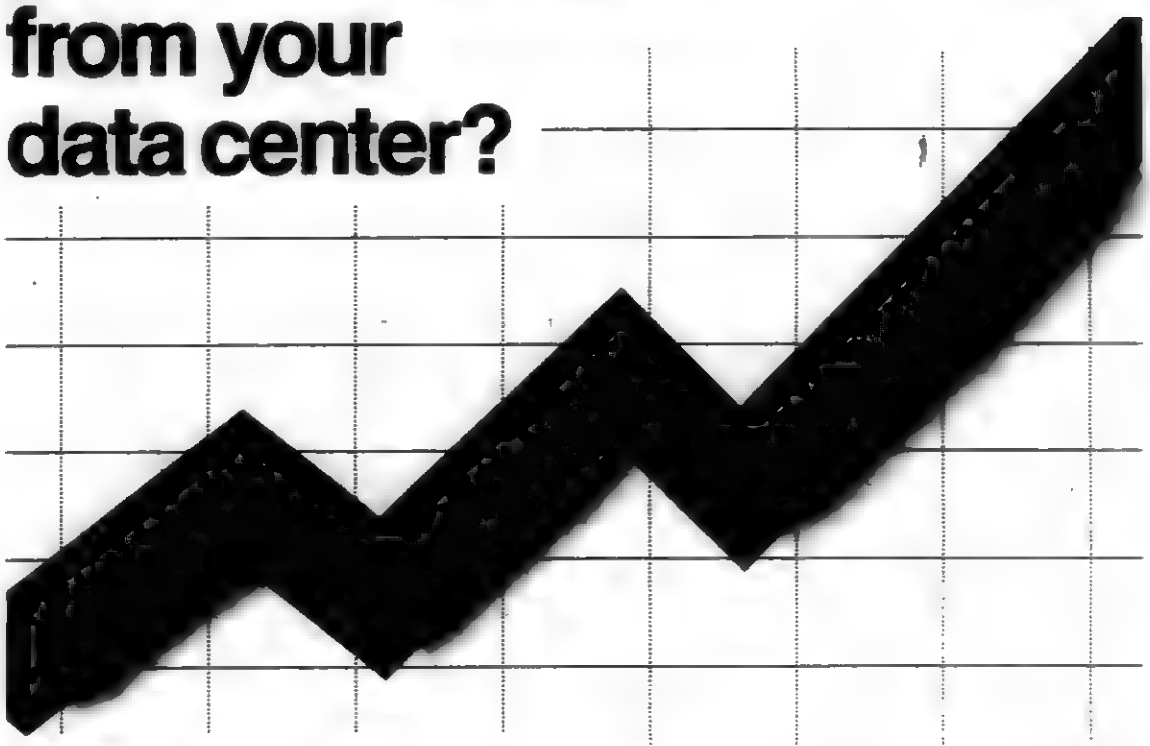

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EDITORIAL

Avoiding chaos

IBM is finally set to take dramatic action to recapture the control of personal computer standards that has been slipping away for the last two years. The industry is nervously awaiting an early-April announcement of new IBM Personal Computers that will be more difficult to clone because they will include proprietary graphics and communications.

The industry has reason to be nervous.

Any attempt by IBM to limit its PC architecture at this point is fraught with risk, not only for clone makers and PC buyers, but for IBM itself. Millions of PCs, PC XTs and ATs are now installed. If IBM gives those users anything less than a clean migration path to its new machines, it will create a potentially devastating schism in the industry.

Unfortunately, we can't be sure IBM won't take that route. The company's track record of PC innovation has been mixed. The original PC and PC XT were, of course, smash hits, and the PC AT has continued the tradition of spawning new markets and imitators.

However, IBM has had its failures in the PC market. In addition to the flops — the PCjr and Portable PC — a host of other machines have fallen short of expectations: the PC XT Model 286, 3270-PC, PC XT/370 and PC AT/370.

These slow-selling products shared some basic flaws: They were either too expensive or incompatible with other PCs. For the company to truly establish a new PC standard, we believe the machines must meet several basic criteria:

100% software compatibility. All existing PC-DOS applications must run on the new hardware with no modifications.

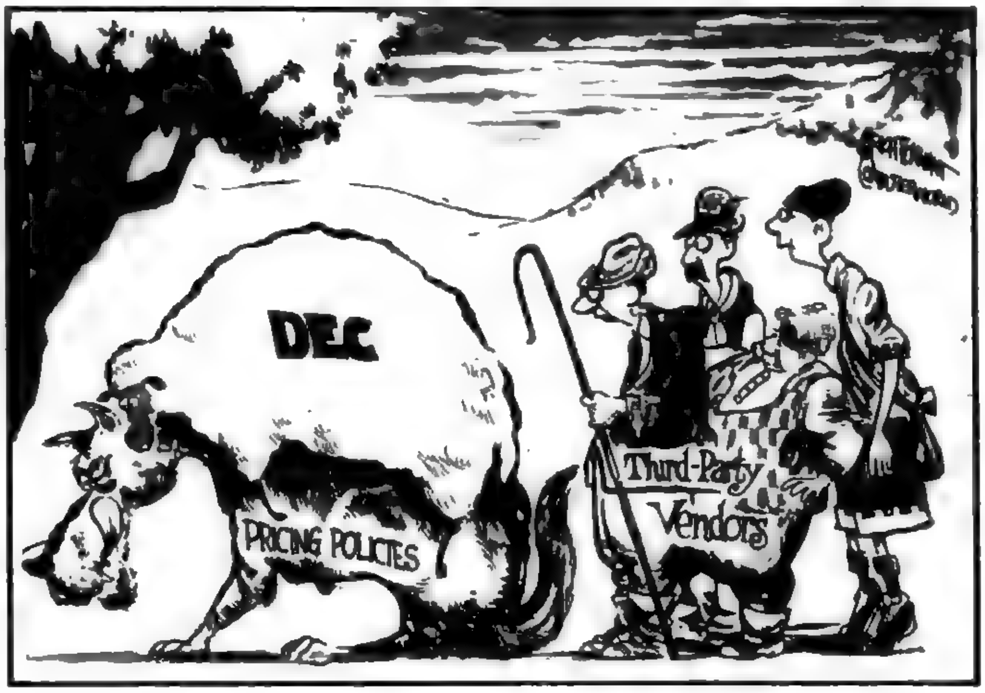
100% hardware compatibility. The PCs must in some way accommodate the millions of installed add-on boards and peripherals.

Aggressive pricing. The IBM price umbrella must be folded. A machine that is based on Intel Corp.'s 80286 and priced higher than the current AT will not sell unless it delivers major functional improvements.

An economical way to use 5¼-in. disks. Corporations have distributed millions of templates and programs on 5¼-in. media. IBM wants to move to the more advanced 3½-in. technology but must allow its customers to move with them.

A continued commitment to the 80286. IBM should not abandon the 80286 architecture before an operating system that takes advantage of it becomes available sometime next year. To keep software developers developing and users using the PC AT, the company needs to keep enhancing it. Radical innovation and architectural changes should be made in the 80386, where IBM can still set standards.

Those who remember the agony users experienced moving from the IBM 1401 to the 360 architecture almost a quarter of a century ago will well remember the chaos that incompatibility can cause. A base of nearly 10 million fiercely independent users will not stand for a repeat performance.



LETTERS TO THE EDITOR

The 20 Questions

Regarding your article, "Bill filed to delay tax change" [CW, Feb. 2], about tax legislation affecting independent contractors in the computer industry: The legislation requires contractors to be employees of the broker that placed them only if the contractors cannot meet certain standards. The standards are based on common law, and they are embodied in the Internal Revenue Service's criteria for independent contractors, called The 20 Questions.

This point is very important. One does not have to become an employee unless he or she cannot meet the standards in The 20 Questions. No one is at risk, not client, broker or contractor, if the contractor can meet these standards.

Contractors in the computer industry have been exempt from the standards since 1978. All Section 1706 does is remove the exemption for contractors who work through brokers. That's all. It simply makes contractors subject to the usual common law standards for independent contracting.

Michael Bradley
Technical Writers
Trade Group
National Writer's Union,
Local 3
San Francisco

Cutting on the bias

Your article, "Users back IBM mid-range strategy" [CW, Feb. 23], reminded me of something that has been bothering me about your newspaper for the past couple of years. While it is an industry consensus that your newsweekly is the most comprehensive, it is also the most biased. Your bias is against the vendor that most of your readers have installed — IBM.

There are many IBM customers who buy IBM equipment because it is the best equipment in the industry, not because IBM is a safe choice.

Take the 9370 for example. Now that IBM has announced a mid-range product that not only offers the best price/performance in the industry, but provides its customers with the widest compatible product line in the industry, *Computerworld* does not praise IBM with the same enthusiasm it criticizes. Instead, you search for something in the 9370 to criticize.

If you evaluate benchmark tests performed by the Argonne Labs, you will see that a 2.7 million instruction per second (MIPS) IBM processor does more work in a specified period of time than a Digital Equipment Corp. 6.0 MIPS processor. Additionally, IBM maintenance costs are significantly lower than DEC's. Maintenance on a 9370 Model 60 with 1,104M-byte direct-access storage drive, a tape drive and four communication lines is approximately $500 per month. The bottom line is that the IBM 9370 product line offers better price/performance than DEC, but *Computerworld* has yet to point that out.

The 9370, with its System/370 architecture, is completely compatible with IBM's large processors such as the 4381, 308X and 3090. This compatibility makes implementation and management of a 9370 distributed network much more cost effective for current IBM customers than DEC's. Software development can be handled centrally from the IBM host and distributed electronically to the 9370s. Anyone can do this, but what IBM can do that their competition cannot is manage the distribution of application and system software. Timetables can be set up to automatically update software releases on the 9370 and log those changes in a master log. This simple function can eliminate the No. 1 nightmare of a distributed network: software distribution management.

There is a lot of good that IBM is doing with its products and product strategies that you seem to ignore. *Computerworld* should concentrate more on the positive aspects of the computer industry rather than dwell on the negative.

M. C. Heiblum
New York

This week in history

March 21, 1977
Sens. Edward Kennedy (D-Mass.) and William Roth Jr. (R.-Del.) introduce a bill to establish a computerized system for dispensing information on federal domestic assistance programs to state and local governments. The proposed act would provide a single source of current data on federal grants and loans.

March 22, 1982
Product manangers reveal in a survey that data dictionary's function is expanding to encompass management of the entire corporate data resource, rather than just the data in the data base management system.

IBM Japan, Superperformer, to the rescue

More powerful than an 80386 chip, able to leap tall competitors at a single bound . . .

CHARLES P. LECHT

On the cover of last month's *Tokyo Today*, an English-language monthly dedicated to Japan's business community, there is a large picture that suggests Superman — but this time "IBM" is written on his chest instead of the big "S." The figure's fist thrusts out of the center of the page — he's on the attack — and a group of cowering people are fleeing from his onslaught.

The headline reads, "IBM Japan to the rescue," but we don't know who or what is being rescued until we turn to page 16 and read the title of the lengthy article — "IBM Japan: Going to the head of the class." The class is the IBM corporate giant, headquartered in Armonk, N.Y.

Whether or not IBM Japan is in fact rescuing the rest of IBM is debatable; what is not debatable is that IBM Japan is an enormously successful company, a superperformer by any standard. In the race for supremacy in the world computer industry, IBM Japan is a highly perfected business machine with an unbeatable track record.

Since the end of World War II, IBM Japan has repeatedly won the race for computer industry profits in Japan. In doing so, it grew to become one of the largest computer companies in the world. (Slightly under $6 billion is the current estimate for fiscal 1986). That it lost market share to an ever-growing field of competing Japanese companies as it grew is deceptive in its implications; in the beginning there was no competition at all.

Government subsidization

It is an unquestionable fact that the growth of the home-based Japanese computer industry was nurtured by the Japanese government, which wisely financed its constituents from the onset. Thus, in addition to competition from the companies themselves, IBM Japan also had to contend with the Japanese government's subsidization of Fujitsu Ltd., NEC Corp. and Hitachi Ltd.

The fact that there are many IBM systems in Japanese governmental agencies and that they continue to be purchased despite the availability of home-grown alternatives speaks for the success of IBM Japan in prevailing against its government-subsidized antagonists.

This fact also confirms that the Japanese companies and their government sponsors have not acted as a unified force to unseat IBM Japan as its industry leader. The way Japanese companies deal with one another and their government gives us the purest meaning of the word "competition."

That IBM Japan's record is what it is today, given the no-holds-barred competitive environment in which it was achieved, is nothing short of miraculous. To become a believer, consider the last five years of outright legal warfare between IBM and the leaders of Japan's home-grown computer industry.

According to revenue estimates for 1986 and stating all dollar amounts using the average exchange rates for each year starting in 1982 and ending in 1986, IBM Japan grew from $1.9 billion to $5.7 billion.

During the same time, the Japan unit's contribution to IBM's total corporate revenue rose from 5.7% to 11.3%. IBM Japan achieved this performance while its profits rose from $142 million to $375 million.

The methods employed by IBM Japan to reach these results are as imaginative as they are successful. While the company employs slightly fewer than 20,000 people, it keeps legions of others involved in promoting its welfare.

For example, IBM Japan has 119 firms — 17 of sufficient size to be listed on the Tokyo Stock Exchange — selling its products. In the past two years, it created joint ventures with five Japanese firms and one based in the U.S.

IBM Japan's product lines include the gamut of products sold in the U.S. and more. I say "more" because the IBM Personal Computer 5540, 5550 and 5560 systems, which are unavailable in the U.S., are essentially superior to U.S offerings — the PC, PC XT and AT.

'Japan-ization'

Certain computer products made by other vendors are more popular than the IBM Japan alternative; these, for the most part, are in the mid- and mini-ranges. Much of this situation can be traced to the lack of "Japan-ization" of IBM Japan's offerings and the marketplace characteristics of companies that acquire them.

For mid-range systems, IBM Japan ranks fourth in installed base and fifth in minicomputers. But for large mainframes, IBM Japan is now and has always been No. 1, commanding 32.6% of the installed base; its closest rival, Fujitsu, holds less than 24%. IBM Japan's success in this area shows that its management placed its emphasis where it counts.

IBM Japan's 1986 sales were adversely affected by the sudden increase in the value of the yen. They remained essentially flat as the year wore on. 1986 was a year of retrenchment in Japan, so new capital expenditures for computer systems suffered as did sales for all manufacturers.

But 1987 is expected to show major improvement. People believe that the yen has peaked, or, if it has not, that future increases will be marginal. *Tokyo Today* forecasts ". . . a brisk sales growth of 10%."

IBM Japan's spectacular performance, while the rest of collective IBM goes on an austerity program to counter the business downturn, is ironic. The marketplace Americans most criticize as closed to their businesses is proving itself as anything but for the U.S.'s flagship computer company.

Lecht is chairman of Lecht Sciences, Inc./Japan, a Tokyo-based software think tank specializing in graphics. He is also an elected public member of the Hudson Institute and a free-lance science writer.

Expert systems technology teaches the uses of artificial intelligence

EFREM MALLACH

In 1896, George Santayana wrote that "the whole machinery of our intelligence . . . are so many symbolic, algebraic expressions. They stand for experience . . . which we are incapable of retaining and surveying in its multitudinous immediacy. We would flounder hopelessly, like the animals, did we not keep ourselves afloat and direct our course by these intellectual devices."

Santayana was not referring to artificial intelligence as we use the term in computing nearly a century later. Yet his words are surprisingly apt. An artificially intelligent system can store a great deal of experience as symbolic expressions and survey them in their "multitudinous immediacy." Managers dream that such systems may stop us from "floundering hopelessly" among the strategic and tactical decision alternatives we face every day.

The question for MIS managers is not whether artificial intelligence will become a reality in their shops, but when. AI promises benefits and has risks, as does any emerging technology. Those who delay moving into AI because of the risks also delay the benefits. If they wait until the technology is fully proven, competitors will reap its advantages. Leaving the gate when competitors are halfway down the course is as great a handicap in business as it is in athletics.

A happy medium

A way out of this dilemma is to find an initial application that lets firms get their toes wet in AI without significant risk. Some firms won't bet the factory on new technology but would try it on the seating plan for the annual company picnic. Between these extremes lies a happy medium in which success is meaningful and failure is not disastrous.

A good place to seek a candidate application is in expert system technology. This aspect of AI is approaching commercial maturity most rapidly. Reduced to essentials, an expert system consists of a knowledge base of rules and relationships among facts, an inference engine to work through the rules and a set of facts to which the inference engine can apply the rules.

Compared with conventional programs that apply the same rules to the same facts, expert systems differ primarily in separating the rules and relationships from the inference logic. This difference makes it feasible to use a smaller program to control the processing, codify the knowledge of scarce human experts directly in the rules and change the rules without changing the program itself. What we want is an expert system application that doesn't risk corporate survival.

System performance optimization is such an application. If we use AI to tune mass storage and it works, we're ahead. If it doesn't, we restore last week's setup. We have wasted effort but not jeopardized the corporate lifeblood. Whatever the outcome, we learn about a technology that will soon be with us.

Performance professionals have reached the same conclusion. Boole & Babbage, Inc. Senior Vice-President Jack van Kinsbergen feels "expert systems-based performance measurement products are a natural extension for firms in the performance measurement and management industry." They are valuable because many variables affect performance; these variables can interact in seemingly infinite ways, and people who understand the implications of the interactions are rare.

Van Kinsbergen's firm recently introduced DASD Advisor to "act as a guru" for IBM MVS sites that lack mass storage optimization expertise. "When expert systems-based real-time performance products are available," he says as he moves on to the next generation of such tools, "they will represent a dramatic improvement for the DP organization as well as the corporation it serves."

Advisory approach

Jim McGuire, vice-president of products and marketing at BGS Systems, Inc. draws a distinction between systems that advise and systems that take over. "It is one thing to use AI to completely answer a problem," he says. "That's tough. It's another to use AI to propose, to suggest. That's do-able." McGuire's advisory approach supports the concept of using performance optimization to introduce AI to the corporate environment. People can learn from such a system by observing its suggestions and how they vary with changing conditions.

One need not have an IBM mainframe to benefit from expert performance-analysis systems. Digital Equipment Corp. recently announced VAX Performance Advisor for system tuning. It takes performance facts from other system monitoring software, applies rules gleaned from the knowledge of human experts and produces reports for system managers. With a product announced by one departmental system vendor, can others be far behind?

In most DP shops, performance analysis is a second-class citizen. It does not get the attention it should. Many MIS managers spend $500,000 on new hardware rather than $50,000 to get the same performance from the hardware they already own.

One reason is the scarcity of expert performance analysts. Here, then, is a marvelous opportunity: To learn about a new technology painlessly and at low risk and to do a better job of managing resources at the same time.

Mallach is associate professor of computer science at the Boston College School of Management and a consultant to top managers of vendor and user organizations.

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Henry Firdman

Use English to sell AI

About three years ago, the artificial intelligence business started, with a euphoric belief that potential customers would fall down on their knees — and untie their purse-strings — as they saw AI gurus coming down from their ivory towers and bringing the truth to plain and dull people.

If you think that this is an exaggeration, just read Teknowledge, Inc.'s commercials of that time. Unfortunately, it did not happen. Plain people did not share the AI gurus' optimism. And they did not buy. They turned out to be very, very smart.

One of the major reasons for such a cool reception is an educational gap. Hardware sales agents are good at talking about things like tagged architecture, hardware-based garbage collection and flavors.

Software sales agents can talk about forward vs. backward chaining, rule-based vs. frame-based technology and how hy-

Continued on page 27

IFPS/Plus revision debuts

Natural language query, response capabilities among enhancements

BY CHARLES BABCOCK
CW STAFF

AUSTIN, Texas — Execucom Systems Corp. has announced that Version 3 of its widely installed decision-support system, IFPS/Plus, includes rules-based programming that provides natural language query and response.

Currently in its 13th release in as many years, IFPS/Plus is a business modeling and analysis tool able to process "what-if" and "how" queries against a previously contrived financial model. With the addition of rules-based programming, it can ask a natural language question such as, "Why did net income go down in quarter 3?" and receive a response that says, "Because sales in region 4 decreased," according to Execucom spokesman Richard D. Tuttle.

The natural language capability was developed by the Intelligent Systems Lab at Carnegie-Mellon University during a four-year period.

Although Execucom spokesmen could not define the extent of the system's vocabulary, they acknowledged that both queries and responses would be limited to the business terms and relationships defined in the model. The model must be constructed by a systems analyst. Middle managers or executives with a lower degree of computer literacy than previous IFPS users could then make use of it through the natural language facility, according to Steve Murchie, product manager.

The natural language capability was termed the most significant of 250 enhancements claimed for Version 3, Murchie said.

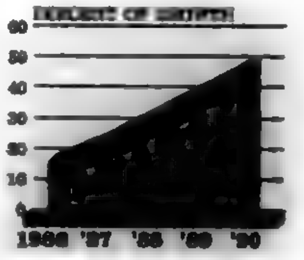
It includes a noise filtering mechanism to screen out vocabulary in a query that does not reflect the definitions in the business model. The system acts on the query at the same time, seeking the underlying meaning of a question such as, "Why did sales get all goofy in quarter 3?" Murchie said.

Continued on page 24

Data View

Cullinet Software, Inc.

Westwood, Mass., firm expects application revenue to grow from 18% in 1986 to 50% of total revenue in 1990



INFORMATION PROVIDED BY CULLINET SOFTWARE, INC.
CW CHART

SOFTWARE NOTES

Compiler for ICL only

Oracle Corp. is developing a version of its relational data base management system to run on International Computers Ltd.'s (ICL) systems using a C compiler that was made developed by Edinburgh University and Edinburgh Portable Compilers "solely for ICL's use," an EPC spokesman said.

Sotas, Inc. in Haverhill, Mass., has bought acquired the Software International Corp. line of financial application software for the Wang Laboratories, Inc. VS system from Computer Associates International, Inc. Computer Associates acquired Software International in December 1986 and is selling off the lines it considers outside its main focus.

Vmark Computer, Inc. in Natick, Mass., has signed a value-added dealer agreement with IBM to sell Vmark's Pick-to-Unix application conversion software on IBM's RT Personal Computer.

Feds focus of Ada tool

BY MITCH BETTS
CW STAFF

SAN JOSE, Calif. — Hoping to increase its penetration in the federal government market, Tolerant Systems, Inc. has announced a software development system for the Ada programming language.

The Tolerant Ada Development System (TADS) is hosted on Tolerant's Eternity series of fault-tolerant, Unix-based computer systems, which are typically used for on-line transaction processing.

"We believe that Ada will open doors to government applications" that can use Eternity's architecture, according to Tom E. Banks, Tolerant's director of marketing.

The Ada language has been mandated by the Department of Defense for use in mission-critical systems.

Tolerant is seeking to do busi-

Continued on page 27

Inside

- On-Line Software International unveils Ramis version. Page 23.
- DEC signs pact with Soft-Switch to co-market servers. Page 23.
- Systems [redacted] sociates introduces software that predicts repair time for electronic systems. Page 30.

4GL tests, debugs, compiles CICS applications

BY CHARLES BABCOCK
CW STAFF

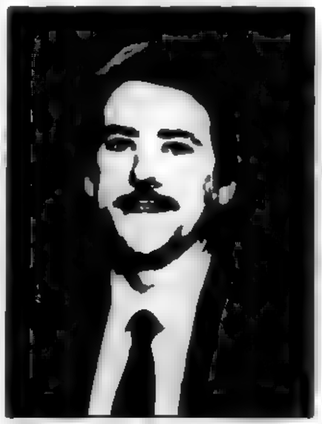
LOS ANGELES — Phoenix Software Co. is offering a fourth-generation language that allows a programmer to interactively test and debug a CICS program during development, then compile it for running in batch mode.

The language, Cygnet, has been available for a year and is installed at 25 sites. Users report that they can develop applications that can run either as stand-alone programs or under IBM's CICS teleprocessing monitor. While other fourth-generation languages can be used to generate CICS applications, most are interpretive rather than compiled, Phoenix Software and industry representatives said.

Cygnet includes its own teleprocessing monitor that permits the stand-alone mode — a one-statement change in the application denoting CICS as the teleprocessing monitor, followed by a recompile, converts the application to CICS, according to James W. Miles, Phoenix Software president.

"Cygnet came out at just the right time for us. We were planning on bringing in CICS and another fourth-generation language when we found we could just use Cygnet," said Russell A. Wong, vice-president of data processing at Lenders Real Estate Tax Services (Lereta) Corp., a Van Nuys, Calif., mortgage-status tracking firm for savings and loans. "We may bring in CICS at a later date. If we do, we will just recompile under Cygnet."

The DOS version of Cygnet costs $25,000, and the MVS version is priced at $35,000. Choosing Cygnet saved the 30-employee Lereta the expense of installing CICS and the system overhead it would represent on the firm's IBM 4341 processor.



Phoenix Software's Miles

Development with Cygnet is similar to developing a batch program, except the programmer is working in a fourth-generation language with only 18 instructions; hence, he does not need to know CICS command-level code or other CICS requirements, Wong pointed out.

Existing CICS applications can be incorporated into a Cygnet application by invoking a Call command. The applications may be written in Cobol, PL/1 or Assembler, Miles noted.

During development, the programmer can make use of interactive trace and debug facilities that show the data accessed and variables used. A Cygnet application can be debugged, tested, compiled and link edited on-line in a fraction of the time it would take to perform the same functions in batch mode, Miles noted.

Cygnet includes the library of a predecessor Phoenix product, Condor, an on-line development and source code management system. The library maintains up to 16 copies of a program and provides an audit trail for program changes, Miles said.

In addition, Cygnet contains the full-screen editor from Condor and a data dictionary. Lereta's Wong said the language allows a developer to produce a batch program "without leaving the on-line environment. A few days' training in Cygnet is adequate for a qualified Cobol programmer."

Cygnet applications are also "quasi-re-entrant. . . . One copy can be used by several people at the same time," saving system resources, Wong added.

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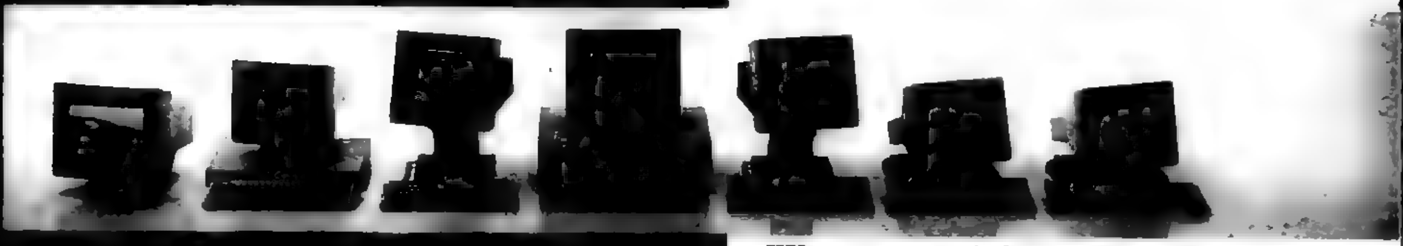

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On-Line offers Ramis system for PC users

BY ALAN ALPER
CW STAFF

FORT LEE, N.J. — On-Line Software International, Inc. has unveiled a version of its newly acquired Ramis fourth-generation language and data base management system for IBM-compatible personal computers that provides micro-to-mainframe information management.

Called Ramis/PC Workstation, the package features a relational data base manager, a fourth-generation language report writer, a workstation manager and a micro-to-mainframe link.

Featuring pop-up menus, Ramis/PC Workstation has an open architecture and can be used with most PC spreadsheets, graphics and word processing programs, according to On-Line Software spokesmen.

Aimed at departmental end users, Ramis/PC Workstation operates on IBM Personal Computer XT- or AT-compatible systems running IBM PC DOS 2.0 and Microsoft Corp. MS-DOS 2.11 — or later versions — with at least 512K bytes of memory.

Stand-alone or mainframe use

Ramis/PC Workstation can be used as a stand-alone information management system or in conjunction with Ramis Information System on a mainframe.

From Ramis/PC Workstation, users are able to enter Ramis mainframe applications with a single keystroke without leaving the workstation environment, according to On-Line Software.

The package works under a variety of IBM mainframe environments, including VM/CMS, MVS/TSO, CICS — under both MVS and DOS/VSE — and ICCF under DOS/VSE.

In addition, it runs in VTAM/NTO and TCAM, On-Line said.

Available immediately, the package lists for $375, according to Jonathan Smith, product marketing manager.

Targets varied experience levels

Using menus and no syntax, inexperienced users can develop their own applications and create and customize reports.

Experienced users can go back and forth between the mainframe and PC, providing a means of distributing computing activities within a corporation, Smith added.

Sophisticated users can use the PC for prototyping mainframe applications and creating smaller, stand-alone applications when needed, Smith said. Data can be uploaded and downloaded to and from files and data bases accessible to Ramis Information System.

Ramis was acquired by On-Line Software from Martin Marietta Data Systems, Inc. last year. Martin Marietta acquired what was then known as Ramis II when it bought the Princeton, N.J., software firm, Mathematica Products Group, Inc.

It is widely used in information centers and competes with Information Builders, Inc.'s Focus.

DEC, Soft-Switch to tie All-In-1, Profs

BY NINAMARY BUBA MAGINNIS
CW STAFF

MERRIMACK, N.H. — Digital Equipment Corp. and Soft-Switch, Inc. recently signed a cooperative marketing agreement to sell Soft-Switch Mailbridge servers that transparently link IBM's Professional Office Systems (Profs) networks to DEC's All-In-1 mail systems.

With Mailbridge servers, users can exchange Profs documents and All-In-1 messages. All-In-1 users do not require any IBM training to operate under Mailbridge, according to the vendor. When Mailbridge servers are installed throughout a network, DEC users can send electronic mail to the server, which automatically routes mail to recipients — regardless of the hardware they are using.

The Mailbridge announcement broadens DEC's All-In-1 connectivity, which already includes an IBM Distributed Office Support System connection, Vaxnotes conferencing, X.400 Open Systems Interconnect gateway, AT&T's Unix System V Interconnect, Telex Message Router and Wang Laboratories, Inc.'s office systems, DEC said.

An installation requires two Mailbridges, one on the DEC system and another on the IBM host. For final form interchange, the Mailbridge Server/DEC and the complementary Mailbridge Server/Profs are both priced at $18,000. A revisable form support that allows the interchange of fully editable documents between DEC and IBM systems costs $14,000.

Mailbridge servers are slated to be available from the King of Prussia, Pa.-based Soft-Switch for immediate delivery. Soft-Switch provides service and support for its software.

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Microbasis broadens user interface

BY CHARLES BABCOCK
CW STAFF

DUBLIN, Ohio — Information Dimensions, Inc., maker of the Basis mainframe text management system, has added a window-oriented user interface to its microcomputer product, Microbasis.

Microbasis Version 4 is intended for retrieving text distributed on compact disks and is available immediately for use in reading read-only compact disks, the firm said.

Microbasis is dubbed onto each compact disk at a license charge of $25 per disk. It is used primarily by existing Basis customers who wish to distribute text and information for use on Microsoft Corp. MS-DOS personal computers and the Digital Equipment Corp. Microvax, according to William G. Griffith, Information Dimensions president.

Microbasis was first issued two years ago but has been upgraded to incorporate greater ease-of-use features. The window-oriented interface provides pop-up menus and function keys or a numeric keypad to perform search and retrieval functions, explained Steven H. Clark, Information Dimensions vice-president.

The software package can manage text on a 550M-byte hard disk and requires 512K bytes of random-access memory on a PC. Information Dimensions, a subsidiary of Battelle Development Corp., is developing interfaces to Wang Laboratories, Inc.'s office systems for release in the middle of this year and DEC's All-In-1 office system for release in September, Clark added.

In addition, Microbasis offers a clipboard function to enable users to extract and tag retrieved data with time and source labels. Users are able to comment on extracted information to be written to MS-DOS files, allowing quicker assembly of bibliographies, ad hoc reports, product ordering information and other such materials, Information Dimensions officials said.

Microbasis reportedly offers the same query language as the mainframe product to perform text searches for key words and expressions. Searches may be conducted by word prefix, suffix, embedded character strings, single term, multiple term and word proximity.

Griffith said Information Dimensions believes that systems like its mainframe product, Basis, should be referred to as text information management systems to indicate the documents stored in them include numerical data and, in the future, images as well as text. Griffith said his company will press to get the phrase accepted as the industry's way of referring to text management systems.

Information Dimensions recently signed a cooperative marketing agreement with DEC.

IFPS/Plus

CONTINUED FROM PAGE 19

Other features of Version 3 include the following:

- User-defined full-screen forms to be used in supplementing applications with custom forms for data entry, prompts and messages.
- Personal computer-oriented features in the PC version of IFPS incorporated into the mainframe version's modeling language. Case management, for example, allows a user to save, maintain and update "what-if" cases and models.
- Applications driven by data stored in tables in the built-in relational data base management system allow users to design multidimensional applications.
- Improved interrogation of multidimensional models. The nonprocedural modeling language has been extended with new ANALYZE, GOAL SEEK and OUTLINE commands. ANALYZE is designed to reveal relationships behind the results to show the interplay of various factors in the model. GOAL SEEK is designed to find the performance level needed to achieve a targeted result. OUTLINE provides a graph of the hierarchy of components that went into a consolidation, Execucom explained.
- A DIAGRAM command creates a flowchart depicting which variables went into creating a particular result yielded by the system. An AGAIN command allows another analysis to be performed after the change in a variable or variables, spokesmen said.

Business models may contain up to 8,000 variables and hundreds of nodes or levels in a consolidation. A node is often a geographic territory, product line, unit of activity or an organization chart, Murchie said.

IFPS has sold 1,600 licenses during its lifetime at current prices that range from $9,000 on the low end of the Digital Equipment Corp. VAX line to $85,000 on IBM mainframes running MVS/TSO or VM/CMS operating environments.

In addition, Execucom has sold 15,000 microcomputer versions of the product.

Execucom was acquired in 1986 by Travelers/Diebold Technology Co., a joint venture of the Travelers Corp. in Hartford, Conn., and the Diebold Group, Inc. in New York.

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CONTINUED FROM PAGE 19

brids such as Intellicorp.'s KEE system, Inference Corp.'s ART or Carnegie Group's Knowledge Craft can do it all. However, most salespeople generally fail to explain to customers why they need to know all of this. Unfortunately, both end users and salespeople know little about how to take advantage of expert-system technology.

The problem must be solved by focused training of both vendors and end users. In addition to seminars and training courses, training must involve joint expert-system development. However, many companies follow the path of least resistance: They sell tools to educated AI professionals rather than to end users. As a result, they shrink their own market.

Teknowledge is one of the few companies that recognized the danger of the easy way quite early. Teknowledge started joint ventures with customers showing them how expert-system technology can affect customers' bottom lines. As a result of hard work with customers, Teknowledge had its first profitable year in 1986.

Symbolics, Inc. is one of the few companies that has not recognized the dangerous situation. At a press conference in Boston last fall, both Russell Noftsker, Symbolics' president, and Bruce Rusch, vice-president of marketing, spent much time selling very large-scale integration CMOS gate array technology and boasting of Symbolics' technological superiority over an unnamed company identified by others as Texas Instruments, Inc.

This is fine, but it does not replace hard work with end users. So far, Symbolics has not been very instrumental in that endeavor.

Symbolics' show could excite some analysts, but plain customers turn out to be smart again. If nothing changes, Symbolics will remain an undisputed leader in the research and development market, but it will hardly improve its position on the vertical commercial market as it is desperately seeking to do. The question is, "How long it is going to take to saturate the R&D market?"

The controversy is clear: Horizontal companies develop tools, but end users need end products. The solution is obvious: In order to advance, horizontal companies must arrange communication with end users in user language, with training a must.

Joint expert-system development will most likely achieve that goal.

Ultimately, the solution may be found in a matrix company. By a matrix company, I mean the company that acquires expertise in a variety of — and eventually, in all available — hardware and software tools and, based on that expertise, develops a variety of applications for vertical markets. Typically, the matrix company is not a hardware or software vendor. The matrix company's service must be quite comprehensive.

A matrix company is not a fruit of my imagination. Such companies appear, but not in the U.S. At the European Conference on AI in Brighton, England, last fall, there were at least two companies with promise to become matrix companies.

AI Ltd. started as a reseller and supporter of Xerox Corp. 1100 LISP machines and software running on them, but now the firm also supports software tools running on IBM Personal Computers. In the near future, this company intends to support Intel Corp.'s Intel Personal Super Computer. It will also develop applications on any of these machines.

Vanilla Flavor Co., founded in April 1986, resells and supports Symbolics 3600, LMI Lambda and TI Explorer systems. It will eventually support most software tools on these machines. It will also support two application systems, Brattle Research Corp.'s Knowledge-Based Text Interpretation System and Reasoning Systems' Refine.

In the U.S., Teknowledge and Carnegie Group, Inc. are close to matrix companies, but with one big reservation: Both are tool vendors and apply their own tools to build expert systems. Sometimes this is fine, but not always: Their tools may be redundant or inadequate or just not cost-effective for an application in question.

I would not be surprised if some big conventional software companies eventually became matrix companies delivering vertical AI products. After all, these companies are experienced in giving end users what they need.

Firdman is the principal consultant in Henry Firdman & Associates, Inc. in Lexington, Mass., and author of the newsletter "AI Through the Looking Glass."

Eyeing

CONTINUED FROM PAGE 19

ness with systems integrators bidding on federal defense contracts, Banks said.

TADS features a production-quality Ada compiler that has been validated by the Pentagon's Ada Joint Program Office, the vendor said, as well as a debugging facility.

Tolerant derived TADS from the Verdix Ada Development System under an agreement with Verdix Corp. in Chantilly, Va.

TADS has a list price of $20,000. A $4,000 runtime license, available separately, entitles users to execute TADS application programs on Eternity systems that do not have the full development software.

Trying with a single financial software system to meet the competing needs of two departments often comes down to a knock-down, drag-out brawl. Satisfying one group usually means compromising the needs of the other. In the end, neither group gets exactly what it wants.

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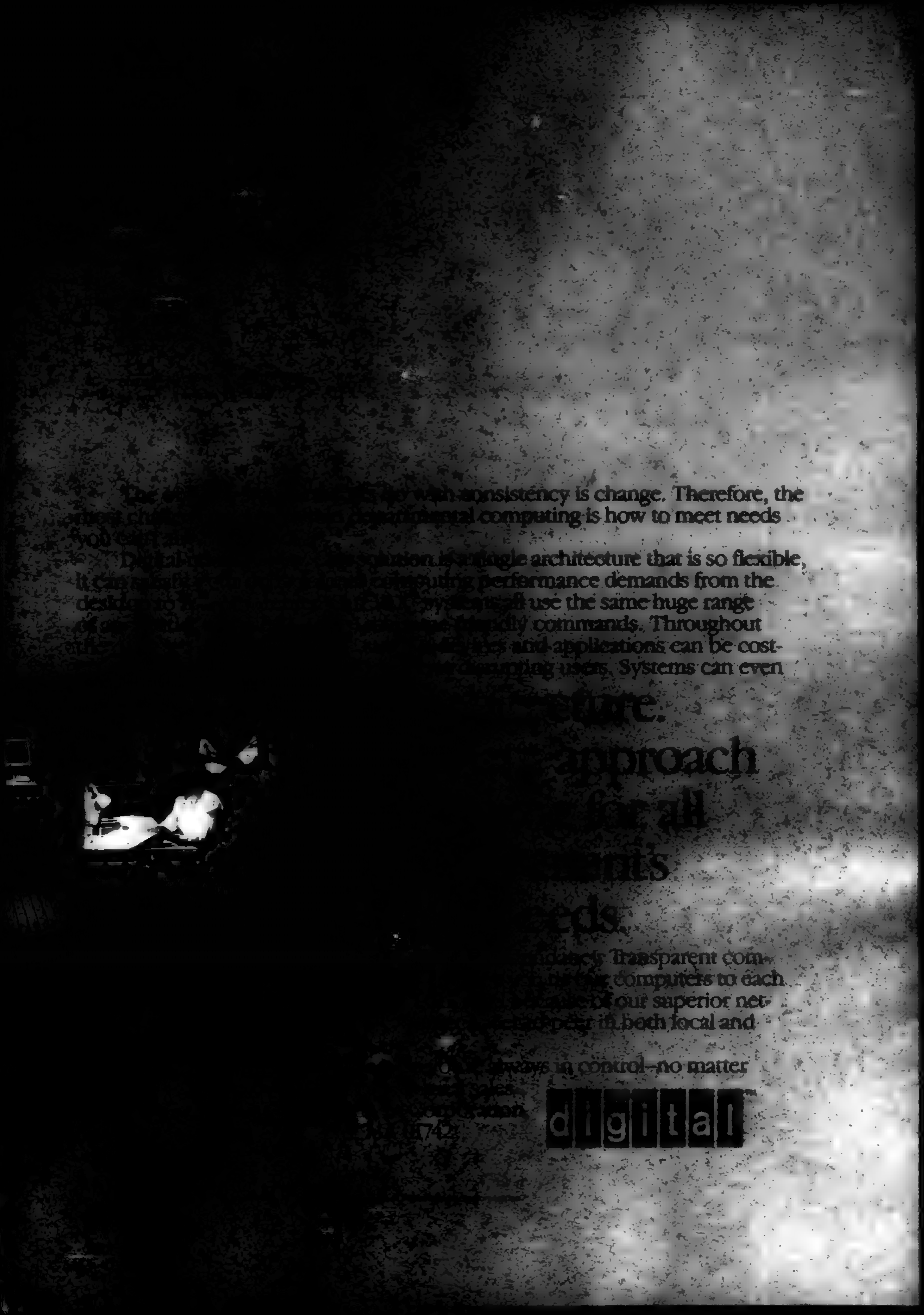

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NEW PRODUCTS

Systems software

Data Retrieval Corp. has ported its **TextDBMS** function-text search system to the Digital Equipment Corp. VAX computer.

TextDBMS is said to provide the ability to enter, store, edit, format, search, retrieve, process, update and publish text. It works with three integrated modules: Textsearcher, Textbuilder and Textcomposer.

A base software system on the VAX 8200 starts at $30,000 for TextDBMS, $27,000 for Textsearcher, $27,000 for Textbuilder and $24,000 for Textcomposer.

Data Retrieval, 8989 North Deerwood Drive, Milwaukee, Wis. 53223.

Tandem Computers, Inc. has announced **Netbatch** and **Netbatch Plus** batch processing software for Tandem Nonstop systems.

Netbatch is a scheduler that provides the ability to automate batch job execution on a Tandem system or across a network of Tandem systems. Batch jobs can be scheduled according to job priority, system load and network configuration. It also keeps a log of batch activity.

Netbatch Plus bundles Netbatch software with DB Batch FE, a batch front-end product from MIS Information Systems, Inc. It adds a full-screen user interface to the functions of Netbatch.

Netbatch costs $1,350 to $2,700 for the initial license with a monthly fee of $100 or $200. Netbatch Plus costs from $1,850 to $3,700 with a monthly fee of $170 or $340.

Tandem Computers, 19333 Vallco Parkway, Cupertino, Calif. 95014.

Applications packages

Systems Effectiveness Associates, Inc. has introduced **Meap**, computer-aided engineering software said to predict the typical time required to repair electronic and electromechanical systems, assemblies and subassemblies.

Meap, which stands for Maintainability Effectiveness Analysis Program, is also said to predict typical downtime associated with each system failure. Meap provides data necessary to compute the cost of ownership, product warranty costs and field service costs. It also evaluates where-to-repair plans. It provides trade-off and "what-if" analysis capabilities.

Meap runs on Digital Equipment Corp. VAX and Microvax II processors using the VMS or MicroVMS operating systems. Prices start at $8,000.

Systems Effectiveness Associates, 20 Vernon St., Norwood, Mass. 02062.

Bradford Information Systems has enhanced its **Interactive Distribution Planning Systems** (IDPS).

Enhancements include an interface to Oracle Corp.'s SQL-based relational data base management system, an additional 1,500 city and town locations in the IDPS data base, time windows for delivery time constraints, modules for distribution analysis and the capability to run on the IBM RT Personal Computer.

IDPS is a distribution and transportation application. It provides software for optimization, analysis, data base management and report generation.

IDPS is priced at $12,000.

Bradford Information Systems, 5608 Woodview Ave., Austin, Texas 78756.

GSC Computer Services, Inc. has announced its **Retail Inventory Management System** (RIMS) designed for the multistore, inventory-intensive retailer.

The system is said to provide an integrated approach to stock control in central and satellite locations. According to the vendor, RIMS offers management control of functions such as automatic stock replacement, purchasing, warehouse procedures and billing.

RIMS is priced from $35,000 to $50,000.

GSC Computer Services, S. Main Common, 87D S. Main St., Newtown, Conn. 06470.

Packagedeal, Inc. has announced its **Accounts Receivable System** for the IBM System/38.

Accounts Receivable System features include multicompany and multilevel reporting; customer balances for future, current and four aging periods; detail and summary analysis reporting; audit reports for all transaction types; calculations for credit limits and average days to pay; on-line inquiry and reporting of customer balance status and statement history; multiple selection screens for custom reporting of data; the ability to select customer information based on 19 different fields; and uncollectable account analysis.

The system is priced at $3,450.

Packagedeal, 6366 Guilford Ave., Indianapolis, Ind. 46220.

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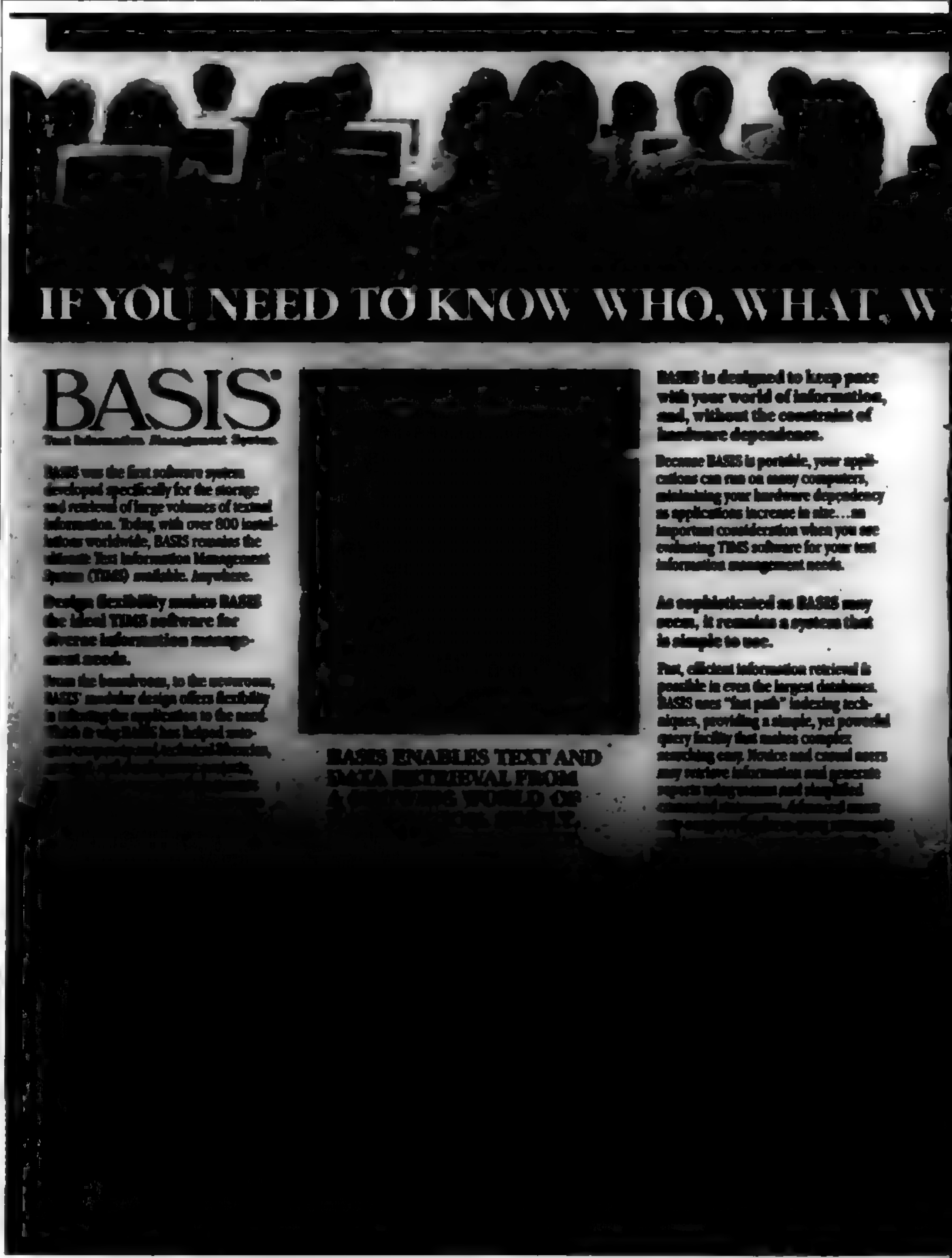

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Fast, efficient information retrieval is possible in even the largest databases. BASIS uses "fast path" indexing techniques, providing a simple, yet powerful query facility that makes complex searching easy. Novice and casual users may retrieve information and generate reports using menus and simplified command statements. Advanced users may compose [illegible] query statements [illegible]

Lawson Associates, Inc. has announced **Release 4.0** of its **Pinstripe** payroll package for IBM mainframes.

Release 4.0 includes the ability to allow noncash benefits, such as company automobiles, to be taxed according to the 1987 Internal Revenue Service tax regulation; the ability to divide an employee's paycheck and deposit it into as many as nine back accounts; to access an individual's paid-to-date and other inquiry records; and to create information for manual checks to be written when necessary.

Release 4.0 of Pinstripe costs $44,000 on DOS systems, $49,000 on OS/MVS systems, $120,000 on SQL/DS systems and $130,000 on DB2 systems.

Lawson Associates, 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

Aspen Technology, Inc. has unveiled **Aspen Plus Release 7.1**, an enhanced version of its chemical-process simulation software program.

Release 7.1 features an optimization package, a physical property equation-of-state and an interface to the physical property data bank compiled by the American Institute of Chemical Engineers.

Other capabilities include distillation and other unit operations, physical properties and electrolytes and flow sheet convergence and costing.

Aspen Plus simulates the performance of any plant with a continuous flow of materials and energy through a network of process units.

Annual single-site license fees range from $60,000 to $100,000.

Aspen Technology, 251 Vassar St., Cambridge, Mass. 02139.

Utilities

Numerical Algorithms Group, Inc. has announced that its **NAG Fortran Workstation Library** offers 172 selected mathematics and statistics routines for implementation on workstations and personal computers.

The 172 routines, taken from the 688 routines in the main NAG Fortran Library include zeros of polynomials, roots of transcendental equations, quadrature, matrix operations, random number generators and mathematical constants.

Each routine includes an example program, the source, data and results to illustrate the routine's usage.

License fees for the NAG Fortran Workstation Library range from $1,296 for a single workstation to $384 each for 11 or more.

Numerical Algorithms Group, Suite 100, 1101 31st St., Downers Grove, Ill. 60515.

Data Base Architects, Inc. has announced **Online Help**, an on-line environment for creating and publishing documentation and instructions in Cullinet Software, Inc.'s IDMS-DC and ADS/Online environments.

Online Help is said to enable users to update and refine system instructions and examples during development. According to the vendor, it delivers field level information at the terminal without loss of the transaction in process.

Online Help is licensed at $15,000 with an annual renewal fee of 15%.

Data Base Architects, Suite 1700, 2101 Webster St., Oakland, Calif. 94612.

Computer Application Services, Inc. has announced **Side-CICS**, a programmer productivity tool for the CICS environment.

Side-CICS features a pop-up menu offering screen print with formatting option, uppercase and lowercase switch, calculator, calendar, time zones, area code look-up and quick-message pad as well as access to CICS utilities such as CEDF, CICS' debugging facility, according to the vendor.

Other features of the product are said to include the ability to activate CEDF without leaving the transaction and without another terminal, and the ability to print a copy of the screen with borders and advance the paper to the top of the form.

Side-CICS costs $100 per terminal with a minimum purchase of two terminals for $195.

Computer Application Services, 15560 Rockfield Blvd., Irvine, Calif. 92718.

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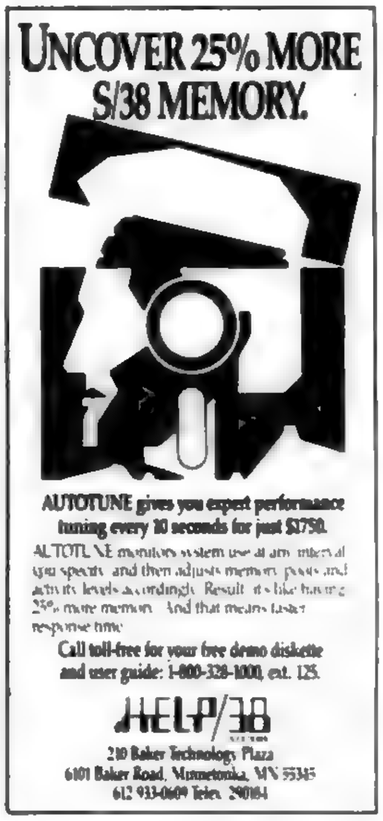
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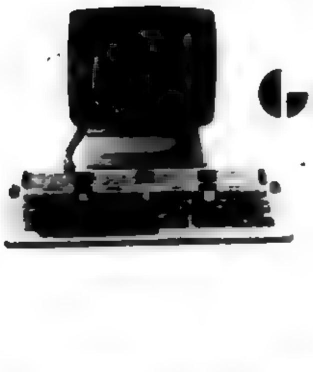

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Hewlett-Packard Co. has announced **Transition/3000**, software for converting Cobol applications on Texas Instruments, Inc. 990 Business Systems computers to run on HP 3000 business computers.

The software consists of conversion utilities and runtime utilities to maintain the TI environment on an HP 3000. According to the vendor, once converted, the same Cobol code is compatible across the entire HP 3000 line.

Transition/3000 is priced at $15,000.

Hewlett-Packard, 1820 Ebarcadero Road, Palo Alto, Calif. 94304.

Origin, Inc. has introduced **Magic Menu**, a software program said to allow users to switch between programs on the Digital Equipment Corp. VAX and Microvax computers.

Running under VMS, Magic Menu is said to let a user jump from any point in a program to any point in another program and back. Magic Menu stores the screen and the terminal attributes for each program. Returning to a program automatically refreshes the screen and restores the terminal attributes regardless of whether the program has the capability of doing so. There can be up to nine programs on the menu.

Magic Menu costs $100 per user CPU.

Origin, 9136 Gibson St., Los Angeles, Calif. 90034.

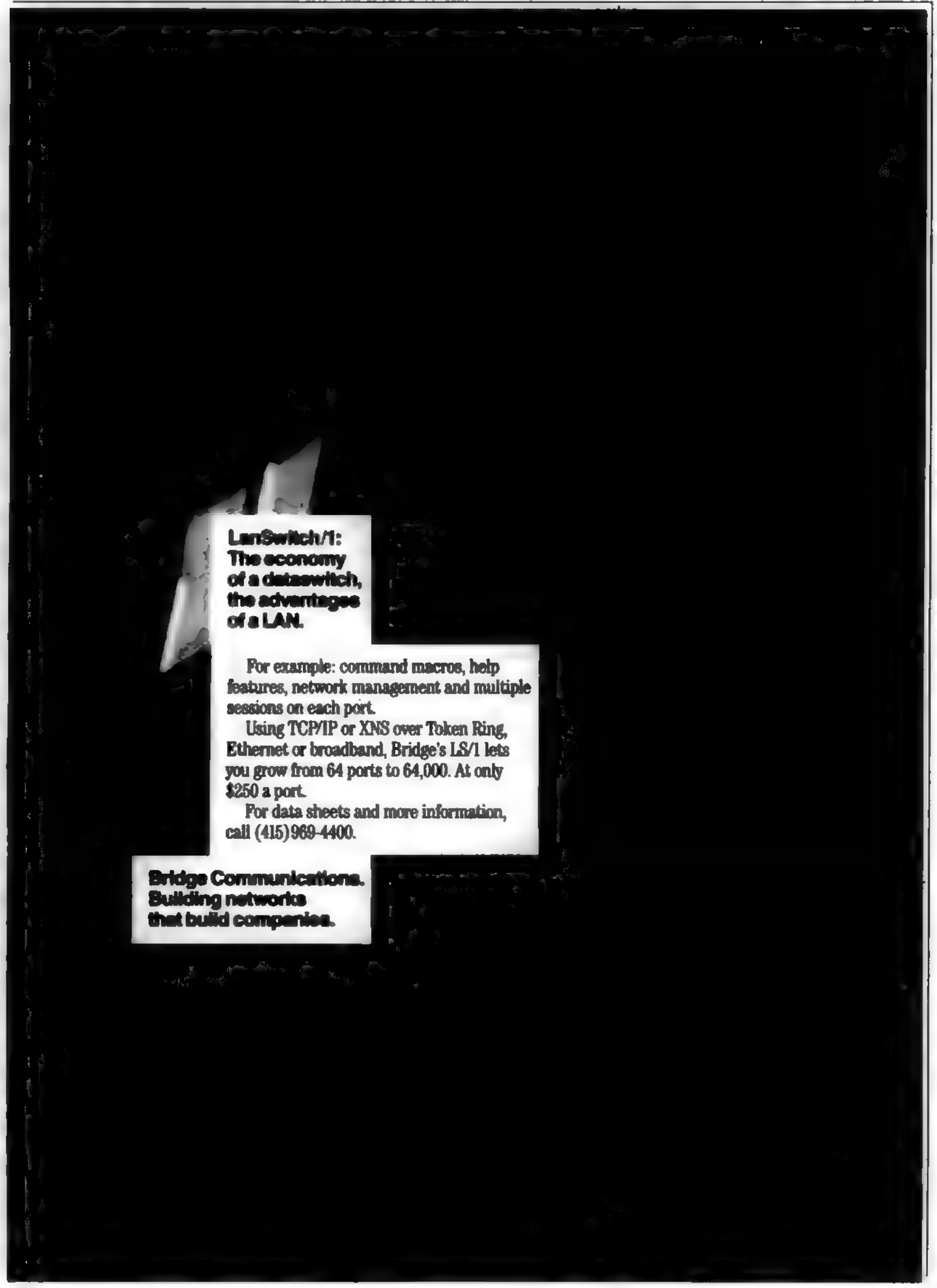
Computer Associates International, Inc. has announced **CA-Planlinks**, software said to link the Tellaplan project management software for mainframes and minicomputers to Superproject Plus, the resource and project management software for IBM and compatible microcomputers.

CA-Planlinks resides on the microcomputer and uploads start-dates, task lengths, dependencies and project cost data from Superproject Plus to Tellaplan, the vendor said.

Tellaplan can then create Gantt charts and Pert/CPM diagrams in activity-on-arrow and activity-in-node formats, as well as cost charts, including pie, bar and line charts.

CA-Planlinks costs $99.

Computer Associates, 711 Stewart Ave., Garden City, N.Y. 11530.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For data sheets and more information, call (415) 969-4400.

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Development tools

Masscomp has announced its **Laboratory Workbench** software for use on its line of MC5000 micro-supercomputers.

Laboratory Workbench is a user interface said to simplify real-time data acquisition tasks. According to the vendor, the interface eliminates the need for programming in most applications but can still accept Fortran expressions when needed. Users design, test, modify and run experiments using a mouse-and-menu system.

Features include a time-base menu; ASCII and binary data files with file names and headers; a hard-copy menu to print out displays and diagrams; and a real-time oscilloscope, histogram, digital and X-Y plot display of data.

Laboratory Workbench is priced from $3,000 to $4,900.

Masscomp, One Technology Park, Westford, Mass. 01886.

Computer Associates International, Inc. has announced **CA-Programmers' Workcenter**, integrated software for application development.

The software is said to combine programming software and an IBM Personal Computer AT workstation. Management software covers application development estimating, project planning, project/resource management and financial analysis and budgeting. Programming software includes a prototyping screen generator, a report generator, file utilities, a test-data generator, a CICS testing and debugging tool and Cobol testing and optimization facilities.

CA-Programmers' Workcenter costs $90,000 for the DOS/VSE versions and $150,000 for the OS/MVS version.

Computer Associates, 711 Stewart Ave., Garden City, N.Y. 11530.

Watcom Products, Inc. has announced **WProlog**, an interactive interpreter for the Prolog programming languages.

WProlog is said to feature a program development environment that allows program prototyping and the structured modular development of large systems. Programs are developed through the use of simple syntax and error checking and diagnostics, the vendor said.

WProlog is available for IBM 370 mainframes running IBM's VM/SP CMS for a yearly fee of $1,800.

Watcom Products, 415 Philip St., Waterloo, Ont., Canada, N2L 3X2.

Mystech Associates, Inc. has announced its **Aurora** line of artificial intelligence products.

Aurora is a generic inference engine designed for the development of knowledge-based programs. It incorporates the use of advanced menus, multiwindowing, a standard three-button mouse and animated graphics. It also incorporates the concurrent use of both forward and backward chaining techniques and a plain English language rule-base. Other features include on-line data retrieval facilities.

Aurora I was designed in Interlisp-D for the Xerox Corp. 1100 system. It costs $3,500. Aurora II, written in Common LISP for the IBM Personal Computer, costs from $1,500 to $2,000. Aurora III, programmed in C for use on the IBM PC, costs from $2,000 to $2,500.

Mystech, P.O. Box 220, Mystic, Conn. 06355.

MICROCOMPUTING

SMALL TALK

William Zachmann

A well-drawn graphics kit

The Kinetic Graphics System adds a wrinkle to presentation graphics software for IBM and compatible personal computers. The product, from Kinetic Presentations, Inc. in Louisville, Ky., includes built-in communications software to transmit presentation images to one of Kinetic's Supercenters, where it can be made into color or black-and-white overheads, as well as hard copy or 35mm slides.

Devices to provide high-quality, high-resolution slide and transparency output are relatively expensive, some costing much more than $10,000. With its unique service bureau approach, Kinetic Presentations makes it possible for users with small or occasional needs for presentation materials to develop their own without investing in expensive output devices.

The Kinetic Graphics System consists of four modules: System, Words, Graphs and Layout. The base system is required and includes the communications software. Words and Graphs are used to prepare textual and graphics presentation material, respectively. Layout provides facilities for flexibly combining text and graphics.

Continued on page 36

Intel simplifies PC board use

Add-ons for AT, XT 286 feature switchless, jumperless installation

BY DAVID BRIGHT
CW STAFF

HILLSBORO, Ore. — In an attempt to appeal to a broad audience, Intel Corp.'s Personal Computer Enhancement Operation introduced last week two add-on memory boards for the IBM Personal Computer AT and XT 286 featuring switchless and jumperless installation and memory reconfiguration.

Above Board product manager Steve Saltzman said the boards were announced in response to customers who claimed it was "a pain" to open up a system and change the DIP switches when reconfiguring the memory. This will be of particular benefit when Microsoft Corp. or IBM bring out a protected-mode version of PC-DOS and customers need to adjust memory to take advantage of it, he explained.

The boards are aimed at both inexperienced and experienced users. According to Intel officials, the two boards' software installation program virtually eliminates the need to read the manuals. "We wanted to advance the ease of use for the person who should read the manual but doesn't," stated Anita Locy Johnson, product marketing manager.

Compared with Intel's previous add-on boards for AT-class machines, the new Above Board 286 and Above Board PS/286 boards run on faster machines and cost $50 more.

Each board's maximum 2M bytes of memory can be used as expanded or extended memory in machines with clock rates up to 12.5 MHz.

The boards can also increase convential memory from 512K to 640K bytes.

According to Intel, the boards' memory configurations can be quickly changed at any time with the software-installation program. For example, memory allocated for expanded memory can be completely or partially reconfigured as extended memory to take advantage of protected-mode applications when they become available. The software also includes a Help facility.

Intel said a custom electrically erasable programmable read-only memory (EEPROM) chip enables the switchless and jumperless installation. The EEPROM also saves board space, which allows more memory to fit into the XT 286's smaller form

Continued on page 38

80386 portable arrives by mail

BY DOUGLAS BARNEY
CW STAFF

HOUSTON — Mail order firm PC Discount, Inc. recently introduced the first known Intel Corp. 80386-based portable computer.

For an early user of the firm's Noble 386 Portable, the speed is the most appealing quality. "Speed is sexy," the user said.

Another advantage is the price. The system sells for $3,000 with a 20M-byte hard drive and 512K bytes of random access memory. "We were looking for an inexpensive way to offer a 386 machine, came up with the idea for the Portable 386 and found a way to do it," said Gerry Lavender, vice-president of engineering for PC Discount.

In addition to single-user sales, PC Discount will position the product as a multiuser operating system and is working with the Software Link, Inc. in Atlanta.

PC Discount's *Noble 386 Portable PC.*

IBM's terrible teens

BY SEYMOUR MERRIN
SPECIAL TO CW

COMMENTARY

Much of the talk surrounding IBM's new generation of Personal Computers, expected within the next couple of weeks, centers around IBM's building "proprietariness" into these systems — in effect, making them different from the existing base of IBM-compatible personal computers that still dominate the business marketplace.

The new products are expected to have features that make them difficult, if not impossible, to copy, so the story goes. By doing this, IBM will create a system that flies in the face of historic successes in this relatively young industry and will make things more difficult for its most loyal customers.

Why would IBM do such a thing? Because the PC is like a teenager and IBM like the typical parent. IBM's main selling arm first ignored PCs, even the firm's own PCs, calling them toys. But end users found

Continued on page 37

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- Kurta introduces a graphics tablet with a pagemaker template. Page 36.
- Micro users groups plan to hold their own trade show. Page 37.
- Kaypro reduces the price of its IBM PC clone. Page [illegible]

Firm chooses centralized PC control to squash remote processing bugs

BY DONNA RAIMONDI
CW STAFF

ELGIN, Ill. — The MIS department of a $255 million Midwest firm discovered that bigger is not always better when it comes to solving multisite remote distribution and inventory tracking problems.

In a project that took just one year from planning to installation and testing, Safety-Kleen Corp. opted for microcomputers controlled at the home office for its remote distribution and manufacturing centers.

Safety-Kleen, a 17-year-old company that has increased its earnings by more than 20% for 16 years in a row, keeps a close eye on expenses. "We are a highly profitable company, so we look at the financial implications of everything we do," project manager Charles Janssen says.

Safety-Kleen sells automobile and washing machine parts and reclaims the chemicals used in the cleaning process.

When Safety-Kleen decided to link 35 to 40 of its remote distribution and manufacturing centers to the centralized corporate mainframe, an IBM 4381 Model P13 with 16M bytes of main memory, cost was a prime consideration. In keeping with the company's centralized MIS control philosophy, ease-of-use was the other critical factor. "We didn't want to generate any remote MIS staff," Janssen says. The firm also wanted to deal with established vendors whose support they could trust.

Users in the remote sites needed one terminal that could access the corporate mainframe for both IBM 3270 CICS-type on-line transactions via a Systems Network Architecture network by day and receive, unattended, IBM 3770 batch mode communications by night. "If we went with minis, the vendors could supply us with hardware and software. If we went with micros, we would get hardware and have to go out looking for software," says Art Niemaszyk, senior systems programmer. After examining four or five minicomputer products, including IBM's 9370, MIS decided on the micros.

The cost savings from choosing micros ranged from 50% to 200% of what similarly functional minicomputers would have been, Janssen notes. In addition, the remote sites do not need operators or programmers and can install the new systems themselves. A one-person help center at headquarters can handle any questions that come up.

MIS wanted a system with readily available hardware and software and they especially wanted a setup that could grow to service any number of the 250 sales and service operations across the U.S. and Canada. The department also wanted to give users the capability to do local spreadsheet, word processing and other noncrucial applications

Continued on page 38

PC kit similar to CAD tools

Graphics tablet, Pagemaker template part of Kurta offering

BY PEGGY WATT
CW STAFF

PHOENIX — Kurta Corp. has announced a graphics tablet for IBM Personal Computer and compatible systems, along with a kit to design templates for any application.

The Kurta IS input system is reminiscent of computer-aided design (CAD) tablets and digitizers, which draw menu choices on a tablet, for the user to activate by pointing with a mouse or pen.

Kurta President Clint Magnussen said the Template-Builder feature is aimed at resellers who can customize the tablets with their own templates for vertical-market applications, as well as for in-house developers who will design templates with menus of the several programs most often used.

In addition, Kurta's new line of tablets features a template of commands for Aldus Corp.'s Pagemaker page-design program. The template also includes commands for Microsoft Corp. Windows, which is the operating environment for Pagemaker.

Kurta designed a Pagemaker template because page layout, like the CAD programs that use tablets, is graphics-oriented, Magnussen said.

"We expect as people moved from the mouse to the pen in CAD that they will do so in desktop publishing," Magnussen concluded.

The line of tablets and pointing devices ranges in price from $295 to $7,200, depending on the size of the tablet and number of pointers. The tablets range from 8½- by 11-in. to 24- by 60-in. and attach to the PC with an RS-232 cable. The accompanying pen, called a penmouse, and cursor, a mouselike pointing device, can be cordless.

Have more Dial-In PCs than your System/3X can handle?
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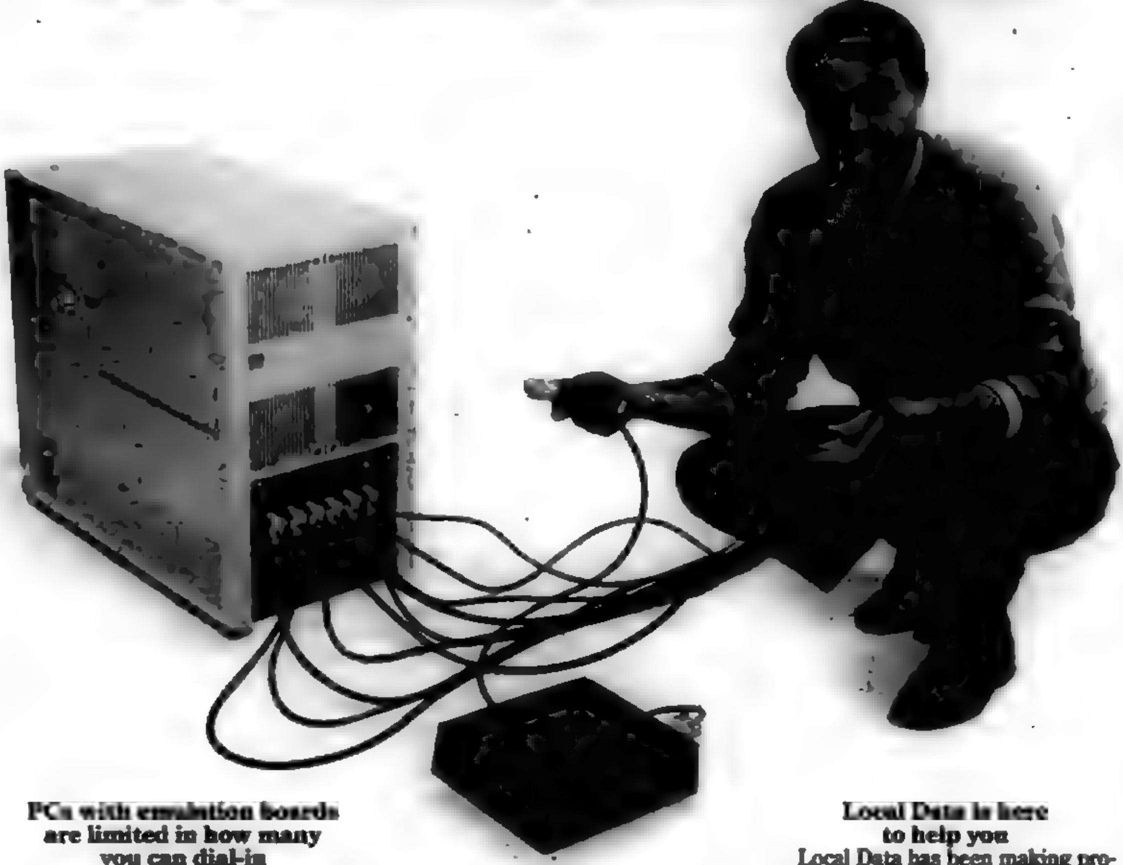

PCs with emulation boards are limited in how many you can dial-in
With emulation boards, each PC takes up one comm line while dialing-in. When you run out of comm lines, you can't dial-in any more PCs. Period. Local Data's InterLynx™/5251 directly attaches to the twinax channel so you can dial-in up to 7 PCs on the same port!

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Graphics

CONTINUED FROM PAGE 35

The entire package is priced at $695, but individual modules can be bought separately or in combination with each other. The package is not copy-protected.

Use of Kinetic's service bureau facilities is not required. The Kinetic System module supports direct output to a wide range of printers and plotters. Also supported are Videoshow, the Matrix Corp. products and Seiko Instruments U.S.A., Inc.'s D-Scan. Low-resolution slidemakers like Polaroid Corp.'s Palette are not supported, however.

The Kinetic Graphics System uses a consistent menu-driven format throughout. Text and graphics images are created by completing on-screen forms, and colors may be selected from a 255 Master Color Table. Six filled-area type fonts are available with superscripts, subscripts, underlining, double underlining, drop-shadow and accent font.

Labeling options

The Kinetic Graphs module supports two- and three-dimensional bar and line graphs, high-low graphs, histograms, layer graphs and pie charts. These provide flexible labeling options with the same type formats and options as Words. Graphs can also be combined with more extensive text created by Words using the Layout module.

The Kinetic Graphics System provides power and flexibility that equals or exceeds other presentation graphics software I have examined. The results are spectacular professional quality slides or transparencies.

As is often the case, the power and versatility of the programs makes them a little more complicated to work with than some of the simpler presentation graphics systems. The four-module structure of the system (with four separate manuals) makes it a bit difficult to know where to start. The absence of a tutorial presentation doesn't help, either.

While this can make the Kinetic Graphics System daunting to the first-time user, the results are well worth the effort; the programs are not difficult to use once you get the hang of them.

There are lots of handy features to the programs, including an easy selection of different bullet formats, optional autosizing of text, multiple palette creation and selection, stroke (in addition to normal filled) fonts for plotter output and multiple header styles.

The service bureau pricing schedule is fairly complex but generally reasonable. Plastic-mounted 35mm slides and color overheads are priced at $6 each on 48-hour turnaround or $9 for normal 24-hour service. A premium as-soon-as-possible service at $18 a slide is also available. Black-and-white overheads are half that price.

The Kinetic Graphics System is a first-rate presentation graphics package. The addition of the service bureau aspect shows that innovation is not just a matter of basic product features. By making it possible to transmit image files 24 hours a day, seven days a week and promising prompt return of completed slides or transparencies, Kinetic adds value and utility to the software.

Zachmann is vice-president of research at International Data Corp.

IBM's teens

FROM PAGE 35

that their new computers helped them get the information they needed on their own. They did not follow MIS's rules; they simply bought programs and learned how to use them.

The problem with IBM's offspring is made worse because the rapid acceptance and growth of the PC did not allow for a preteen period. The product was born a teenager. By 1986, five years after its introduction, PC sales were more than $6 billion — 12% of IBM's total revenue.

The rapid growth and changes brought on by that kind of growth represent a major problem to a company that typically works on five- and seven-year plans. Planners and strategists decide what new products, upgrades and features will be announced next year and the year after and the year after that.

All this planning assumes a knowledge of where the market will be in five or seven years. This assumption has been reasonable with mainframes, has proven somewhat risky with mid-range products and is totally absurd when it comes to personal computers.

The difference is that the more the end user has to say, the less certain is the planning function. MIS directors and chief information officers plan for their organizations and justify purchases on longer range factors.

Mute giant

IBM's customers for PCs are those end users the giant rarely speaks to. Big Blue's market surveys touched only the MIS personnel who had radically different perspectives of what the user needed. Even Chairman John Akers recently admitted that IBM had lost touch with its customers.

The more that IBM tries to force the PC to fit IBM's view of what the end user should have, the more likely it is that the end user will buy non-IBM or find a way to thwart IBM's goals, as they have since the IBM PC's introduction. The more IBM finally recognizes that there are millions of users with specific needs and desires differing from MIS's and IBM's perception of what they *should* want, the greater the probability that IBM will once again become the dynamic leader it should be.

This is a new era, a new environment that will require a new culture within IBM. History is clear: Those companies that refuse to change with the times lose their dominance, some rather rapidly. Just take a look at General Motors Corp.

Merrin is a former computer dealer and currently president of Merrin Resources, Inc., a Southport, Conn.-based consulting firm.

Federal PC users unite, plan show

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Federal microcomputer managers, aware of their high-volume purchasing power, have decided to hold their own annual trade show beginning this September, the sponsors announced last week.

The event, called the Capital Microcomputer Users Forum, will be a two-day affair entirely designed by local users groups. "It's the first microcomputer show by users, for users," said David Jacobson, planning officer at the Internal Revenue Service.

Jacobson said the trade show reflects the clout of federal agencies in the PC marketplace. "Just look at the IRS laptop buy, which set standards in that market," he said, referring to the IRS contract with Zenith Data Systems for 15,000 Z-171 laptops [CW, March 3, 1986].

The show, to be held Sept. 9-10 in Washington, D.C., is sponsored by the Integrated Software Federal Users Group and the Capital PC User Group, Inc. Jerry Schneider, president of the latter group, said the show will feature a session on data base management software.

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Firm chooses

CONTINUED FROM PAGE 35

in the future. Finding the right combinations of packages was not easy.

"Everybody has a 3270 emulator," Niemaszyk says, "but you can't say all emulators are the same." Certain 3270 functions that worked on dumb 3270 terminals would not work with some 3270 emulators, he explains. The group learned not to take salesmen's claims for their products. "We tested all the equipment and software for at least two weeks and sometimes a month," Janssen says. The group discovered both hardware and software problems this way.

In order to reach the functionality level of minicomputers, the staff had to integrate a number of software packages on the personal computers. "We use Network Software Associates, Inc.'s emulation package, and that takes care of the 3270 and 3770 needs. Along with that, we use [Software Directions, Inc.] PrintQ so we can spool the reports onto hard disk drives so they will not have to be printed immediately. And then we wrote some menu-type programs in Cobol to make the PC easy to use," Janssen says.

For hardware, MIS chose IBM PC XTs with 512K bytes of memory, a 20M-byte hard disk drive and 360K-byte diskette drives. They bought IBM monitors, adapter boards and Synchronous Data Link Control communications adapters and Alps Electric, Inc. ALPS P200 250 char./sec. printers. The printers were chosen for their ability to produce good near-letter-quality characters and for their durability, Janssen notes, because they are likely to be used for local word processing as well as the nightly reports from headquarters.

Changes had to be made to the mainframe as well. In preparation for the remote site link-ups, IBM's Network Control Program and an IBM 3705 communications processor were added.

Because the end users are unsophisticated with computers, the staff had to write menus that would allow them to switch between interactive use and report reception mode. "They would not understand what a 3270 or a 3770 emulator was. They would not know whether to do one or the other, but they do understand whether to receive reports or do interactive transactions," Niemaszyk says. Communication is via leased and dial-up lines, using Racal-Milgo, Inc. Omnimode 96 diagnostic modems for the leased lines and synchronous Universal Data Systems, Inc. 4800 bit/sec. modems for the dial-up lines.

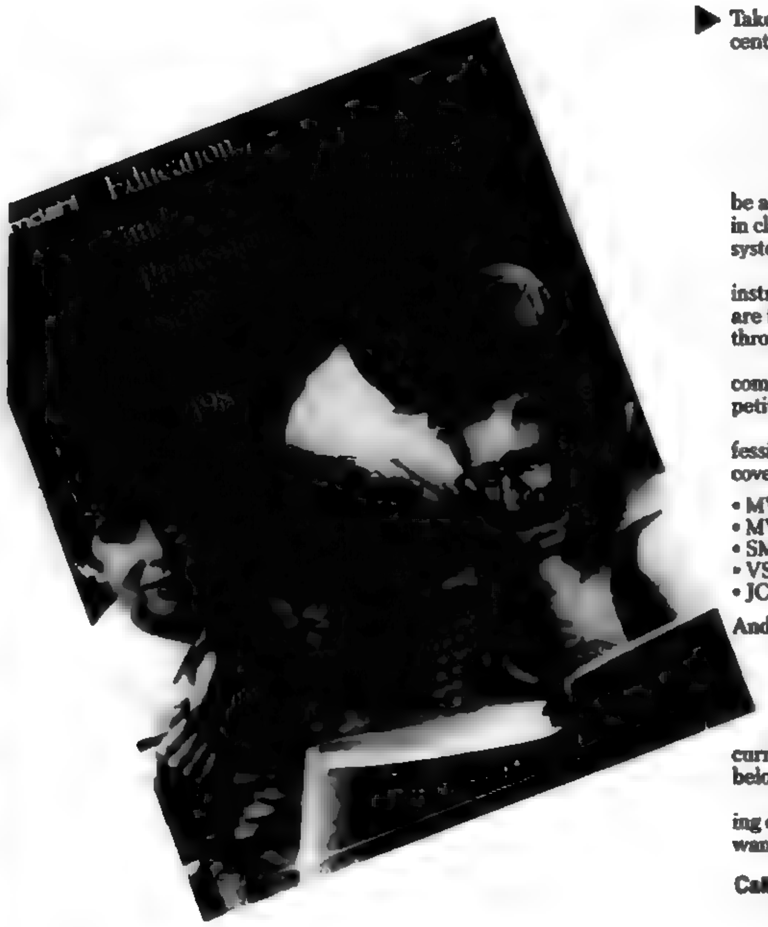
Users install systems

MIS came up with a plan to allow users to install their own systems. The communications coordinator, who serves as the first line of help for users, also is responsible for receiving all hardware, software and documentation at headquarters. He puts the systems together, burns them in to make sure they work and ships them out to the remote sites with a three-page manual on how to install and test. He also designates unique user identification numbers for each system and coordinates installation of leased lines with the telephone companies.

"He doesn't even have to go out and set them up," Janssen says. "We send anywhere from five to nine boxes. The user opens particular boxes first according to our instructions. It has everything they need, and it has worked for 12 sites already and we are working on eight more right now." The boxes contain, in addition to the hardware and software, cables, diskettes, ribbons and diagrams. Users get three days of training at headquarters and a three-day visit by the staff in preparation to use the system.

MIS was not idle elsewhere while the PC program was developed. "We wrote and coded and tested about 110 CICS programs for the mainframe and had to modify and/or write about 100 batch programs for the mainframe all in the same 10 months that we were doing this project," Janssen says. Sometimes, up to 12 of the company's 40 MIS staff worked on the PC project, which Janssen estimates took six man-years, compressed into one calendar year, to complete.

"You can say it was fun because it worked," Niemaszyk adds. The project was on time and under budget. "You don't hear about those very often," Janssen says.



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factor. The Above Board PS/AT could hold only 1.5M bytes on board. Because of the smaller size, the boards can be used in PCs as well, Saltzman added.

In addition, the EEPROM contains important information for technical support. The information, which includes testing data and the board's serial number, can be displayed on the system's monitor.

The boards come with several software utilities, including some for creating random-access memory (RAM) disks for fast data access, and a print buffer.

Prices start at $695 for an Above Board 286 with 512K bytes of memory. The 2M-byte version is priced at $1,145. Two piggyback boards are also available: a 512K-byte board is $495, and a 2M-byte board is $995.

The Above Board PS/286 adds one serial and one parallel port to the Above Board 286. A 512K-byte model is $745; with 2M bytes of RAM, the price is $1,195. A second serial port is available as a $50 user-installed option.

NEW PRODUCTS

Systems

Kaypro Corp. has reduced the price of its **Kaypro 2861** IBM Personal Computer clone.

Both Models A and C feature a 10-MHz clock and 640K bytes of random-access memory. The Model A features a single disk drive unit with storage capacity of 1.2M bytes per floppy disk. The Model C features the same floppy disk drive and a 30M-byte hard drive.

The Kaypro 286i Model A is priced at $1,995. The Model C is priced at $2,995.

Kaypro, P.O. Box N, Del Mar, Calif. 92014.

Digital Vision, Inc. has announced the **Computereyes** video-acquisition system for IBM Personal Computers and compatibles.

Computereyes is said to allow users to capture real-world images from any standard video source. The slow-scan device connects between any standard video source and the computer. Capture routines provided include high contrast, true gray-scale, dithered gray-scale and false-color images.

Acquired images are said to be compatible with graphics packages, printing utilities, terminal programs and picture data base programs.

Computereyes requires the IBM Enhanced Graphics Adapter and Color Graphics Adapter. It costs $249.95.

Digital Vision, 66 Eastern Ave., Dedham, Mass. 02026.

Auricom, Inc. has introduced **'N-Touch**, software for the IBM Personal Computer and PC AT said to allow Ashton-Tate's Dbase III, Nantucket, Inc.'s Clipper and Rbase users to link data files with digitized photos and graphics.

Users can search photo data bases via a touch screen at an average retrieval speed of 4½ sec. Photos are displayed in high resolution with data and graphics displayed concurrently in IBM Color Graphics Adapter or Enhanced Graphics Adapter mode. Large data bases can be stored on write-once optical disks.

The entire touch screen-based development system with an Auricom XT, video digitizing and display card, 'N-Touch software and 20M-byte disk drive costs $2,495.

Auricom, Suite J, 17985 Skypark Circle, Irvine, Calif. 92714.

Software applications packages

Cricket Software has announced **Cricket Graph**, a graphics software package for the Microsoft Corp. Windows environment.

Cricket Graph is said to generate graphs, including regular and stacked horizontal and vertical bar graphs and area, line, scatter, pie, polar and quality-control graphs. Users can transpose rows and columns within the data window, use row numbers as a variable, set minor tick-mark intervals and use decimal notation on log scales.

Data can be sorted, grouped by ranges of values, smoothed and transformed by logarithmic, trigonometric, exponential and statistical functions.

Cricket Graph for the Windows environment costs $295.

Cricket Software, Suite 206, 3508 Market St., Philadelphia, Pa. 19104.

Mindwork Software has unveiled **Mindwrite**, a word processor for the Apple Computer, Inc. Macintosh.

Mindwrite features multiple windows and an accumulating clipboard, a hand tool that allows the mouse to be used to move text elements around in a document and the ability to simultaneously select and act on text, pictures and headings in an unlimited number of different sections of a document.

Other features include integrated outlining; tools such as a word-count command, vertical revision bars and search; and replace commands with seven search options.

Mindwrite is priced at $125.

Mindwork Software, P.O. Box 222280, Carmel, Calif. 93922.

Xenergy, Inc. has announced **Breakout**, its residential energy-bill analysis software.

Breakout runs on the IBM Personal Computer or compatibles. It was designed to help utilities itemize bills for residential customers. It operates as a template to Lotus Development Corp.'s 1-2-3.

Breakout is said to conduct a customized analysis for each household. It can also provide energy-saving recommendations and estimates of potential savings if customers convert to time-of-user rates.

Breakout costs $995.

Xenergy, 60 Mall Road, Burlington, Mass. 01803.

Zsoft Corp. has introduced **Publishers' Paintbrush**, a freehand paint software package for the IBM Personal Computer.

Features include the ability to edit images 8-in. by 10-in. and larger; the ability to edit in zoom mode; and three font technologies for enhanced headlining, captions and annotation.

In addition, the software supports numerous text per page-composition soft-

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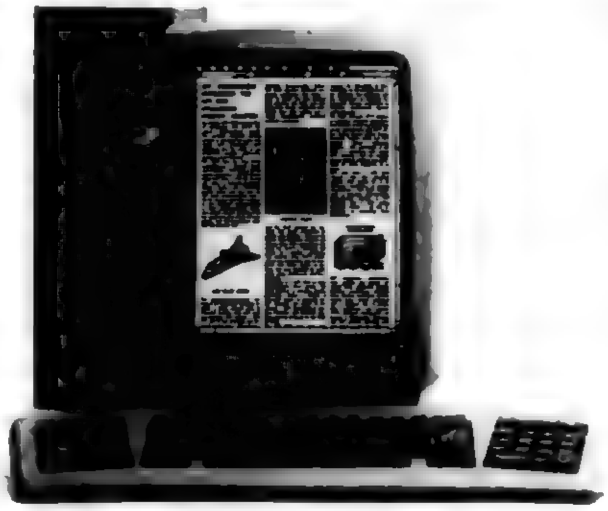

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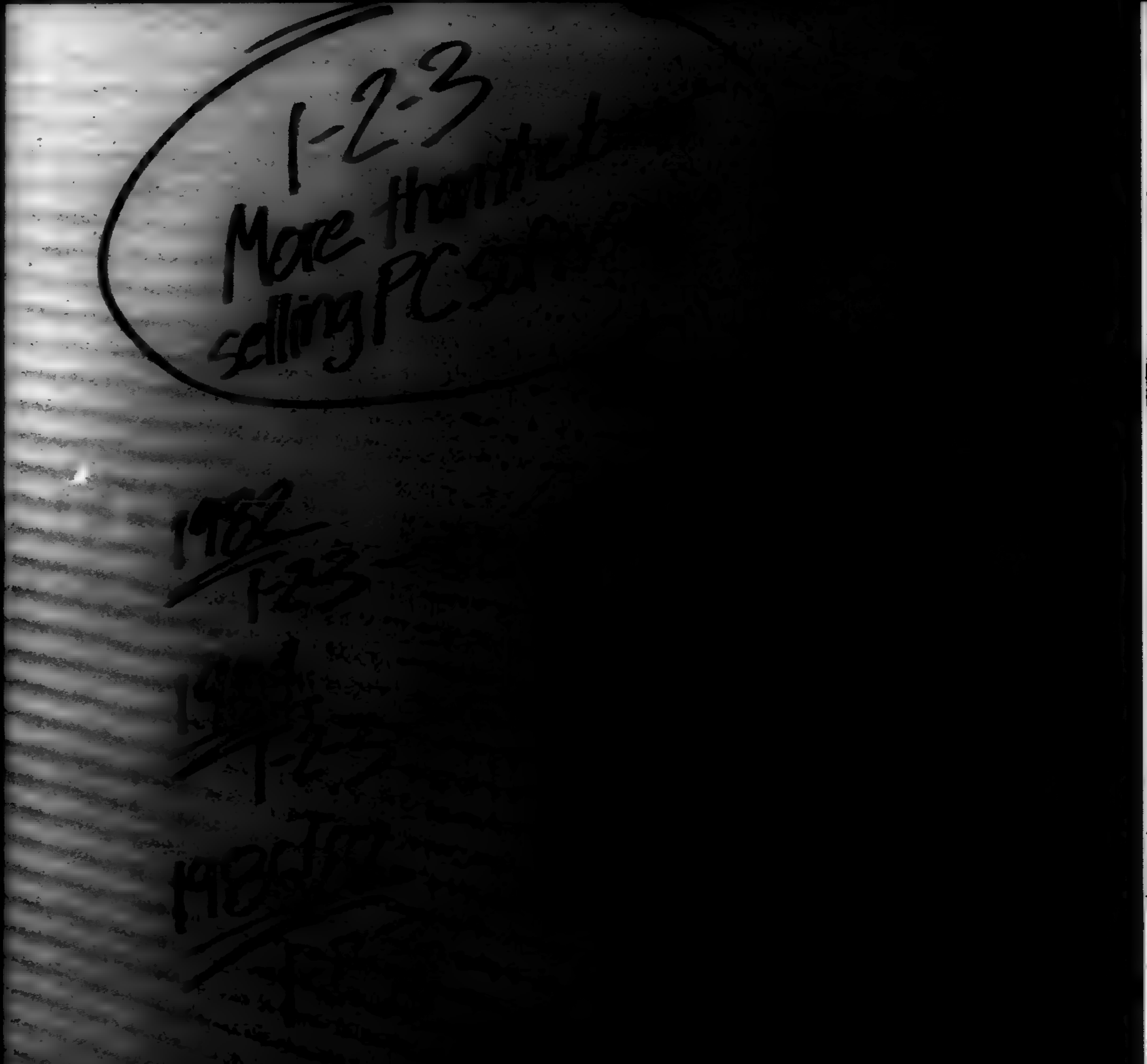
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Continued from page 39

ware such as Ventura Software Inc.'s Publisher and Aldus Corp.'s Pagemaker, graphics boards and I/O peripheral devices.

Publisher's Paintbrush costs $285.

ZSoft, Suite A-495, 1950 Spectrum Circle, , Marietta, Ga. 30067.

Airs, Inc. has announced **Marcon**, a text-based management system for archiving, filing and desktop publishing.

Marcon features variable length fields, multiple data base searching, on-line editing, browsing and windowing. It was developed for use with hard disks, compact disk/read-only memory and write-once, read-many-times disks.

The product requires 640K bytes of random-access memory on an IBM Personal Computer AT with Microsoft Corp. MS-DOS 2.0 or higher.

According to the vendor, Marcon enables the maintenance of large document collections while controlling inventories.

Marcon is priced at $1,495. A network version costs $2,500 plus $50 per node.

Airs, 335 Paint Branch Drive, College Park, Md. 20742.

Target Software, Inc. has introduced **Scoop**, desktop publishing software for the Apple Computer, Inc. Macintosh.

Scoop is said to include a full-featured graphics package, a what-you-see-is-what-you-get text editor and page layout and composition capabilities. Features include text wrapping around graphics, filling irregularly shaped objects with text, compatibility with various image scanners, automatic and manual hyphenation, automatic slanting of margins, fractional font sizes, built-in Apple Maclightning spell checker, editing of multiple pages simultaneously and compatibility with Apple's Imagewriter and Laserwriter.

Scoop costs $495.

Target Software, 14206 S.W. 136 St., Miami, Fla. 33186.

Successware, Inc. has announced **Marketing Edge**, a personal computer software tool containing 17 applications and tutorials for use with Lotus Development Corp.'s 1-2-3.

The software was designed to provide a step-by-step approach to market planning.

Topics covered include analyzing market potential, evaluating competitors, choosing distribution channels, planning product introduction and setting product pricing.

Features include instruction and Help screens and graphs constructed automatically from the user's data input.

Marketing Edge costs $149.

Successware, Cary, N.C. 27511.

Sourcemate Information Systems, Inc. has announced a price increase on its General Ledger, Payroll and Fund Accounting modules, which is part of its **Accountmate** integrated Ashton-Tate Dbase-compatible accounting software.

The single-user versions of the programs are now priced at $495. The multiuser versions cost $695.

Sourcemate Information Systems, 20 Sunnyside Ave., Mill Valley, Calif. 94941.

The personal computer-based **Present Slide Presentation System** has been unveiled by **SML Services, Inc.**

The system is said to enable users to prepare, edit and arrange screen images while utilizing the micro as a full-featured slide projector to display the screen images on a color monitor.

The system is composed of four programs. The memory-resident Camera captures text or graphics screen images, and Pretext, a text editor, allows the user to create or touch up captured text screens. Prepare allows users to view the slides and organize them into the desired order, and Present displays the show on the monitor.

Features include a choice of 16 background colors and 16 dissolve types for transition from slide to slide.

Present costs $80.

SML Services, 6095 River Chase Circle, Atlanta, Ga. 30328.

Software utilities

Allied Electronic Services, Inc. has announced **Tempo PC Monitor**, designed to identify personal computer use. Tempo PC Monitor displays such statistics as how many keystrokes are used per hour, which programs are executed and which disk files are accessed, terminal emulation time and total percentage. All data is displayed on the screen and can be printed or saved in a disk file. Statistics are displayed in percentage and bar-graph form.

Tempo PC Monitor consists of one printed-circuit board and one floppy disk drive. It costs $395.

Allied Electronic Services, P.O. Box 819, Lebanon, N.H. 03766.

TEK Microsystems, Inc. has introduced **HQ**, memory-resident productivity software designed for use on IBM Personal Computers.

HQ is said to provide disk management, keyboard macros, desk accessories and other utilities. It is memory resident and can be called up over other applications. HQ is composed of eight modules including an appointment book, a calculator, security functions, a note pad, an organizer and a phone book.

Other features include the ability to transfer data from HQ or an applications program to another HQ module or applications program.

HQ costs $79.

TEK Microsystems, 2067 Massachusetts Ave., Cambridge, Mass. 02140.

Software enhancements

Gamma Productions, Inc. has announced **Multilingual Scholar Version 3.0.**

Multilingual Scholar is a full-featured, multilanguage word processing program for IBM Personal Computers and compa-

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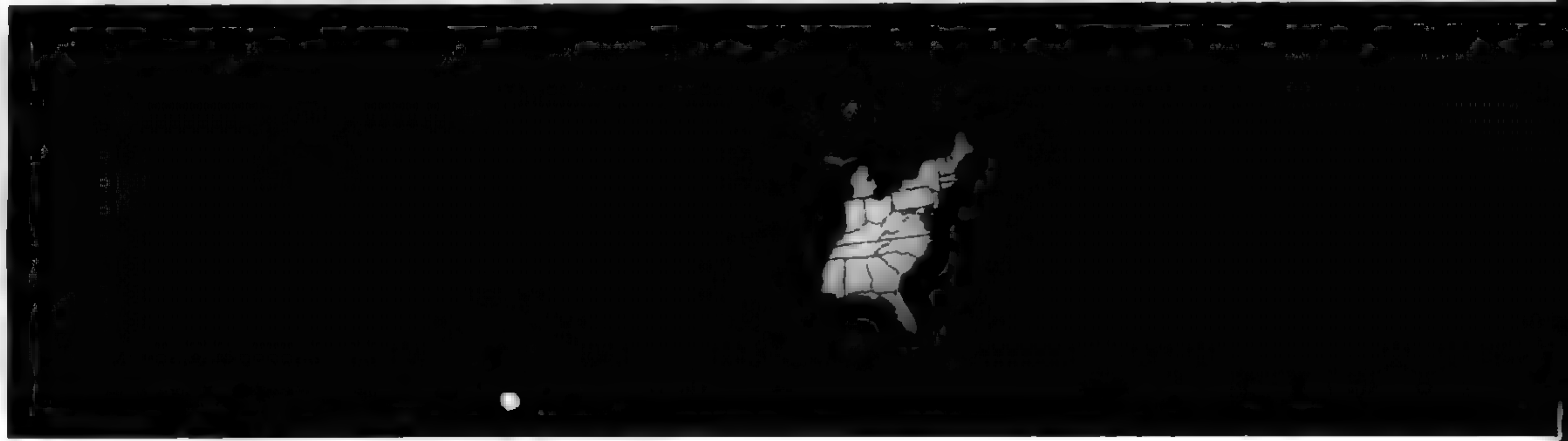

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tibles. Languages supported include Hebrew, Arabic, Greek and Russian. Up to five languages can be written in one file.

Version 3.0 includes support of contextual analysis in Arabic and full support for 24-pin printers, laser printers and quad-density printing on Epson America, Inc. printers and compatibles.

Multilingual Scholar 3.0 costs $350. Laser-printer support costs $150.

Gamma Productions, Suite 609, 710 Wilshire Blvd., Santa Monica, Calif. 90401.

Mathsoft, Inc. has announced **Mathcad Version 1.1**, an enhanced version of its engineering scratch pad software.

Mathcad is said to allow personal computers to perform complex numerical analysis and to document the results. Version 1.1 offers enhanced computational features, including differentiation, integration, root finding, curve fitting, cubic splines and built-in statistics functions.

The upgrade is also said to provide plots and tables with greater versatility, expanded formatting and printing capabilities and increased display support.

Mathcad 1.1 costs $249.

Mathsoft, One Kendall Sq., Cambridge, Mass. 02139.

Lifeboat Associates, Inc. has announced updated versions of its software development tool, **Advantage** C++, for the IBM PC-DOS and Microsoft Corp. MS-DOS environments and for Microsoft's Xenix.

Advantage C++ is said to include its own AT&T Unix System V-style preprocessor. The translator and driver system is 120K bytes smaller than the previous version, enabling the program to run in 512K bytes of random-access memory. It also supports both small- and large-memory models.

Advantage C++ for the PC-DOS and MS-DOS environments costs $495. For the Xenix environment, it costs $695.

Lifeboat Associates, 55 S. Broadway, Tarrytown, N.Y. 10591.

Board-level devices

Western Digital Corp. has announced the **D210S ESDI-to-SCSI** disk controller, the **WD1008-SCS** optical-disk controller and the **WD7000-ASC PC AT-to-SCSI** host adapter.

The three small computer systems interface (SCSI) products were designed to accommodate the 16- or 32-bit CPU systems and the 10- to 15-MHz magnetic and optical-disk drives.

The D210S is a 5¼-in. form-factor Winchester disk controller said to link the enhanced small device interface (ESDI) to the SCSI. The WD1008-SCS is a 5¼-in. form-factor optical disk controller that supports up to four ESDI optical drives.

Based on a 1,000-unit quantity, the D210S costs $165, the WD1008-SCS costs $250 and the WD7000-ASC $220.

Western Digital, 2445 McCabe Way, Irvine, Calif. 92714.

Computer Peripherals, Inc. has announced **Graphmaster**, an enhancement board for the IBM Personal Computer, PC XT and AT.

The single board is said to be compatible with IBM's Enhanced Graphics Adapter, Color Graphics Adapter and Monochrome Display Adapter. Graphmaster emulates each adapter at both the hardware and basic I/O systems levels, the vendor said.

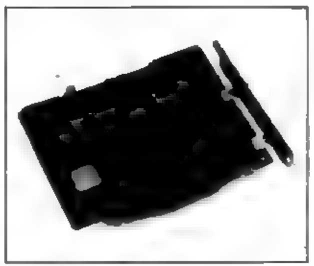
Maximum resolution is 720 by 350 pixels. Memory capacity of 256K bytes is said to be adequate for all modes and applications. A character generator in random-access memory allows the user to program up to 1,024 characters.

The Graphmaster board is priced at $545.

Computer Peripherals, 2635 Lavery Court, Newbury Park, Calif. 91320.

Microway, Inc. has announced **AT8**, a serial-controller board, **Fastcache-286**, a 12-MHz Intel Corp. 80286 IBM Personal Computer accelerator, and **287Turboplus**, an IBM PC accelerator board.

AT8 has an on-board 8-MHz 80186 with built-in direct-memory access said to manage up to eight terminals with operating rates of up to 38K bit/sec. It includes software drivers for Santa Cruz Operations Xenix and Concurrent PC-DOS.



Microway's *accelerator*

Fastcache-286 is a half card said to use 8K bytes of 55nsec cache. According to the vendor, it features zero-wait state memory and runs with an 80286 clock speed of either 9 or 12 MHz. 287Turboplus generates an adjustable clock signal. It plugs into the PC AT's 80287 socket.

AT8 costs $1,599. Fastcache-286 costs $449 for the 9-MHz version and $599 for the 12-MHz version. 287Turboplus costs from $549 for the 10-MHz version to $629 for the 12-MHz version.

Microway, P.O. Box 79, Kingston, Mass. 02364.

Auxiliary equipment

Electro Standards Laboratory, Inc. has introduced the **Model 8380-D PC Keyboard and Monitor Switch.**

The switch is said to allow dual access to one IBM Personal Computer or compatible from either of two keyboard and monitor locations. In application, PC Keyboard-Monitor Station A and PC Keyboard-Monitor Station B are connected to the rear panel of the Model 8380-D switch. The IBM PC or compatible is connected to the common port on the switch.

The Model 8380-D PC Keyboard and Monitor Switch is priced at $125.

Electro Standards Laboratory, P.O. Box 9144, Providence, R.I. 02940.

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NETWORKING

DATA STREAM

Patricia Keefe

LANs lean on third parties

Despite speculation about a trend toward direct sales, third-party distribution remains extremely important to personal computer network vendors, as well as to their users, for precisely the same reasons — training, service and support.

The fact is, local-area network (LAN) vendors do not have a great service history, which is the reason that 90% of all articles on networking start off with a "nightmare" theme. This is why resellers specializing in networks are so important to both parties.

But LAN support services — particularly those provided by third parties — are increasingly in danger of attack from two corners: users and vendors.

Network consultants like to say that *their* clients, typically Fortune 1,000 and Fortune 500 users, care more about performance and functionality than they do about price. Maybe so, but as resellers have found, often the larger the company, the more likely it will take its busi-

Continued on page 52

IBM channel link hits market

BY ELISABETH HORWITT
CW STAFF

MINNEAPOLIS — An intelligent communications processor introduced recently by Computer Network Technology Corp. provides channel-to-channel communications for multiple mainframes, either locally or over remote T1 links, the vendor claimed.

Based on Computer Network Technology's existing 5100 Channelink products, the Channelink Model 5100/R permits IBM mainframes to communicate at 1.5M bit/sec. T1 speeds. An intelligent system based on the Motorola, Inc. 68000 microprocessor, the 5100/R off-loads communications functions from the mainframe and reportedly improves transaction processing response time from four to 1.7 seconds in one customer configuration, the vendor said.

Handling T1 channel-to-channel communications "drags a $200,000 to $300,000 IBM front-end processor to its knees, so that it cannot handle terminal networking," according to Mac Lewis, Computer Network Technology's president and chief executive officer. In contrast, the 5100/R utilizes a T1 channel with as high as 95% efficiency and can interface with a terminal network, he claimed. Transmissions from a mainframe are stored in a buffer so that the channel is free to start sending more data while the first load is being sent over the network, he explained.

The buffer feature also elimi-

Continued on page 52

UPDATE

Searching for a standard

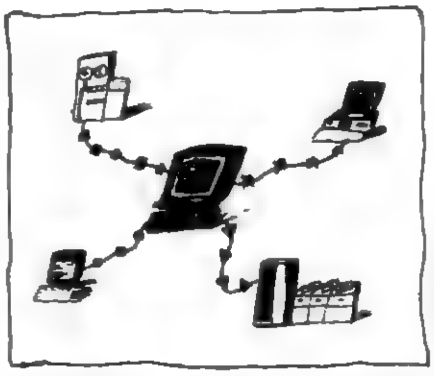
BY PHILIP J. GILL
SPECIAL TO CW

When MIS managers daydream, it's probably about running a shop in which all their incompatible hardware is integrated into one cohesive network.

Distributed file system protocols promise to do just that. Where local- and wide-area network standards provide common protocols that define the physical means by which computers can attach to and communicate with each other on a network, distributed file systems provide a structure for managing and accessing file systems, shared resources and data bases across a network.

The only problem with distributed file systems is that one common standard does not yet exist. Actually, four candidates compete for the title of Industry Standard for Heterogeneous Distributed File System Protocol: Sun Microsystems, Inc.'s Network File System (NFS); AT&T's Remote File System (RFS) with the Streams communications facility; the International Stan-

Continued on page 50



BLAIR THORNLEY

Server ups volume on T1 switch

Timeplex, Inc. announced last week Link Packetized Voice Server (LPVS) for its Link family of T1 switches, which reportedly will allow customers to increase voice traffic volume up to a factor of 10 without having to add T1 capacity. The LPVS offers "near toll-quality voice digitization," Timeplex said.

LPVS uses several voice compression techniques to achieve a 10:1 compression rate while maintaining voice quality that is equal to or better than the Advanced Digital Pulse Code Modulation standard for a 2:1 voice compression rate, according to Joseph Mozerino, Timeplex Link/2 product manager. Requiring 224K bit/sec. for every 40 voice channels, the system can be configured to take either all or a portion of a T1 link, "thus permitting a substantial amount of remaining bandwidth to be available for other voice/data applications," Timeplex said.

Continued on page 51

Inside

- ISDN site trials due to pick up speed. Page 46.
- NSA, banking industry resolve encryption standard dispute. Page 47.
- Ansa Software announces SQL mainframe connection for Paradox. Page 55.

MAINFRAME

printf("Hello, ^ world\n");

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Real-world ISDN trials pick up steam

BY DONNA RAIMONDI
CW STAFF

Integrated Services Digital Network (ISDN) site trials, a mere trickle in 1986, are due to pick up speed this year as vendors seek to test the telecommunications standard under real business conditions.

ISDN is a network architecture that defines a common set of protocols for transmitting voice, data, facsimile and video over ordinary telephone lines.

Most recently, New Jersey Bell and Bell Communications Research Corp. (Bellcore) announced that they will jointly conduct an ISDN trial this fall. Additionally, two weeks ago, U.S. West subsidiary Pacific Northwest Bell began a site trial with U.S. National Bank of Oregon in Portland.

The six- to nine-month New Jersey Bell-Bellcore site trial will provide ISDN access to Bellcore's Navesink, N.J., Research and Engineering Center. The trial will attempt, for the first time, to implement ISDN networking on existing AT&T 1AESS analog switches equipped with a small adjunct digital switch — as opposed to using all-digital switches, as in previous trials.

Aim increased access

While implementing ISDN on a digital add-on switch will not necessarily mean lower service rates, the move is intended to make ISDN more accessible to customers who want only 200 or 300 ISDN lines. This is because it does not necessitate replacing a 40,000- to 60,000-analog Centrex switch with a digital switch, according to Joe Mastriani, director of market and technical planning and support at New Jersey Bell.

It is difficult for the divested Bell operating companies to justify replacing an analog switch with a digital switch for a small number of ISDN lines, Mastriani says. Using the small adjunct switch, however, "would greatly reduce the investment required to provide ISDN and thereby speed deployment of the service," says Ray Albers, Bell Atlantic Corp.'s division manager for network planning.

Today, digital switches account for 18% of all access lines, and that number will jump to 50% by 1990, according to Victor Krueger, vice-president of telecommunications industry services at Dataquest, Inc. in San Jose, Calif. Digital switches can be equipped for ISDN functionality by replacing some circuit boards and adding software, be added.

The ISDN Basic Rate Interface — which will be used in the Bellcore trial — defines two 64K bit/sec. B channels that carry digitized voice, data and video and one 16K bit/sec. D channel, which carries network-related information between switching devices, and can also be used for packet switching.

For example, a Bellcore researcher in Navesink could talk over a B channel with several other Bellcore workers in various departments. During the conversation, the participants could simultaneously display information such as a memo on their terminals using a D channel. As changes were made, participants could see the changes on their terminals. The final versions could be stored, printed or sent via facsimile message to other workers.

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Bellcore, the centralized research and engineering arm of the seven regional Bell holding companies, will ultimately be responsible for implementation of ISDN services in the holding companies' networks.

The New Jersey Bell trial will give Bellcore much-needed firsthand experience with ISDN technology, which will be helpful for planning future services, according to Wayne Felts, division manager for ISDN implementation support at Bellcore.

Another field test planned for the near future will test rapid facsimile transfer, automatic messaging, file sharing and transfer, coaxial elimination alternatives and video teleconferencing at the U.S. National Bank in Portland.

Other planned U.S. West ISDN trials will interface a range of customer-premise equipment with central office switches from NEC America, Inc., Northern Telecom, Inc. and AT&T.

Multivendor drawback

These trials share one drawback, however: In each case, the voice and data equipment on customer sites is designed to interface with a particular vendor's central office ISDN switch.

Still to come are trials that explore communications among different brands of ISDN switches.

"Each of the central-switch vendors we are using tries to keep information from the others," says Loren Henry, director of ISDN planning for U.S. West, while speaking at a recent trade conference.

Bankers' encryption gripes end

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The National Security Agency (NSA) and the banking industry have resolved their dispute over use of the Data Encryption Standard (DES) for electronic funds transfer, according to testimony at a recent congressional hearing.

After 16 months of discussions, the NSA agreed to back off its decision to stop supporting DES-based technology for the financial industry, according to Cheryl W. Helsing, who chairs the American Bankers Association's data-security management committee. Helsing is vice-president and deputy director of corporate security for Bank of America in San Francisco.

Under the agreement, the NSA will continue to support the financial industry's use of DES-based technology until an acceptable replacement is available, Helsing said at a recent hearing on the NSA's role in data security.

The NSA announced last year that it would replace DES with new algorithms in 1988, apparently on the grounds that DES, which is in the public domain, has become an attractive target of code-breakers in foreign countries [CW, May 19]. NSA certifies encryption products under its Commercial Communications Security Endorsement Program.

"Years of work and many millions of dollars devoted to [DES-based] encryption and message authentication efforts were jeopardized," Helsing said.

She added that the NSA action unnecessarily cast a shadow on the security of DES and that NSA restrictions on the use of new algorithms would have made those algorithms unusable by the financial industry as a replacement for DES. "While pleased that the NSA was ultimately receptive to our needs and operational constraints, 16 months elapsed while we worked to educate the NSA about our business," Helsing concluded.

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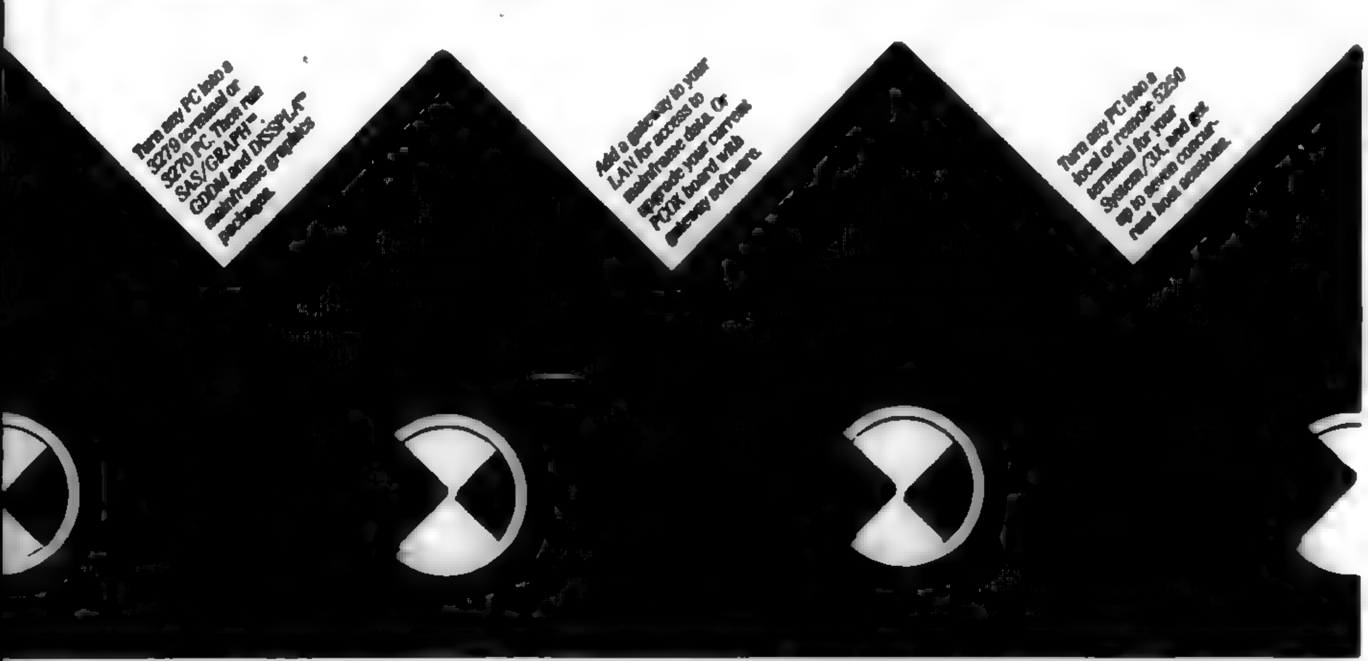
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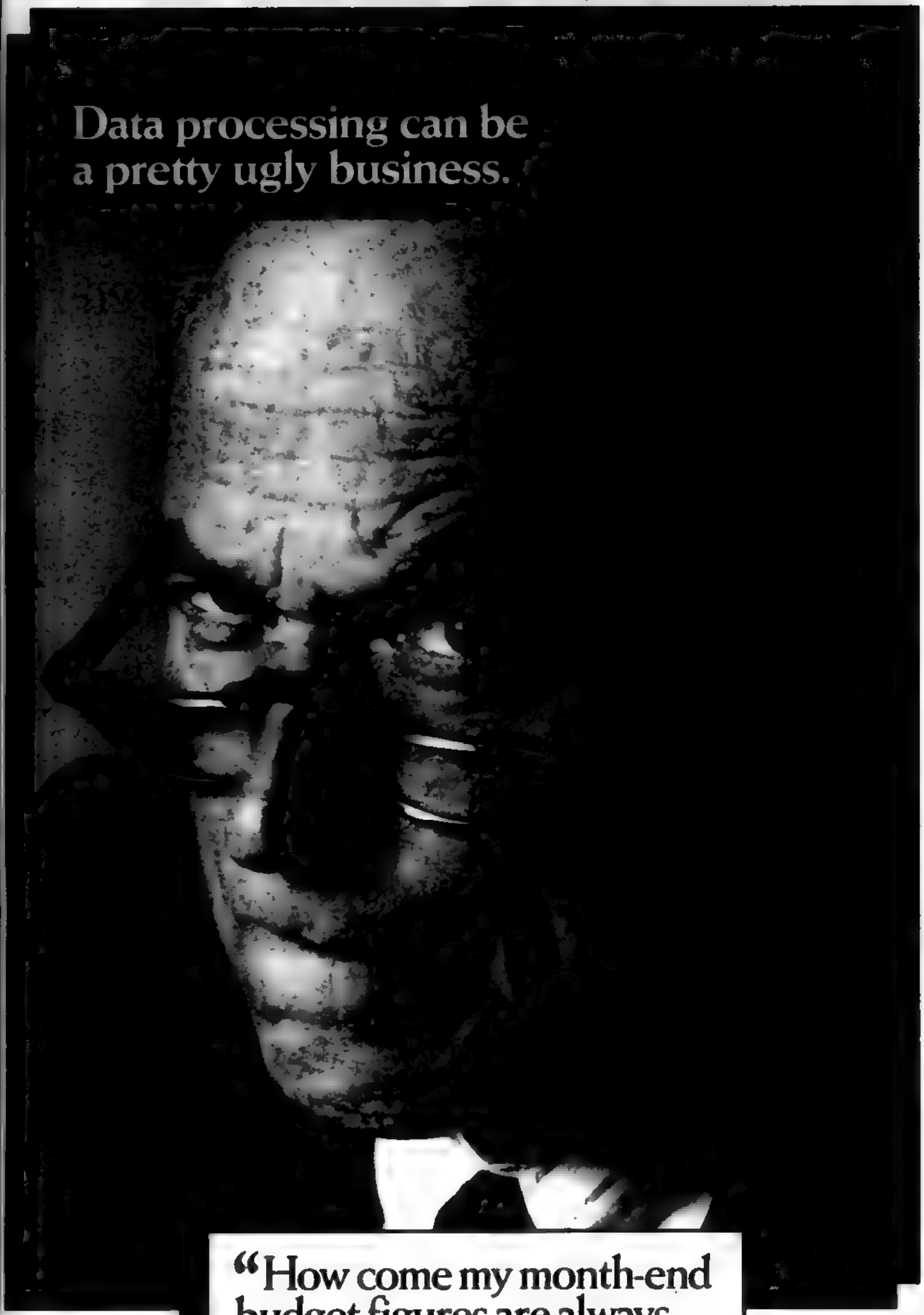

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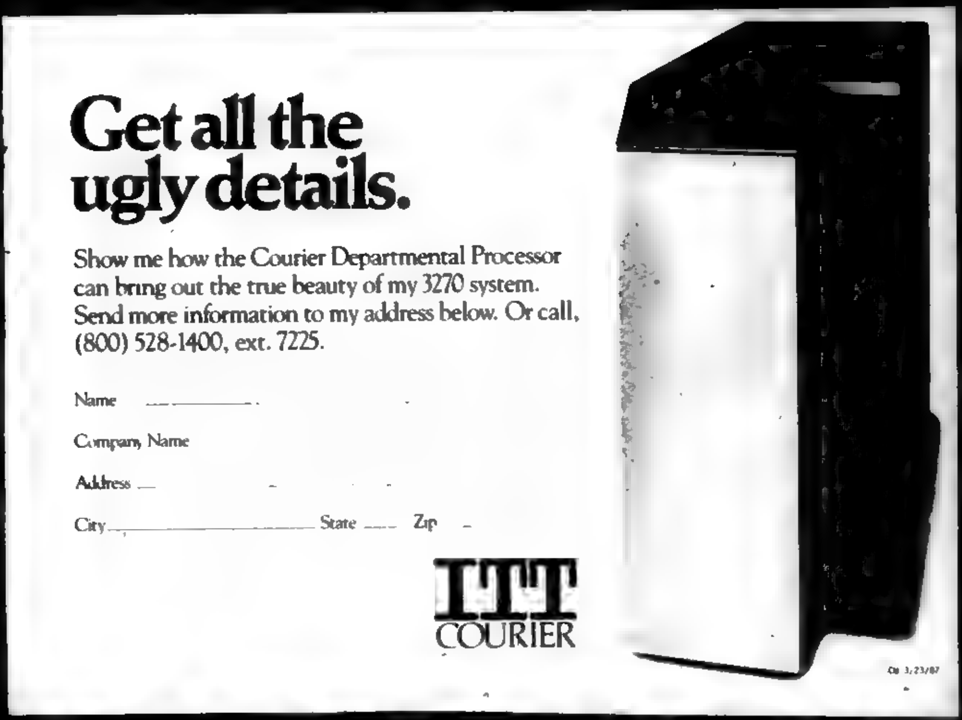

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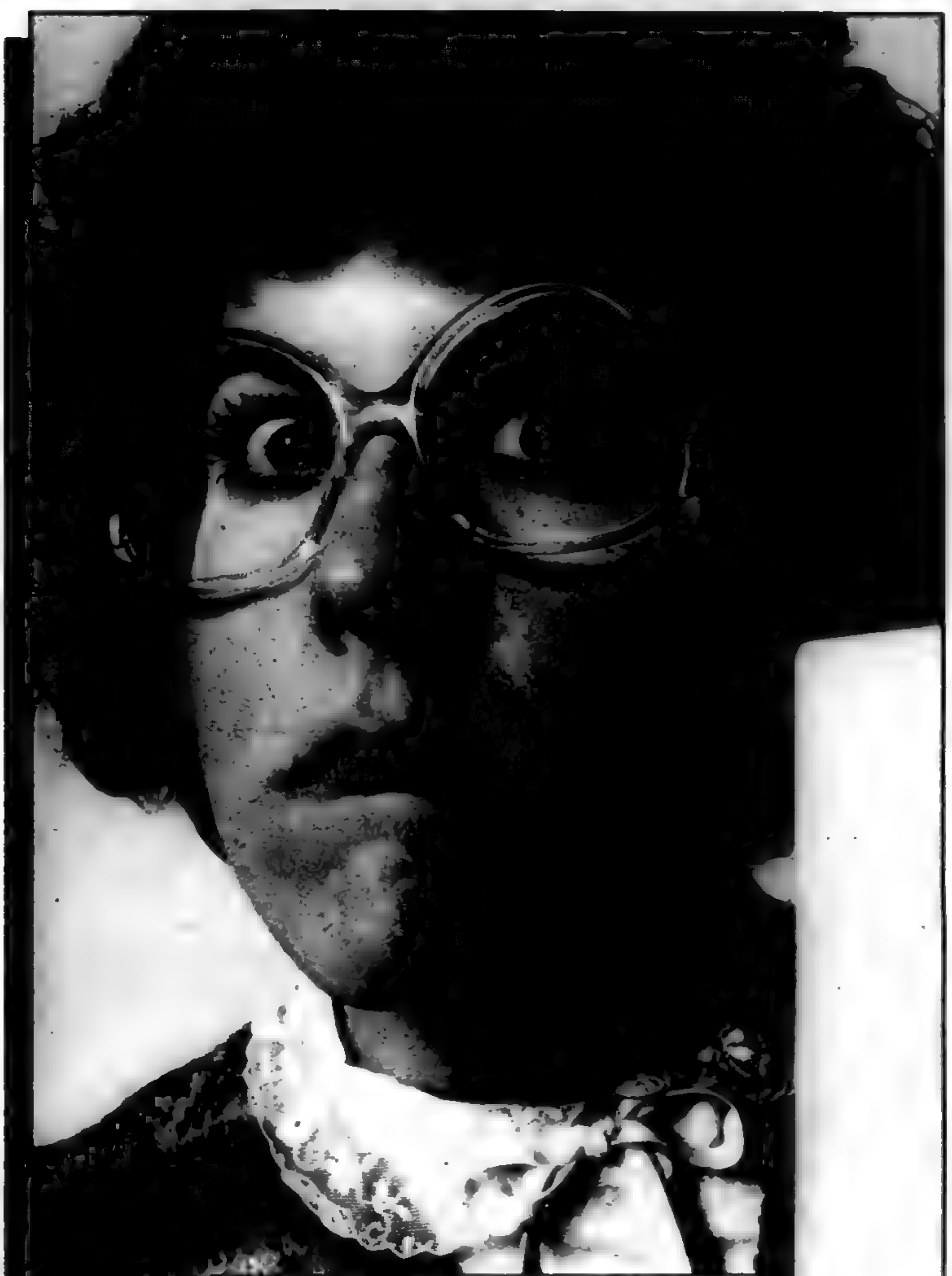

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ITT
COURIER

Searching

FROM PAGE 45

dards Organization's Open Systems Interconnect (ISO/OSI) File Transfer, Access and Management (FTAM) protocol; and the Server Message-Based (SMB) protocol, jointly developed by IBM and Microsoft Corp.

While each of these protocols offers valuable capabilities, the real potential of distributed file system protocols will not be realized until a recognized standard surfaces.

Eventually, shops that use distributed file systems will be able to integrate incompatible hardware — some of which may be running different operating systems — into a single network. What is more, a file in this environment, although scattered across many machines and perhaps even file system architectures, would be maintained, backed up and updated as though it were a single, unified file on one machine.

The protocols will eventually allow one copy of an application to reside on one machine and service all users on the network and will change the way the industry updates and licenses software.

From an MIS viewpoint, distributed file systems will help users conserve precious computer resources and, therefore, money. For instance, network systems administrators could shift files from one system to another as disks reach capacity. They could also choose to place applications and related files on the machine the local users will most often access them. This lessens network traffic, thereby reducing network overhead.

To understand the strengths and weaknesses of the protocols as they currently stand, however, the following descriptions should prove helpful.

Big winner

If endorsements, licensees and implementations are the measures of success, then Sun's NFS is a big winner. NFS has more than 100 licensees, including more than 60 hardware vendors, of which Hewlett-Packard Co., Digital Equipment Corp. and Harris Corp. are a few.

The protocol has won out in most of the nation's big-name university computer-science departments, such as Carnegie-Mellon University, Stanford University and the University of California at Berkeley.

According to Bill Keating, Sun's manager of network software, NFS is more than a distributed file system protocol: It is a member of a family of network services that permits not only file exchange but also file access and resource sharing across the several networks of disparate computer systems. These other network services include the Remote Execution Environment (REX), the Yellow Pages and the Lock Manager.

REX allows users to execute a program on a remote machine while accessing their home directory environment. In other words, users can use the command syntax they are familiar with, such as a Unix or DOS command syntax.

The Yellow Pages is a distributed data look-up table that keeps track of all users on the network and records their access rights to network resources. Lock Manager is NFS's record- and file-locking mechanism, which permits multiple users to access the same file without undoing each other's updates.

One of the features that distinguishes NFS from other distributed file system protocols, according to Keating, is that it achieves what others only talk about — vendor independence. Versions of NFS are available for virtually all forms of the Unix system, including AT&T Unix System V and University of California at Berkeley's Unix 4.2, as well as vendor-proprietary implementations. NFS is also available for linking Unix to DOS and DEC VMS environments.

RFS fades

Once considered a cornerstone of AT&T's thrust into the Fortune 1,000, RFS is now ranked dead last in the four-way distributed file protocol race. It is even thought to be behind the less developed and less robust FTAM protocol.

Charlie Bass

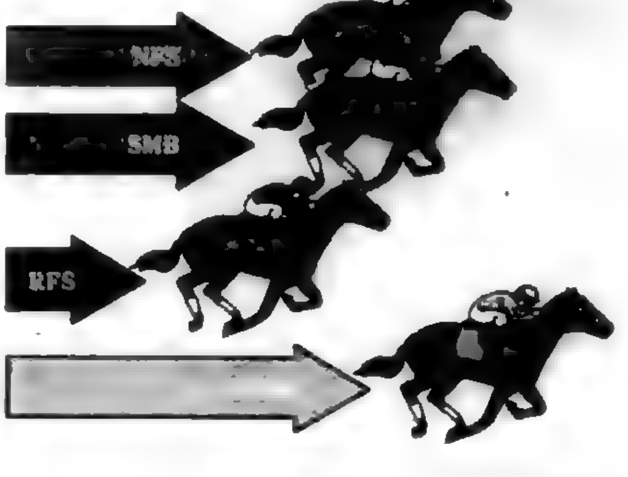
An important part of RFS is Streams, a protocol-independent interface that allows different computers and networks to communicate with each other regardless of what protocol standards they support. Streams provides an interface between RFS and networks running certain recognized standards, outlined below.

As announced by AT&T almost a year ago, Streams' initial release, which is part of Unix System V, Release 3, will support the AT&T Starlan local-area network.

In addition, AT&T says it is committed to backing other international networking standards such as the ISO/OSI protocol suite, the Department of Defense's Transmission Control Protocol/Internet Protocol, General Motors Corp.'s Manufacturing Automation Protocol and Boeing Computer Services Co.'s Technical Office Protocol, as well as CCITT's X.25 — the international packet-switching protocol — and, eventually, IBM's Systems Network Architecture.

The winner of the race

NFS and SMB are strong contenders in the distributed file system protocol race, and RFS has a hold on Unix System 5, Release 3 users. But in the long range, FTAM promises users the most for their money.



CW CHART MITCHELL J. HAYES

NFS is almost always pitted against RFS as its archrival. The matchup is only natural as both have roots in the Unix community, although NFS originated in the Berkeley Unix 4.2 world and RFS comes directly out of AT&T Bell Laboratories and Unix System V.

Both RFS and NFS do many of the same things: They both provide transparent access to network resources, file systems and data bases. And both work with AT&T's Unix System V, Release 3. Interestingly, RFS was the first to have record- and file-locking facilities. NFS, as it was originally constructed, did not.

But, as Dave Morse, product marketing manager at Hewlett-Packard's Colorado Networking Division in Fort Collins, Colo., points out: "It probably didn't need it when it first came out because of the [technical and scientific] environments it was operating in."

Morse, who oversees network offerings for technical applications, notes that HP supports NFS and SMB and is committed to supporting the emerging FTAM protocol. However, it does not, and does not intend at this time, to back RFS.

"RFS is the one most in doubt of the four," Morse says. "Our company is driven by what our customers ask us for." And, Morse says, HP's customers are asking for NFS. "Both RFS and NFS do the same thing," he says, "but NFS is ahead in the number of implementations."

There is one substantive difference RFS cannot get around — it has been designed from the very start to be a Unix-system-to-Unix-system protocol. According to Sun's Keating, RFS is, in fact, "Unix System V, Release 3 to Unix System V, Release 3."

NFS, on the other hand, is emerging as the premier distributed file system protocol for environments of mixed Unix system versions, as well as for mixed Unix and non-Unix environments, including IBM PC-DOS.

It seems that the folks at AT&T do not disagree with Keating's assessment of RFS. "We have said before that RFS is for a homogeneous Unix environment and NFS is for a heterogeneous Unix environment," an AT&T spokesman says.

Moreover, there has long been speculation that Sun and AT&T would join forces to make RFS and NFS work together on the same network. While declining to comment on any particular agreements between Sun and AT&T, Keating does say that one of the ultimate goals at Sun in thinking about a merged 4.2/System V Unix kernel was linking NFS and RFS.

Least known standard

Ironically, the most widely implemented and installed distributed file system protocol is probably the least well known. SMB is the standard for DOS and mixed DOS/Microsoft Xenix networks using Microsoft's MS-Net interface.

"Anything with MS-Net uses the SMB protocol," says John Harker, communications product marketing manager at Santa Cruz Operation, a Santa Cruz, Calif., supplier of Xenix-based systems, communications and applications software. "SMB is the core protocol for DOS network file operations and services."

SMB was jointly developed by IBM and Microsoft. While it provides the same basic services as the other distributed file system protocols, most observers agree that SMB's greatest potential is as a medium between DOS and Unix systems residing on the same network — an increasingly familiar phenomenon.

Although NFS has been implemented to support DOS systems, Harker says he believes SMB is better suited technologically than NFS for the DOS world of commercial applications. For instance, SMB includes a record- and file-locking mechanism, while with NFS this is a separate facility — the Lock Manager. "You have to do something extra," Harker says. "SMB makes better conversions between DOS and Unix files systems, largely because it is exactly the DOS calls."

SMB does have its limitations, however. For instance, Harker notes, SMB requires the user to know the exact file name — including any machine and directory information — in order to access the file on a remote machine across a network.

Harker also says that SMB suffers from limitations imposed on it by DOS, which is a single-tasking operating system. Unix, on the other hand, is multitasking, which creates problems in constructing a bridge from NFS or RFS into an SMB environment.

Independence of FTAM

Unlike the other three contenders, which have deep roots in and specific ties to a particular operating system, FTAM was, from its inception, designed to be operating-system independent.

"NFS and RFS are Unix-oriented. As such, they reflect the Unix way of doing things with files and the way file systems are constructed within Unix," says Charlie Bass, co-founder of Ungermann-Bass, Inc. and chairman of Touch Communications, Inc. a developer of networking software. "SMB is DOS-oriented and has the same perspective," he adds.

Conversely, FTAM's operating system independence is a philosophical premise and technical feature embodied in its design. "What you really want is for the location of a file to be able to wander through the network," Bass says. "The way [NFS, RFS and SMB] are being installed, you have to know the difference between a local and remote file."

Although Bass says he believes that FTAM will be the long-term industry-standard distributed file system protocol, he admits that in its current form it exhibits some shortcomings. "At this point, it is very modest in its facilities," Bass says. "As it matures, adding features and becoming more robust, it should be

Continued on page 51

Searching

CONTINUED FROM PAGE 50

able to sit under the other three and accomplish true file access. You could run NFS, RFS and SMB as operating system sets of file-access primitives — or verbs as they are sometimes called — on top of FTAM."

Considering all the distributed file system protocols, Bass predicts, what will be left will be protocols like NFS, RFS and SMB, each running in environments where they are well entrenched and well suited to the needs of the application and user bases. FTAM will then form an invisible bridge, or neutral ground, between systems supporting NFS, RFS and SMB, allowing them to exchange data and share resources.

No clear winner exists today. But a consensus on the current status of the four goes something like this:

NFS has easily emerged as the de facto standard for scientific, engineering and other technical computing applications and environments, which is not surprising considering that it was developed by Sun, a leader in the technical workstation market. RFS solves a limited problem at this point, that of sharing resources between AT&T Unix System V, Release 3 machines. So RFS would have some importance in environments committed to that standard only.

SMB is to the commercial microcomputing world what NFS is to technical computing — a de facto standard. It is heavily entrenched and is likely to continue to be for quite some time.

Ultimately, however, all agree that FTAM will triumph, even if, as Touch Communications' Bass suggests, it does so as the invisible, neutral protocol that ties the other three together and permits them to communicate with each other.

"That's where everybody will go," Keating says. "It's the future."

Gill is a San Mateo, Calif.-based free-lance writer and former editor in chief of *UNIX/World.*

Server

CONTINUED FROM PAGE 45

The LPVS comes in two models. Priced at $145,000/pair, the LPVS-40 accommodates up to 40 simultaneous voice conversations over four 56K-bit/sec. channels, providing a 10:1 compression rate. Priced at $33,000/pair, the LPVS-8 allows up to eight simultaneous voice transmissions over a single 56K-bit/sec. channel, providing an 8:1 compression rate.

Timeplex also announced the Integrated Channel Service Unit (ICSU), the first Timeplex channel service unit (CSU) that uses the Extended Superframe industry standard for communicating diagnostic and error-checking data to a centralized network management system, the company said.

An ICSU configured with a diagnostic control unit and four nonredundant CSUs will have a list price of $13,000, or $3,300 per CSU. The ICSU supports up to 14 dual CSUs in a single enclosure and provides control and diagnostic functions via an Extended Superframe link to Timeplex's Link Network Management System.

IBM unites telecom marketing groups

Combines Rolm's operations and own support staff to offer a single point of sales

ARMONK, N.Y. — IBM recently formed the Telecommunications Marketing and Service Organization within its Information Systems Group and can now offer its customers a single point of telecommunications sales.

The new sales group combines IBM's U.S. Direct Sales and the service and support operations of subsidiary Rolm Corp. with IBM's Information Systems Group telecommunications marketing support staff.

The marketing organization is responsible for domestic direct sales, installation and service of Rolm products and technical and marketing support for both Rolm and other IBM telecommunications products.

'Increases customer focus'

"This is an important step toward providing a single IBM marketing and service organization to increase our focus on our customers' telecommunications product needs," said Edward E. Lucente, IBM's vice-president and Information Systems Group executive.

The group's North-Central and South-West marketing divisions and the National Service Division will continue to market and service IBM's telecommunications products other than the Rolm product line, according to company officials.

The Information Systems Group's National Distribution Division markets IBM's telecommunications products other than Rolm's through alternative distribution channels.

The 15-Minute Data/Voice Network

Line Miser™ Converts Your Ordinary Phone System Into a Local Area Network

Now you can turn your phone system into a versatile local area network (LAN) for data and voice. It's as easy as plugging in a new telephone. And it takes about that long, too.

Gandalf's new Line Misers enable you to use your existing phone wiring for simultaneous voice and data communications. They function as limited distance modems that pass voice transparently. Simple bandwidth allocation is used to separate the data from the voice. Should your PBX fail, the data will not be affected.

Line Misers provide a fast, cost-effective means of expanding your data terminal network — up to 18,000 feet. Everywhere you have a telephone, you can quickly and easily add a terminal. It's a plug-in job — all you need is a power outlet and a phone jack. No more 4-wire dedicated data lines! Asynchronous full-duplex data rates up to 19.2 Kbps can be handled. Also supports synchronous data at speeds up to 64 Kbps.

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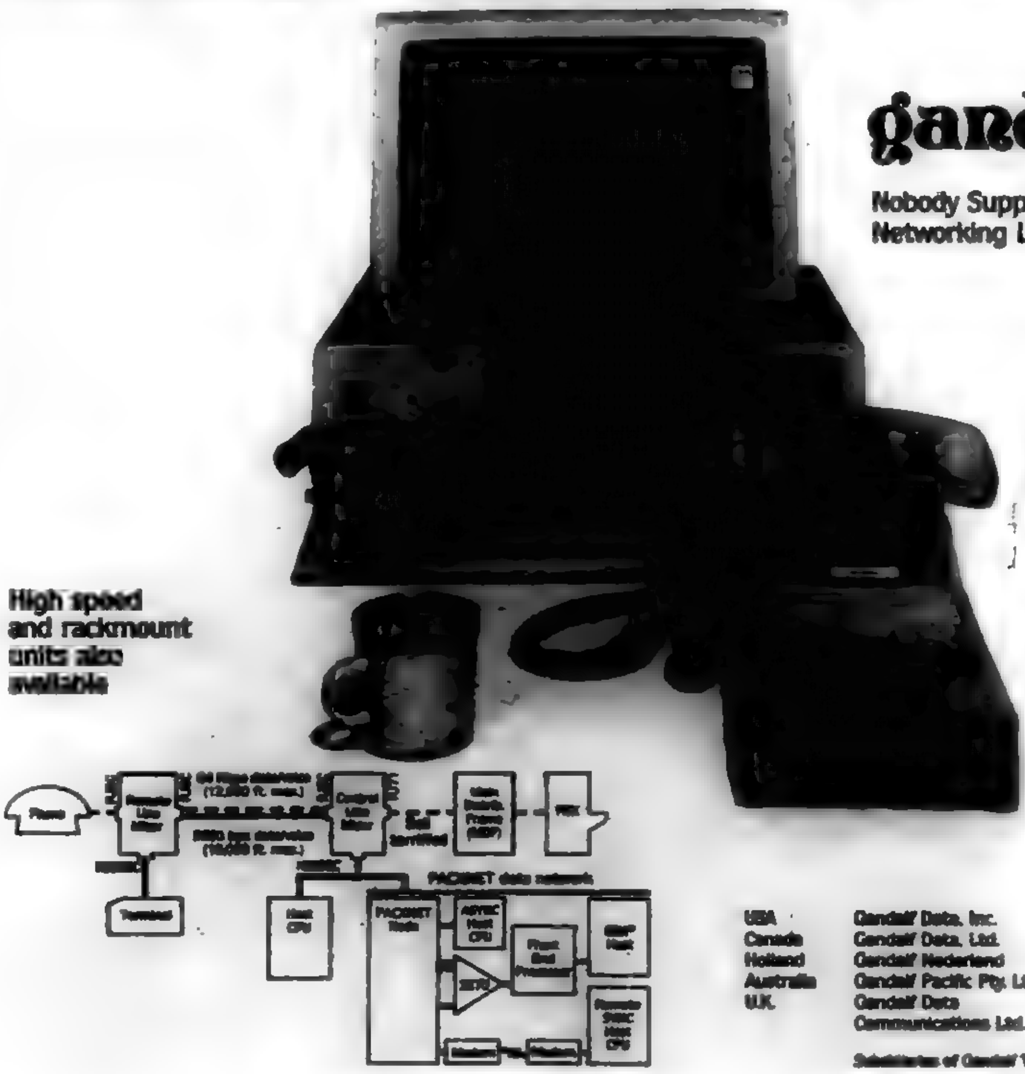

High speed and rackmount units also available

USA	Gandalf Data, Inc.	(312) 541-6060
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U.K.	Gandalf Data Communications Ltd.	(0925) 818484

Subsidiaries of Gandalf Technologies Inc.

LANs lean

CONTINUED FROM PAGE 45

ness through the bidding process. This is a little short-sighted. The lowest bid can turn out to be a risky proposition for everyone else involved.

It's frustrating for the reseller, who consults with the user, helping to determine office and technical needs, testing equipment and mapping out system specifications, only to lose the bid and all that preliminary work to a lower offer.

No wonder one former network reseller doesn't paint a pretty picture of his previous occupation. "It [networking] is not a good market for good [full-service, full-support] people," he says.

From a user's perspective, sometimes things work out just fine. But other times, the best offers come from resellers who aren't authorized to sell the systems — hardly a minor point. Other times, the bid is so low that there is no margin for support. The user gets his CheapLAN but ends up eating expensive service and training functions. Remember that frustrated reseller? He often comes back and cleans up the mess — courtesy of a stiff support contract.

A former West Coast network reseller, strong on service and support, closed his doors last fall after losing one too many contracts to poorly qualified low bidders. Bill Alderson laments the plight of knowledgeable network resellers: They're caught between a rock and a hard place: end users who only care about price and vendors who only care about volume. He closed his reseller business, Xmital, after "losing $500,000 telling users we give good service. Users used us and abused us," he says.

Networks have become such a commodity that quality dealers are going out of business because they cannot compete with dealers that sell below list price and lack a service overhead.

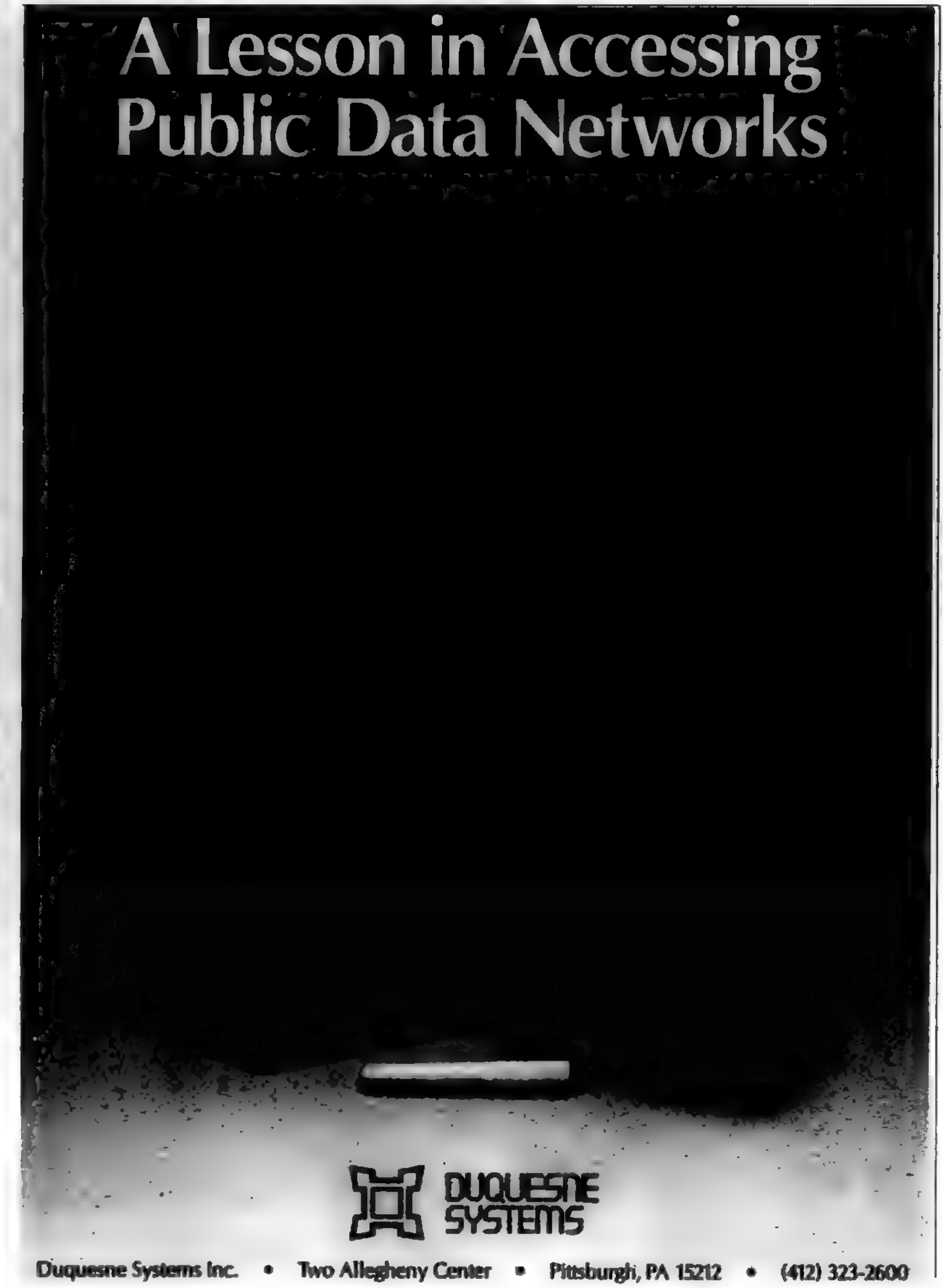
As for the vendor, well, it faces bad word-of-mouth at minimum. The problem with independent LAN vendors is that many simply cannot afford to provide service and support directly to the user. Indeed, many resellers have complained about the training and support *they* receive from these vendors.

The point is, despite all this talk about the strategic importance of connectivity and backbone networks, many corporate buyers are showing dangerous signs of buying networks as if they were commodity products. Buyers with that attitude had better think twice. For peace of mind, it just might pay to take some free advice from Alderson.

"You can't have both, users. If you want good service, you've got to pay for it," he says. Networks are so hot that hundreds of people with minimal qualifications are hanging out their shingles as network specialists. "Unfortunately, most users wake up to the fact that discounters don't provide service only after they find themselves stuck with thousands of dollars in equipment that doesn't work," Alderson adds.

Now that is a nightmare situation.

Keefe is a *Computerworld* senior editor, networking.



A Lesson in Accessing Public Data Networks

DUQUESNE SYSTEMS

Duquesne Systems Inc. • Two Allegheny Center • Pittsburgh, PA 15212 • (412) 323-2600

IBM link

CONTINUED FROM PAGE 45

nates the need to synchronize timing between communicating mainframe channels, Lewis claimed. This increases maximum distance between two hosts or between a host and a peripheral, since a synchronized link can go out of commission if it takes too long for an acknowledgment to arrive.

Buffering also gives the 5100/R greater flexibility in allocation of T1 bandwidth, according to Lewis. For example, a communications manager can allocate part of the 1.5M bit/sec. capacity for voice communications during the day, but reserve the whole T1 band for data center updating overnight.

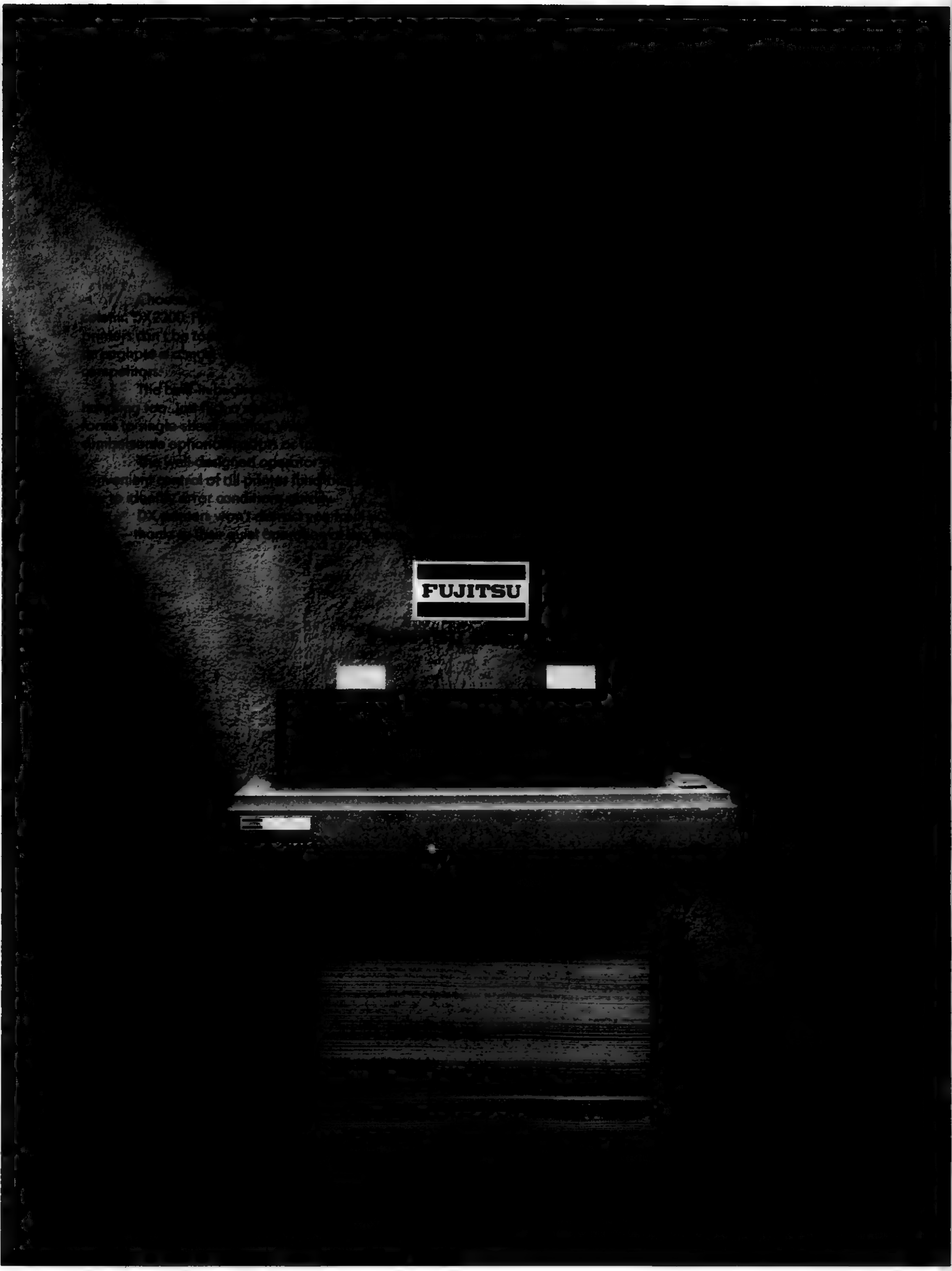
Where the original 5100 was a point-to-point channel link, the 5100/R can handle channel-to-channel communications for up to 10 hosts using IBM's IMS/Multiple Systems Coupling feature, so that terminals attached to one host can access data on other hosts by high-speed local or remote links, Lewis said. By acting as an interface between multiple hosts and terminals, the 5100/R can eliminate the need to designate a different Systems Network Architecture subarea address for each mainframe, he added.

Multichannel fiber-optic link

Multiple 5100/R's linked together through a broadband local-area network can support up to 65,000 channels, Computer Network Technology claimed. The company said it plans to introduce a multichannel fiber-optic link between 5100/Rs, based on the Fiber Distributed Data Interface industry standard. It did not give a date for the release.

The 5100/R's T1 networking capabilities include load leveling, alternate routing and error checking. Optional network management features include network usage, monitoring and diagnostics. The Channelink 5100 family supports a range of existing IBM mainframe applications including Virtual Terminal Access Method and Remote Job Entry, according to Computer Network Technology.

The system is priced at $70,000 for a point-to-point, dual-T1 link between two mainframes, which includes a 5100/R for each system. The vendor said the 5100/R will be available in quantity by the end of this month.



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FUJITSU

NEW PRODUCTS

Local-area network software

Network Software Associates, Inc. has unveiled **Remotetalk**, which is personal computer-to-PC synchronous-communications software said to offer both remote-control and concurrent background file-transfer capabilities.

Remotetalk runs on IBM Personal Computers and compatibles and communicates via IBM's Synchronous Data Link Control protocol. The remote-control capabilities allow two PCs to link together as one. Files can be transferred in foreground or background mode.

Remotetalk operates at up to 19.2K bit/sec. Features include an interactive message window, password protection, data compression, an idle timer and Help.

Remotetalk costs $295.

Network Software Associates, 22982 Mill Creek, Laguna Hills, Calif. 92653.

Traveling Software, Inc. has announced **Lap-Link**, a serial-transfer kit for use between IBM-compatible laptop and desktop computers.

Lap-Link is said to achieve a minimum data transfer rate of 115.2K bit/sec. as well as allow the transfer of individual files, directories and entry disks. The user can specify files for transfer by DOS wild cards, by the date on which the files were created or last modified or by selecting those files on one computer that are different from those on the other.

Lap-Link costs $129.95.

Traveling Software, 19310 N. Creek Pkwy., Bothell, Wash. 98011.

Headlands Communications Corp. has announced **PC-Talk4**, an enhanced version of its data communications software for the IBM Personal Computer.

PC-Talk4 features the Xmodem CRC error-checking protocol, screen emulation of Digital Equipment Corp.'s VT100/52 and expanded macro capability split-screen editing.

Other features include on-line data transfer rate changes, a silent mode, a dedicated hang-up command and 36 user-defined program default settings.

PC-Talk4 is priced at $129.

Headlands Communications, P.O. Box 8, Tiburon, Calif. 94920.

Network management

Intel Corp. has announced its **Multiserver** system, including a set of networking services.

The Multiserver system is said to provide a common networking solution with transparent-file access regardless of where the data resides on the network. It supports personal computers, departmental-level computers and mainframes.

According to the vendor, Multiserver provides the ability to share resources such as printers and peripherals and to exchange information between computers. Network services provided include print spooling, acting as a central link between PCs and mainframes and allowing a virtual terminal mode to gain access to data or files.

Multiserver systems are priced from $15,000 to $30,000.

Intel, P.O. Box 58065, 3065 Bowers Ave., Santa Clara, Calif. 95052.

Customer-premise equipment

Message Processing Systems, Inc. has announced **Auto-Tend**, an automated switchboard attendant.

The microprocessor-based system answers each call with a company greeting and provides the caller with the opportunity to direct the call without operator assistance. Each system can be expanded from four ports to eight, 12 and 16 ports. Each can process another call once the first has been handled.

Auto-Tend is priced from $12,400 to $24,340.

Message Processing Systems, 8848 Red Oak Blvd., Charlotte, N.C. 28210.

ARBITER VENTS PEER-TO-PEER PRESSURE

The Micro/Mainframe Cooperative Processing Software Solution

The pressure is mounting to integrate hundreds of increasingly more powerful PCs into existing networks. Networks with teleprocessing subsystems originally designed to support terminals.

Application backlogs have created pressure to provide advanced program communications between intelligent processors using current and next-generation languages and data bases.

There's pressure between peer groups in organizations to use their own mainframe- or PC-based tools.

And there's even pressure on companies to make strategic connectivity decisions given the myriad temporary link fixes on the market and the promises of future deliverables from a single vendor.

The answer to peer-to-peer pressure is peer-to-peer communications. The answer is Arbiter.®

Arbiter is a VTAM-based, cooperative processing sub-system which was designed to integrate mainframes and microcomputers as peers. As a VTAM subsystem, Arbiter is capable of supporting hundreds of PCs simultaneously with higher data transfer rates and lower system overhead than CICS- and TSO-based approaches. Fully SNA-compatible, Arbiter not only improves the performance of existing networks with LU 2 and async devices, but, by design, is compatible and performs optimally with LU 6.2.

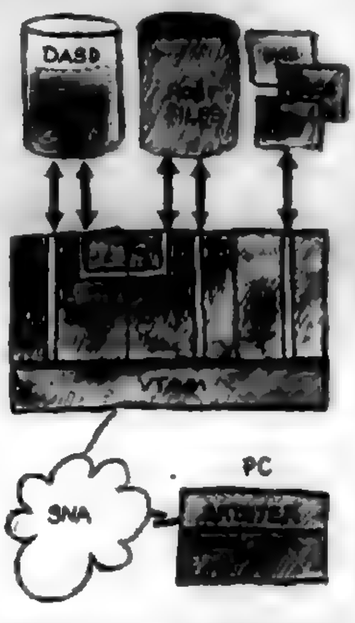
Arbiter's advanced file transfer facilities include application program interfaces (APIs) to existing COBOL, PL/I, Pascal and Assembler applications, and a general-purpose External File Interface utility. In addition, Arbiter delivers total end-to-end communications between 4GL and data base extraction packages (e.g. SAS®) and PC tools like Lotus 1-2-3® and dBASE II® and III.®

Data transfers may be interactive or batch in both directions, directly or through remote disks using familiar PC DOS commands. Arbiter's dynamic management of VSAM data sets and a more efficient VTAM-based transport vehicle result in a superior implementation of the virtual disk concept.

Arbiter addresses major security considerations by complete integration with RACF, CA-TOP SECRET™ and ACF2.® Arbiter also generates SMF records to provide information for accounting, auditing, and network and CPU performance measurement.

With Arbiter, management of the micro/mainframe environment is based on an organization's policy rather than technical product limitations.

So, to find out why Arbiter is without peer, call Tangram Systems Corporation today at (919) 481-4444. Ask about putting Arbiter to work immediately with a trial evaluation.



Arbiter's cooperative processing architecture: The Remote Disk Environment (RDE) provides a seamless interface to remote disks on the host. The External File Interface (EFI) transfers data to and from files on the host. The Interactive Session Relay (ISR) connects a PC to another mainframe subsystem simultaneously.

TANGRAM SYSTEMS CORPORATION

Tangram Systems Corporation
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Cary, NC 27511-1999
(919) 481-4444

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Octel Communications Corp. has introduced **Aspenlink**, a transaction processing software product said to provide access to information in a computer data base by using the telephone.

According to the vendor, Aspenlink integrates voice messaging, call processing and transaction processing applications on one system. Application-specific software works with the Aspen Voice Processing System to communicate with the host computer and the caller.

The Aspenlink interface is available for use with the IBM System/36 and 38 and IBM 3270-type terminals. It is sold as a software option on Aspen voice processing systems.

Aspenlink Transaction Processing software costs from $10,000 to $25,000.

Octel Communications, 890 Tasman Drive, Milpitas, Calif. 95035.

Links

Ansa Software has announced a structured query language (SQL) mainframe connection for Paradox, its relational data base management program for IBM Personal Computers, called **PC/SQL-link**.

PC/SQL-link's menu-driven SQL generator is said to allow Paradox users to gain access to and transfer data stored on IBM's DB2 and SQL/DS relational data base systems without leaving the PC environment. Data can be reformatted, analyzed and manipulated on the PC. Paradox users can also upload data stored in Paradox to host relational tables on mainframes.

Paradox and PC/SQL-link costs from $14,900 to $19,800 for a host license and from $295 to $495 for the PC license.

Ansa, 1301 Shoreway Road, Belmont, Calif. 94002.

Protocol converters

Siemens Data Switching Systems, Inc. has announced the **Advanced Network Processor 1220**, an X.25 concentrator.

The concentrator is said to provide access to X.25 networks for non-X.25 terminals. It also permits multiple terminal users to share access to a single X.25 line. The Advanced Network Processor 1220 ensures X.25 compatibility with IBM Binary Synchronous Communications (BSC) 3270, IBM BSC RJE, IBM Systems Network Architecture/Synchronous Data Link Control, asynchronous and X.25 attachments.

The Advanced Network Processor 1220 is priced at about $5,000.

Siemens Data Switching, 186 Wood Ave. S., Iselin, N.J. 08830.

Electronic mail

C&W Incotel Ltd. has announced **Secure Electronic Mail**, a software module said to provide automatic auditing features for message traffic sent via Digital Equipment Corp.'s All-In-1 office menu system.

The module is said to prevent undetected duplication of any part of a message. It also makes undetected nondelivery of a message impossible and provides the originator with a detailed delivery-status report on demand. It automatically handles all monitoring, receipt time-out detection and other integrity factors and provides a display of the original message when receipt status is presented.

Secure Electronic Mail is reportedly priced at $6,000.

C&W Incotel, 5 Penn Plaza, New York, N.Y. 10001.

Security

Cylink Corp. has announced the **Cidec-MS** data encryption standard-based medium-speed digital encryptor.

The Cidec-MS operates in full-duplex mode for synchronous communications at rates from 1.2K through 112K bit/sec. It operates in configurations in which a synchronous clock is provided by the network or by the customer's terminal equipment. It is available with an RS-232C or V.35 interface.

The Cidec-MS implements a proprietary automatic electronic key management system.

The Cidec-MS is priced at $2,500.

Cylink, 920 W. Fremont Ave., Sunnyvale, Calif. 94087.

Modems/Multiplexers

Connecticut Technical Corp. has announced a series of **Modem Eliminators** said to replace a pair of in-house short-haul modems and allow local synchronous or asynchronous bidirectional communications.

The Modem Eliminators are available for RS-232-, V.35- and RS-422-compatible equipment. A single Modem Eliminator is said to permit user equipment to be separated by distances of up to 4,000 ft.

Features include front-panel selection of data transfer rates, clock mode and source, digital loop-back diagnostics, interface-activity LEDs and a monitor port.

The Modem Eliminators are priced from $250 to $550 and are available in stand-alone or rack-mount modules.

Connecticut Technical, P.O. Box 4607, Stamford, Conn. 06907.

Telenetics Corp. has introduced the **Model ED208** synchronous 4,800 bit/sec. stand-alone modem.

The modem is said to function full-duplex over four-wire leased lines, conforming to AT&T 208 standards. In a two-wire CCITT leased-line or switched network, the modem operates in half-duplex to V.27 standards. Over two-

Continued on page 58

NetView from IBM.®

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"NET/MASTER Is The Most Complete Network Management Solution Available"– Datapro*

The way to solve the network management puzzle is with software components that are made to fit together.

That's why you need to compare NET/MASTER with NetView.

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NCR

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Continued from page 55

wire, dial-up lines, an X.25 function supports pseudo-full duplex.

The modem is said to feature automatic calling and provisions for callback security.

The Model ED208 is priced at $1,245.

Telenetics, 895 E. Yorba Linda Blvd., Placentia, Calif. 92670.

Raycom Systems, Inc. has announced the **Raycom 5000 Series Coax Multiplexer** for IBM 3270 systems.

The series includes four multiplexer units. A 32-port unit and a 16-port unit are available for controller site use; a 16-port unit and an eight-port unit are available for the terminal site. The multiplexer units are interconnected by standard RG-62/AU coaxial cable.

The multiplexers are compatible with Type A IBM 3270 equipment. Each is available with RJ-11 connectors.

The 32-port controller unit costs $1,875; the 16-port controller unit is $1,550. The 16-port terminal unit costs $1,355 and the eight-port terminal unit is $990.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301.

Sigma Information Systems has introduced a Digital Equipment Corp.-compatible eight-line asynchronous communication multiplexer designed on a single dual-wide module, called the **SCD-DHV11/8**.

All eight lines of the multiplexer are said to have full modem control with RS-232C and RS-423 operation. Four lines can operate under RS-422. The module includes a 256-char. buffer for received characters and direct-memory access for transmitted data. Each communication line is independently programmable for word format and hardware-character echo, as well as for split-transmit and receive-transfer rates up to 38.4K bit/sec.

The SCD-DHV11/8 costs $792.

Sigma Information Systems, 3401 E. La Palma Ave., Anaheim, Calif. 92806.

Adaptive Computer Technologies has introduced the **Act 154**, an error correcting compression modem.

The full-duplex, asynchronous modem is said to follow the standard Hayes Microcomputer Products, Inc. command set. Act 154 accommodates speeds up to 9.6K bit/sec. over standard 2,400 bit/sec. dial-up lines or up to 4.8K bit/sec. over 1,200 bit/sec. lines.

The modem uses full Communications Regulatory Commission-16 error-checking code. According to the vendor, the Act 154's data compression results in a high compression ratio on all types of data, performing on text, spreadsheets, data base files, binary object code, computer languages, on-line transactions, interactive graphics or any combination of these.

Act 154 costs $895.

Adaptive Computer Technologies, 2475 Augustine Drive, Santa Clara, Calif. 95054.

Diagnostic equipment

Communications Solutions, Inc. has announced the **DIA/DCA Product Assurance Package** designed for users of the vendor's Access communication products.

The package is said to test the capability of office systems to support IBM's Document Content Architecture (DCA) and Document Interchange Architecture (DIA). The program allows users to test compatibility with known applications such as IBM's Personal Services software and Disoss. It includes the Access/DIA Automated Test Kit, the DIA Compatibility Kit, the DCA Compatibility Kit and the vendor's Computer Services.

The Access/DIA Automated Test Kit and the DIA Compatibility Kit cost $6,000 each. The DCA Compatibility Kit costs $7,000. All three together cost $17,500. The Computer Services Shared Use Disoss includes unlimited use for up to 20 users for $5,000 per month.

Communications Solutions, 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

Progressive Computing, Inc. has introduced two personal computer-based **protocol analyzers**, one for decoding Systems Network Architecture protocols and one for decoding X.25 protocols.

Both products are for use with the vendor's LM1 Line Monitor add-in board. They are said to interpret and translate the meaning for every bit and byte in the data communications protocol. The LM1 operates at up to 72K bit/sec. full duplex.

The SNA and X.25 software cost $295 each. The LM1 board costs $1,595.

Progressive Computing, 28 Greenwood Court, Glen Ellyn, Ill. 60137.

Control Systems Technology, Inc. has introduced a portable, battery-operated data line monitor called the **CST Dataprobe I**.

The unit is available with asynchronous and optional synchronous protocols including Binary Synchronous Control, Synchronous Data Link Control, H Data Link Control, Systems Network Architecture and X.25. According to the vendor, it can achieve data rates of up to 19.2K bit/sec. It offers communications protocol analysis, data network monitoring, equipment installation, product development and systems integration capabilities.

Dataprobe I is priced from $1,195 to $1,495.

Control Systems Technology, 19045 Cherry Bend Drive, Germantown, Md. 20874.

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SYSTEMS & PERIPHERALS

HARD TALK

James Connolly

A mainframe market stall

The situation has not reached the point where everyone is standing on a corner watching the world pass by. But quite a few people have been tentative about moving in the mainframe market for longer than most observers expected.

In addition, if conversations with MIS managers and recent surveys are indicative, predictions that the market for new mainframes will pick up by the third quarter of this year may be off the mark.

More, not fewer, managers seem to be reporting in informal conversations that they are set for CPUs this year or that an inexpensive upgrade will suffice for not only this year but 1988 as well. With the caveat that most of these statements came in day-to-day conversations, rather than a formal survey, it is apparent that mainframe growth may have stabilized to a degree where the best times of the product cycles for the IBM 3090 and its equivalents are past.

Even managers questioned after IBM enhanced the 3090s two months ago frequently report that they have enough computing power or enough options — such as used IBM 3080s — to last them well into 1988 or 1989, when analysts predict IBM will be offering a third generation of 3090s or perhaps even moving toward the 3090's re-

Continued on page 62

Sierra CPUs bump XA's limits

NAS machines hit 2G in memory, signal revaluing of architecture

BY JEFFRY BEELER
CW STAFF

ANALYSIS

IBM's Extended Architecture (XA) still probably has a number of years to go before it reaches the end of its useful life. But technology is already beginning to overtake XA, as a recent hardware announcement by National Advanced Systems Corp. (NAS) demonstrates.

Included in the announcement was word that NAS has technologically overhauled its entire AS/XL mainframe series to allow the Sierra-class machines to expand to 2G bytes of main memory, the largest amount XA can architecturally accommodate. The refinements, which quadrupled the AS/XL line's internal storage size across the board, make NAS the first vendor to bump up against the 2G-byte limit.

Part of the increase in main memory resulted from the replacement of the processor family's existing 256K-bit random-access memory (RAM) chips with parts that are four times more sophisticated. But the addition of 1M-bit RAMs is only half the story behind the AS/XL's expanded capacity.

The other half has to do with NAS's recent adoption of 64K-byte storage protection arrays, the densest in industry history, according to Carl Claunch, the company's director of systems marketing. Previously, all five models in the AS/XL series used 16K-byte arrays.

To understand why improved storage protection is so crucial to the company's latest hardware enhancements requires some basic knowledge of how IBM CPUs manage their main memory.

Every system that conforms to Series/370 architecture divides its internal storage into pages containing a specified number of kilobytes. To ensure data integrity, the architecture further requires the systems to maintain a fixed proportion of main memory to storage protection, which prevents a bug in one program from causing trouble in another. The more RAM a mainframe supports, the more storage protection it demands.

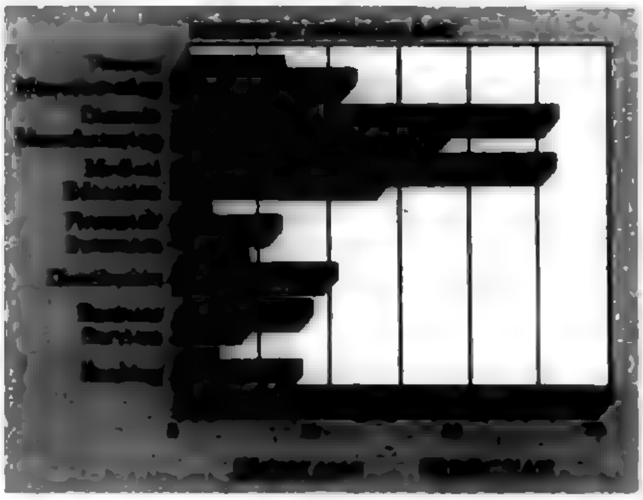
Like the AS/XL series, IBM's recently introduced 3090E family incorporates 1M-bit components. But because the circuit technology is shackled with 8K-byte storage protection arrays,

Continued on page 68

Data View

Market trends

IBM 4300s and Digital Equipment Corp. VAXs still vie for different markets



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CW CHART SUSAN ALDAM

EMC adds memory for 3080s

NATICK, Mass. — EMC Corp. has moved into the IBM mainframe add-on market with the introduction of main memory upgrades for IBM 3080 host systems.

According to EMC officials, the upgrades have a 30% price advantage in comparison with IBM memory upgrades.

"The product follows our introduction of main storage upgrades for IBM 4381 computers and Powercache-16 cache storage upgrades for IBM 3880 storage directors," said Greg Strakosch, senior product manager for EMC's large systems group.

"We are continuing to look for ways to provide IBM mainframe users with cost-effective system-enhancement products. We want to give these users the same performance and reliability improvements that we've been offering mini and superminicomputer users for years," Strakosch added.

The upgrade uses 256K-bit memory chips and is supported with a standard lifetime warranty, which includes a no-cost replacement of the upgrade for any reason, according to the company.

A 16M-byte upgrade costs $110,000.

HP pits 330 vs. Sun, DEC

BY NINAMARY BUBA MAGINNIS
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. is aggressively eyeing the engineering workstation market with the recent debut of its HP 9000 series Model 330 workstation, a replacement for the Model 320, according to a Wall Street analyst who monitors that market.

With a monochrome, 17-in. display and base price of $12,700, the workstation is pitted directly against Sun Microsystems, Inc. and Apollo Computer, Inc. workstations, said Peter D. Schleider, senior vice-president for the New York-based brokerage house of L. F. Rothschild, Unterberg Towbin.

Continued on page 64

Inside

- **Sky Computer puts out near supercomputer Vortex accelerator boards. Page 62.**
- **The Bank of Tokyo Ltd. plans to extend its international banking network. Page 64.**
- **Palantir Corp. enhances document processing system. Page 68.**

ITT spices 9000s with MLU systems

BY ALAN J. RYAN
CW STAFF

TEMPE, Ariz. — ITT Courier Terminal Systems, Inc. recently enhanced its 9000 series of terminals with multiple logical units (MLU) software, adapter cards displays that connect directly to twisted-pair wiring schemes and enhanced controller and display models.

The terminal series, which is compatible with IBM's 3270 product line, ranges in price from $1,445 to $2,145 for basic and extended function models.

With the MLU software, the Courier 9000 displays will have a higher level of functionality, according to Lowell Coulson, manager of product marketing.

The software allows six simultaneous sessions per display, up to a total of 128 logical 3270 sessions per controller, the vendor said.

Adapter cards and a twisted-pair version of Courier display models permit the use of twisted-pair wiring between the 900's controller and devices located up to 5,000 feet away, the vendor claimed.

ITT's director of product marketing, Walter Nagel, said twisted-pair wiring capability is popular because of IBM's Token-Ring Type III cabling system. "It gained popularity in the European community, and it is increasing its popularity in the U.S.," he said. "It's just a very cost-efficient manner to connect terminals to clusters."

The enhanced controllers will include Release 12 software, which incorporates features including compatibility with IBM's Systems Network Architecture Alert diagnostics and support of the MLU and twisted-pair options.

List prices of the controllers will not change, the company said.

Courier also announced the 9322 parallel and 9323 serial printer controllers to support printers via twisted pair. Each costs $1,600.

The displays have been enhanced to support multiple logical units and other features provided by the Release 12 controller software. Those prices have also remained unchanged, Courier said.

Current users who wish to upgrade can do so through a display upgrade kit, which costs from $500 to $2,000, according to the vendor.

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Aid pumps ATs into near-supers

BY ALAN J. RYAN
CW STAFF

LOWELL, Mass. — Sky Computers, Inc. recently announced a computer board the firm said can give an IBM Personal Computer AT and some workstations near-supercomputer performance in certain applications.

The Vortex board-level array processor family "addresses a growing demand for near-supercomputer levels of performance on scientific/engineering workstations," said Howard Klemmer, the company's chief executive officer.

"The idea of this whole product area . . . is to bring the price of near-supercomputing down to a practical and affordable price range," Klemmer added.

Designed for high computation

Vortex was designed for use in a variety of scientific applications that require high computation, including geophysical, mechanical computer-aided design (CAD), electrical CAD, simulation, aerospace and computational graphics.

These applications involve number-crunching computations in the 5 to 10 million floating-point operations per second (MFLOPS) range, according to the vendor.

"We're not replacing their supercomputers by any means, but if you have an application that requires intense number crunching, it's not necessary to go out and buy a supercomputer for that," Sky spokesman Bruce Nelson said.

The Vortex family reportedly works with workstations based on the Intel Corp. Multibus II memory bus and the Texas Instruments, Inc. Nubus.

Nelson said Sky is working to make the Vortex compatible with the VMEbus.

The Vortex can execute 20 MFLOPS in single-precision (32-bit) mode or 10 MFLOPS in double-precision (64-bit) mode, the vendor claimed.

"Many researchers and many of the OEMs who would like to get [near-supercomputer] performance really can't afford to pay large amounts of money for the machine. This can give them that performance," Klemmer said. "It really becomes a substitute process for guys who can't afford to jump up to the big machines."

The board is priced at $9,900 for the PC AT version. Prices for the Multibus II, Nubus and VME versions start at $11,900.

Prices vary depending on memory options. Deliveries are scheduled for 90 days.

The $9,900 versions include a baseline arithmetic unit, a processor with 1M byte of on-board memory, documentation and software library routines.

Mainframe

CONTINUED FROM PAGE 59

placement, nicknamed Summit.

Of course, IBM is not the only company dealing with the mainframe market slowdown.

It is just that IBM controls 75% or more of the mainframe market. Some of the managers reporting nonacquisition plans run IBM plug-compatible equipment from companies such as Amdahl Corp. and National Advanced Systems Corp. and IBM-incompatible vendors such as Unisys Corp., formerly Burroughs Corp. and Sperry Corp., and Honeywell, Inc. All of these companies are likely to say their systems are selling well and are likely to have statistics to support those claims.

But what should be of concern to all vendors is the undercurrent in the user community.

There is a feeling that customers cannot or should not buy new mainframes. And despite the claims of downsizing advocates, the customers are not basing their decisions solely on the availability of smaller systems or microcomputers that can be networked.

3080s gain popularity

A late-1986 user survey by International Data Corp., a Framingham, Mass., market research firm, found that used 3080s were gaining popularity, while lower end 3090 models fell out of favor.

The reasons for managers opting for standing pat or going with minimal upgrades are as varied as the companies in the Fortune 1,000.

One may cite a downsizing strategy, but another may mention a downturn in his own company's profits.

One may talk about a lack of functional differentiation between the 3080 and 3090, while another will say her company invests heavily in equipment only every three years and that last year was its year to spend.

The bottom line is that there may be little room for optimism among those watching for the mainframe market to take off.

Connolly is *Computerworld*'s senior editor, systems & peripherals.

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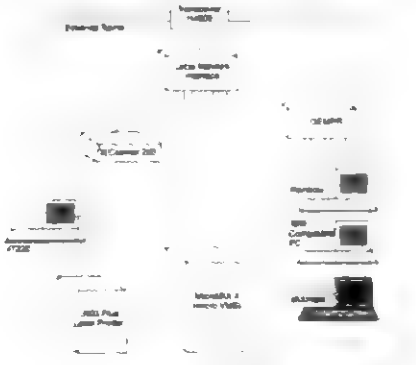

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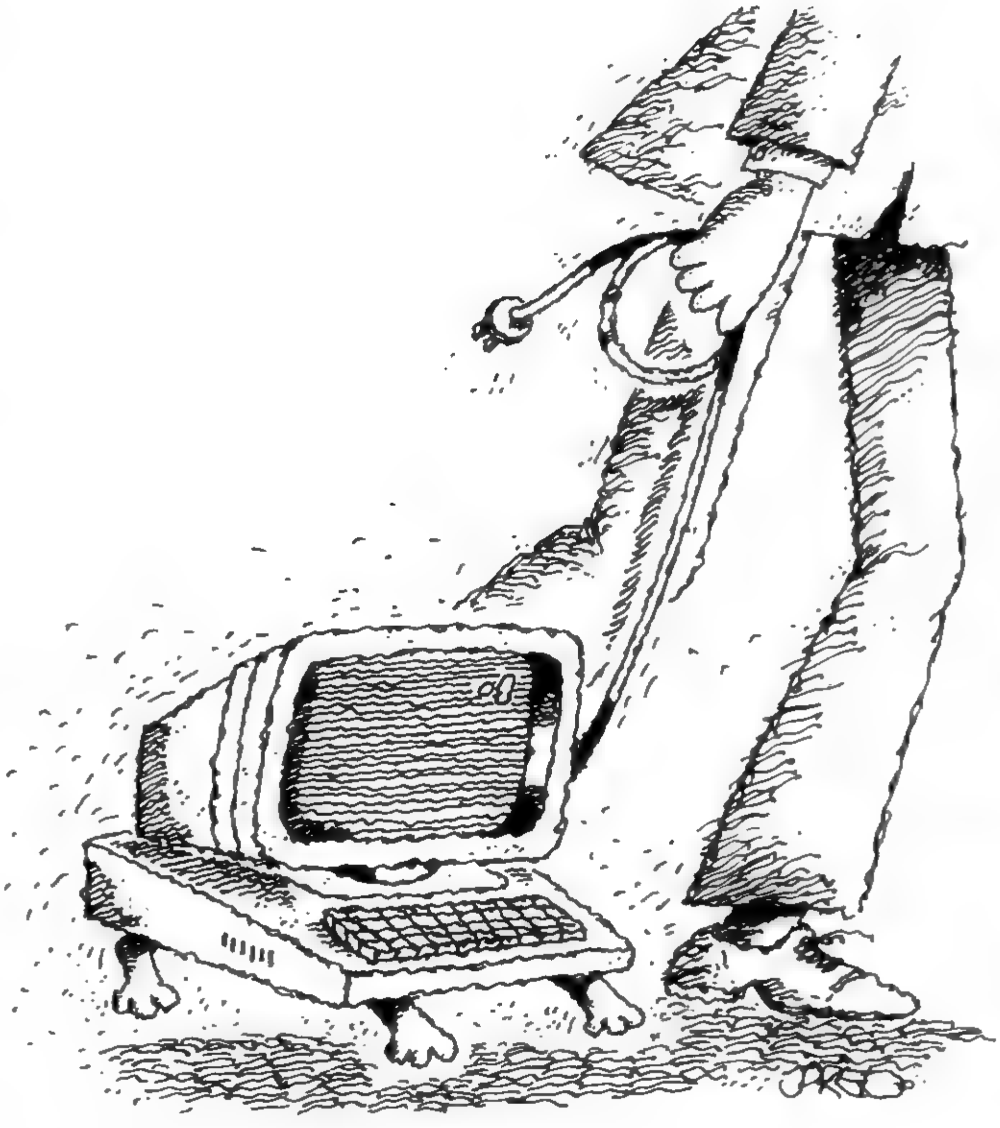
Issues of the Information Age:

The paradox of power.



The Information Age, for all its potential, has brought with it a new kind of problem. Often, the machines that contribute so much to the flood of information do little to help most of us cope with it. They are difficult to use, rigid in their demands, almost arrogant in their inability to work with any but their own kind. They are the muscle-bound tools of specialists.

In our view, the problem is not that the machines are too powerful for the rest of us. They are not powerful enough.

This is the paradox of power: the more powerful the machine, the less power it exerts over the person using it. We define a more powerful machine as one that is more capable of bending to the will of humans, rather than having humans bend to its will. The definition is deeply ingrained in AT&T. The telephone is such a powerful device precisely because it demands so little of its user.

AT&T foresees the day when the Information Age will become universal. People everywhere will participate in a worldwide Telecommunity. They will be able to handle information in any form—conversation, data, images, text—as easily as they now make a phone call.

That day is coming closer. One example: scientists at AT&T Bell Laboratories are developing "associative" memories for computers, further enabling the machines to work with incomplete, imprecise, or even contradictory information. That's perfectly natural for a human. What makes it a breakthrough is that these computers won't ask you to be anything else.

Telecommunity is our goal. Technology is our means.

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HP pits 330

CONTINUED FROM PAGE 59

The Model 330 delivers two million instructions per second and operates with a Motorola, Inc. 68020 microprocessor and Motorola 68881 floating-point coprocessor that run at 16.67 MHz, the vendor claims. Basic models come equipped with 4M bytes of memory with an option to expand to 8M bytes. The 32-bit wide I/O bus provides 6M byte/sec. bandwidth to high-speed peripherals yet remains compatible with earlier Series 300 interfaces and peripherals, HP said.

The 330 is targeted for engineers, scientists, programmers and architects and supports computer-aided engineering and design applications for test measurement, software development and electrical and mechanical design. HP is vying for the Apollo DN 3000, Sun 3/110 and Digital Equipment Corp. Vaxstation II workstation markets, the vendor said.

The 9000 series installed base includes 60,000 workstations, compared with Sun's 30,000 and Apollo's 35,000, Schleider noted. "So HP almost sold twice as many — but not in the same markets. Now they're starting to address those other markets and will leverage unit volume to do that. They made a commitment to it and now have got to get third parties to support the [HP-] UX operating system," he said.

Instrumentation largest sales

HP's largest workstation sales to date have been in instrumentation, instrument controllers, medical and analytical business markets, Schleider said. Now the firm is developing application software for computer-aided software engineering markets, the analyst said. "So, they're really going after mechanical development software themselves or contracting others to do so," he added.

Four Model 330 configurations come standard with keyboard, display, cabling, IEEE-488 peripheral/instrumentation interface, IEEE 802.3 local-area network port, RS-232C interface, two-channel direct-memory access controller, HP Human Interface Link and four-slot card cage. Hardware options include an HP DOS coprocessor for personal computer applications, a high-speed disk interface, a four-port RS-232C multiplexer, an I/O expander, disk storage up to 571M bytes and personal or high-performance engineering plotters and printers.

Four operating systems are available for the Model 330. HP-UX, a Unix-based operating system, is compatible with AT&T's Unix System V, Release 3 interface definition and has passed the System V, Release 3 validation suite.

Under HP-UX, the Model 330 is object-code compatible with other Series 300 systems and source-code compatible with HP Precision Architecture HP 9000 Model 840. A single version of an application will run on either model, HP said.

HP Basic 5.0 is enhanced for instrument applications. Basic provides extensive structure-programming features, high-level graphics capabilities and predefined mathematical and string functions.

HP Pascal is offered for its compiled-program performance and efficiency for high-level or complex programs, the vendor said. The Series 300 HP DOS coprocessor card turns the Model 330 into a personal computer, with access to IBM PC AT-compatible software.

The Model 330 is available in four packages. Model 330C includes the HP-UX Applications Execution Environment and a 16-in. color display with 1,024- by 768-pixel resolution that provides six planes of color for two-dimensional applications such as circuit design. Base price is $16,900.

The Model 330M includes the HP-UX Applications Execution Environment and a 17-in. monochrome display with 1,024- by 768-pixel resolution for applications such as software design, schematic entry, office automation and electrical-circuit design. The 330M lists at $12,700.

Model 330CMA includes a 12-in. color display with 512- by 400-pixel resolution in four planes, HP Basic 5.0 and high-speed disk interface. Designed for applications such as measurement-automation software design and high-performance instrument control, it costs $15,900.

Model 330MMA has a 12-in. monochrome display with 512- by 400-pixel resolution, HP Basic 5.0 and high-speed disk interface. For applications such as instrument control, the Model 330MMA lists at $12,500.

HARD BITS

Bank of Tokyo inks $16.5M Tandem deal

The Bank of Tokyo Ltd. says it will extend its international banking network by adding $16.5 million worth of **Tandem Computers, Inc.**, Nonstop transaction processing mainframes. As part of the second phase in its worldwide network implementation, the bank says it plans to extend the network to include Tokyo, New York and London. Sites will be linked in an on-line banking network with a Nonstop VLX at each site. The international network will handle funds transfer, connect personal computers, interface to wire-service carriers and facsimile transmissions between bank offices.

The Canadian government has chosen **Convex Computer Corp.**'s C-1 minisupercomputer to form the nucleus of the seismic reflection data processing operations for the Hibernia oil field, recently discovered off the coast of Canada.

Convex was also the choice for Woking, England's Spectrum Energy and Information Technology Ltd. Spectrum will use the system in seismic reflection surveying for land and marine hydrocarbon exploration, borehole seismic surveys and information technology, says Paul Blundell, managing director.

BBN Advanced Computers, Inc. recently sold four of its Butterfly parallel processors. Indiana University has a 16M-byte, 16-processor model with floating-point processors that the school will use for designing parallel compilers, graphics, artificial intelligence applications and genetic algorithms. Mitre Corp. installed a 32M-byte, eight-processor model for AI applications. FMC Corp. has a 12M-byte, three-processor Butterfly with three floating-point processors, and the Naval Research Laboratory bought a 128M-byte, 32-processor model that it will use for a range of computer-intensive operations.

Tandem Computers, Inc. and **Syntech International, Inc.** have signed an agreement to jointly market an integrated on-line lottery system. The Marathon II lottery system will include a Tandem Nonstop computer and Syntech player-activated terminals, clerk-activated terminals, video lottery terminals and applications software.

Researchers at the **University of Illinois** have developed a semiconductor switching mechanism they claim is so fast that current testing equipment cannot measure it. The diode will probably be used to improve communication devices in supercomputers, the researchers say.

The heterostructure hot-electron diode, or H^2ED, is made of gallium arsenide and aluminum gallium arsenide, layered by metal-organic chemical vapor deposition, a process for depositing microscopically thin layers of semiconductor materials. The H^2ED was developed by electrical and computer engineering professors James Coleman and Karl Hess and three doctoral students.

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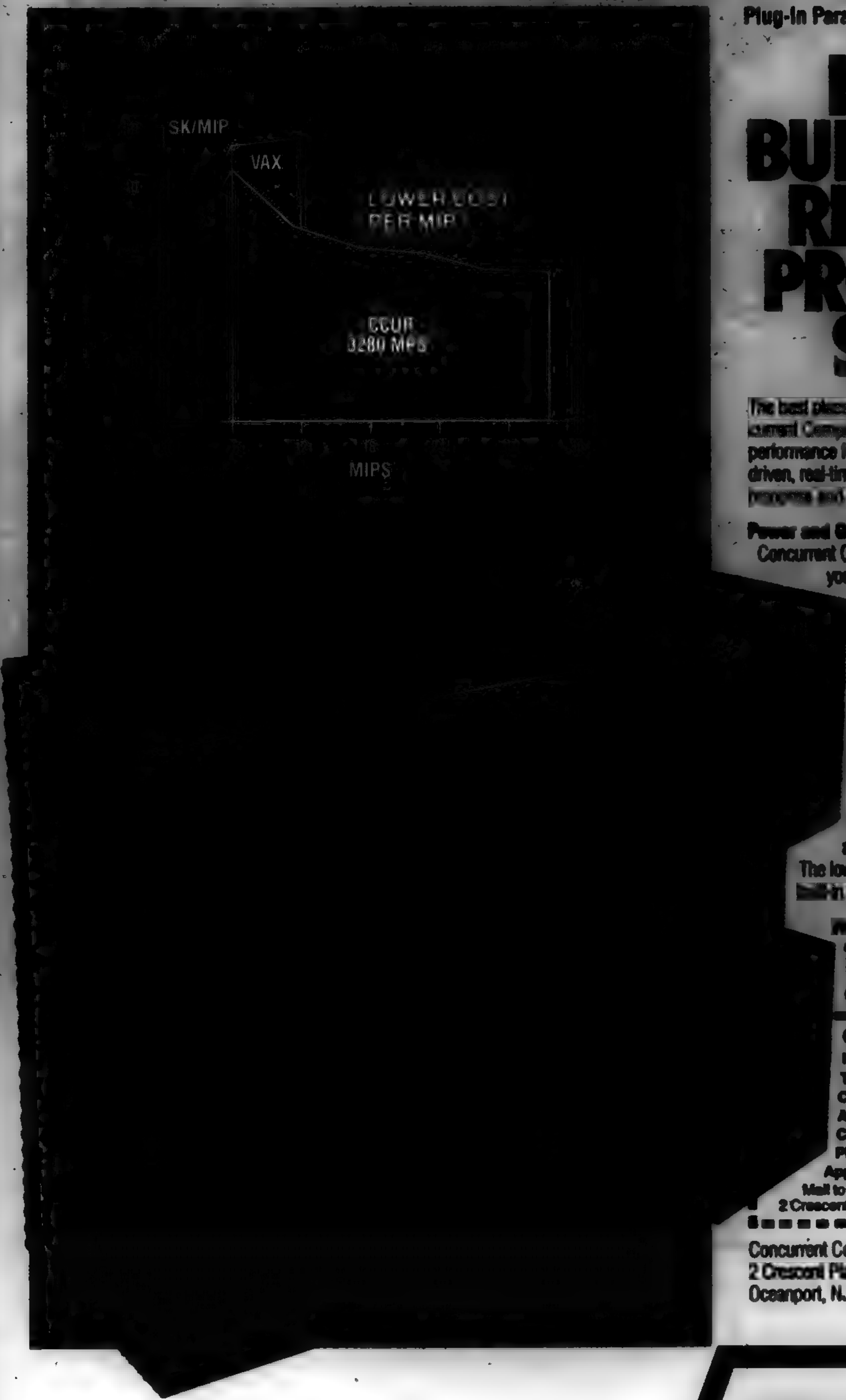

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documents throughout your IBM networks of mainframes, 8100s, 5520s, System 38s, System 36s, *and PCs*. What's more, it delivers full distribution services, as well as local and remote library services.

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ONE PLUS's unique document exchange capabilities makes it the only departmental system to cost-effectively integrate such a wide range of Honeywell, Wang and IBM systems, and IBM PC compatibles running WordStar, MultiMate, DisplayWrite 2 and 3, or using other DCA compatible commodity software. What were once islands of isolated Wang and PC computing can now enjoy full office functionality, as well as create, transfer, revise and store information in a range of native formats. Automatically. Transparently.

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Naturally, ONE PLUS is backed by TotalCare, Honeywell's nationwide hardware and software maintenance services. All of these services can be tailored to your individual needs.

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Together, we can find the answers.

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Sierra CPUs

FROM PAGE 59

Big Blue's maximum main memory is restricted to 256K bytes, just an eighth of what a fully configured AS/XL-90 or AS/XL-100 hold.

Likewise, Amdahl Corp.'s 5890-series processors are equipped only with 16K-byte arrays and are therefore constrained from expanding beyond 512K bytes of internal storage.

Someday, both IBM and Amdahl will reportedly follow NAS's lead and upgrade their own storage protection arrays to 64K bytes. When they do, all three vendors will again be on an equal footing, at least from a main memory standpoint.

On that fateful day, however, the companies will have jointly reached a storage-capacity impasse beyond which none will be able to proceed without fundamental changes to XA itself, according to computer scientists.

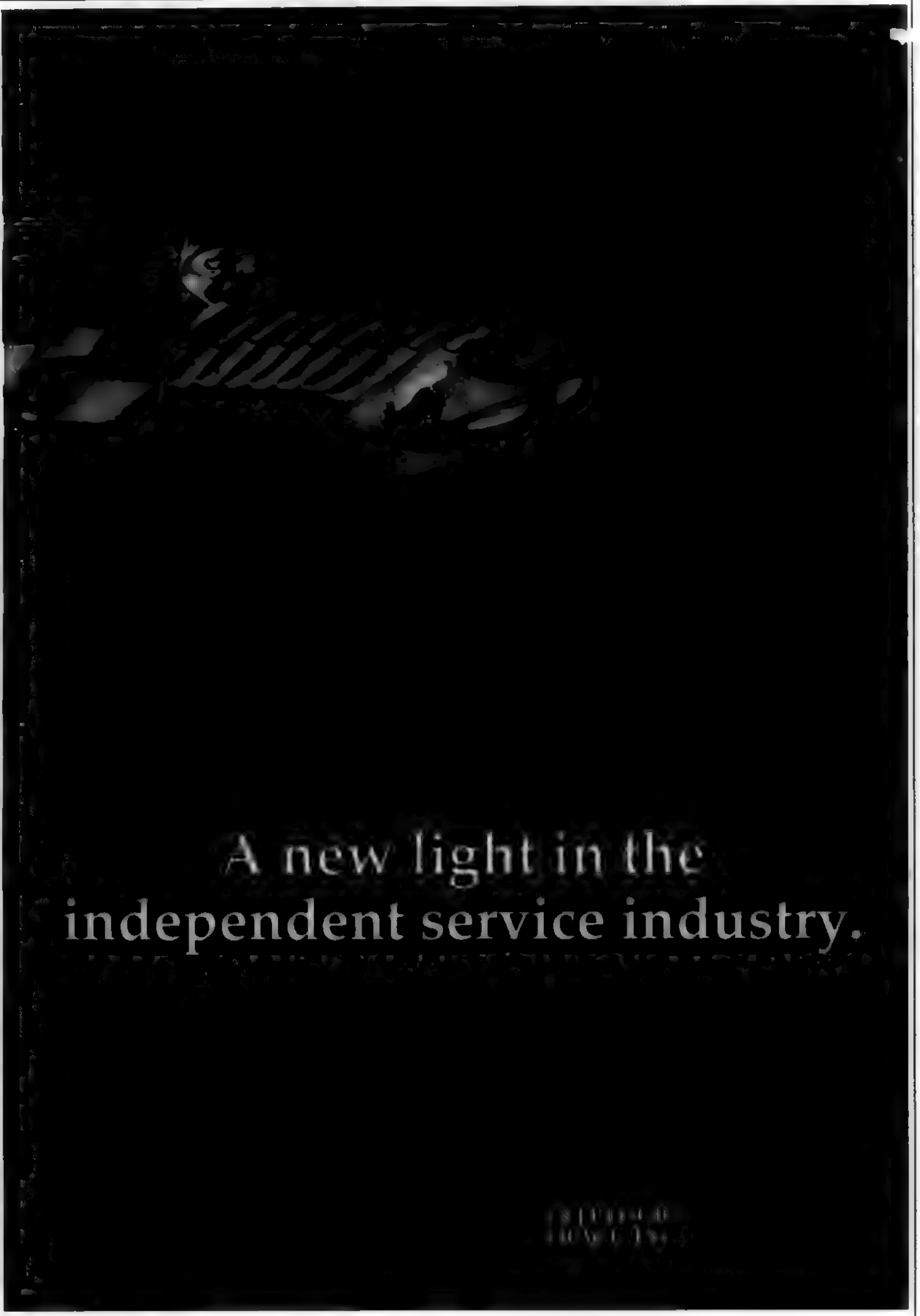
Why does current IBM architecture prohibit the direct addressing of more than 2G bytes of real storage? The answer lies in the size of the registers that are allowed under XA. Although the registers in IBM-style mainframes are theoretically 32 bits wide, only 31 of them are available for addressing. The remaining bit is reserved by the software for control purposes.

So what does the future hold for XA? What will happen when the technology in all IBM systems has advanced to the point that further refinements become meaningless because their architectural framework is no longer adequate to house them?

Eventually, IBM will be forced to extend its architecture yet again. But by what means the extension will be accomplished — and at what point Big Blue will stake its next addressing boundary — no one can say for sure.

In theory, IBM could circumvent the current 31-bit limit by implementing "shadow registers" and developing an as-yet-unknown kind of software to load and manage them. Under such a scheme, each existing IBM register might have behind it a shadow register, which could hold a certain number of additional bits," according to Carl Amdahl, former designer for Magnuson Computer Systems, Inc.

But although the use of shadow registers could undoubtedly overcome XA's existing barriers, the technique would also exact a heavy toll on both price and performance. "The more bits a system's registers contain, the more its hardware costs and the more time it needs to generate an address," Amdahl said. For those reasons, shadow registers remain firmly entrenched in the realm of industry speculation.


A new light in the independent service industry.

Palantir enhances processing

SANTA CLARA, Calif. — Palantir Corp. has announced the Compound Document Processor 3000 Extended Functions enhancement of the firm's Document Processing System. The CDP 3000XF is said to offer new functionality for forms processing, electronic publishing and data base applications.

The extended functions product consists of the CDP and Pro Series Software that enables document entry and verification, automatic data capture, conversion, checking and correction. The CDP 3000XF includes expanded character recognition, additions to the special character set and support for dot matrix print, Palantir said.

The CDP 3000XF reportedly can read degraded characters, poor-quality photocopies and characters on or touching vertical or horizontal lines.

Customers with existing CDP 3000s can upgrade free of charge if they have an on-site third-party maintenance agreement with Eastman Kodak Co., Palantir said. Customers without a maintenance contract can purchase the XF enhancement at $2,500 per machine.

The CDP 3000XF lists at $39,500 and is deliverable within 30 days, according to the vendor.

YOU'VE ONLY GOT UNTIL APRIL 3 TO GET INTO DEPARTMENTAL COMPUTING.

MAY'S COMPUTERWORLD FOCUS ISSUE ON DEPARTMENTAL COMPUTING CLOSES APRIL 3!

Departmental computing has been helping companies make major productivity gains for over a decade. And with advanced systems, applications, and enhancements continually being announced, implementation of department computing is very much alive and well. More than ever, MIS professionals need information on making it work for them. And that's what they'll get when they turn to the May *Computerworld Focus* on Departmental Computing.

May *Computerworld Focus* will give our readers the whole departmental computing story, cover to cover. It'll report on implementation strategies, training, new products and applications, DBMS options, communications and integration, security, and more. Plus, a special feature section will analyze the IBM 9370 in terms of both users and the competition.

Computerworld Focus. Every month it helps you reach over 127,000 paid subscribers and thousands of pass-along readers. And it puts you in touch with a powerful audience of MIS professionals involved in a market with over $120 billion to spend annually.

Now is the time for you to get into departmental computing. And the May issue of *Computerworld Focus* will help you do just that.

In May, departmental computing is our focus.

Departmental computing and its implementation. In-depth interviews with three MIS managers and discussion of their successful implementation strategies. Plus—results of a survey over 100 departmental computing user sites.

Mid-range systems. Is another mid-range systems war in the offing? May *Computerworld Focus* looks at which vendors offer what and who will prosper.

Communications and integration. An analysis of the pros and cons of networking PCs—and how best to incorporate PC clusters into departmental computing.

Software environment. A detailed look at where software is headed in today's departmental computing arena and what end-user issues have surfaced—plus what it all means to MIS.

MIS challenges. A guide to how MIS can meet its challenges while satisfying department manager concerns—and a look at operating systems that can create a compatible environment.

Special feature on IBM's 9370. An in-depth analysis of the IBM 9370—how it fits into IBM's product line, what it offers users, and how it compares to DEC's new Microvax 2000.

Plus in-depth coverage of: database management systems, fourth generation languages, popular applications, and new products—all for departmental computing.

If you act now, you can still get into departmental computing. But the closing for May's *Computerworld Focus* is April 3. Hurry—and you can reach your customers and prospects in this specially focused issue.

For more information, contact Ed Marecki, Vice President/Sales, Computerworld Focus, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, (617) 879-0700. Or call your local Computerworld sales representative.

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NEW PRODUCTS

Turnkey systems

Vicom Systems, Inc. has announced the **Vicom-VME**, a desk-side workstation combining a Sun Microsystems, Inc. Sun-3 microcomputer with Vicom's image processing on the same Motorola, Inc. VMEbus.

The Vicom-VME is said to offer separate modules for image acquisition, processing and display. Real-time image processing needs are handled through a real-time operating system, separate from the University of California at Berkeley Unix Version 4.2 operating system.

In addition to image processing, the Vicom-VME is said to function as a Sun-3 workstation for handling other tasks. It can run standard Sun-3 software and can be networked with other Sun workstations or other computer systems.

Vicom-VME is priced from $68,000 for a complete workstation.

Vicom Systems, 2520 Junction Ave., San Jose, Calif. 95134.

Processors

Hewlett-Packard Co. has introduced five **I/O plug-in modules** for the HP 48000 RTU measurement and control unit.

The modules were designed so that the process industry user can interface the HP 48000 with a variety of field instrumentation such as pneumatic-control valves, process-chart recorders, motor-starter circuits and thermocouple input.

The modules include an analog output module, an isolated digital input module, isolated digital relay output module, an isolated digital triac output module and a thermocouple/analog input module.

The HP 48000 backplanes were designed to accept three, six or 11 plug-in modules. Prices range from $1,200 to $1,600 each, plus a master control module and a power-supply module.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Bicc-Vero Electronics, Inc. has announced a small computer systems interface (SCSI) **host adapter board** for the Motorola, Inc. VMEbus.

The board is said to implement full SCSI functions including arbitration, disconnect, reconnect, parity and synchronous or asynchronous data transfers. The board features direct-memory access transfer ability over the VMEbus and 512K bytes of dual-ported memory. The VMEbus interrupt and bus request may be sent to any level.

The board with direct-memory access and memory costs $885. Without dual ported random-access memory (RAM), it costs $585. Without RAM or direct-memory access, the board costs $485.

Bicc-Vero, 1000 Sherman Ave., Hamden, Conn. 06514.

Data storage

EMC Corp. has upgraded its **Falcon series** disk subsystems for the Hewlett-Packard Co. HP 3000.

The Falcon I is now said to provide 406M bytes of storage, and the Falcon II offers 812M bytes. These new capacities are said to give the Falcon I a maximum storage capacity of 1.6G bytes per cabinet and the Falcon II a maximum of 2.4G bytes per cabinet.

The Falcon series features EMC's disk-cache processing cards, which include an on-board Motorola, Inc. 68000 microprocessor and 4M bytes of high-speed cache per card.

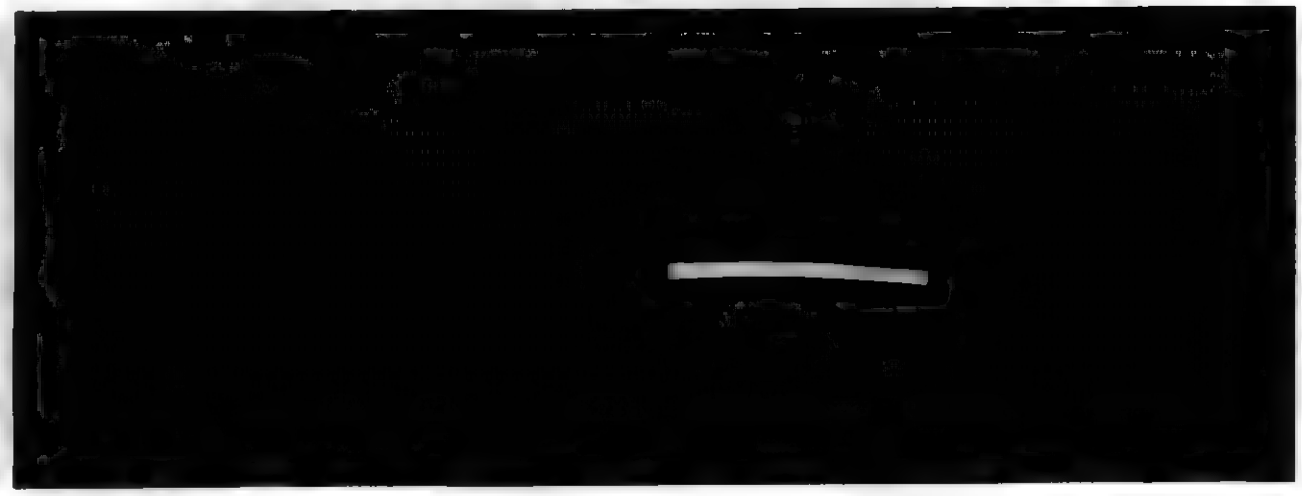
The Falcon I costs $12,900; the Falcon II costs $23,400.

EMC, Natick Industrial Centre, Natick, Mass. 01760.

Force Computers, Inc. has announced the **ISCSI-1**, a mass-memory controller for small computer systems interface (SCSI) applications in Motorola, Inc. VMEbus environments.

The 10-MHz controller is based on a Motorola 68010 microprocessor featuring high-speed direct-memory addressing channels that are coupled to SCSI and floppy-disk controller

HERE'S HELP



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chips. It features a 128K-byte dual-ported random-access memory and is capable of acting as a host controller to any number of SCSI drives and up to four floppy-disk devices simultaneously.

The ISCSI-1 is priced at $3,890. Source code and documentation for the firmware costs $3,950.

Force Computers, 727 University Ave., Los Gatos, Calif. 95030.

Terminals

Evans & Sutherland Interactive Systems Division has announced the **PS 390** computer graphics terminal.

The PS 390 is said to allow calligraphic-quality lines and solid-shaded images to be displayed on a single raster. It offers an effective resolution of 4,096 by 3,456 pixels on a standard color-raster display.

According to the vendor, the PS 390 is capable of rotating three-dimensional wireframe models in real-time and locally rendering static-shaded images on a full screen or in user-selected windows. Other features include depth cuing, perspective and six-plane clipping. A palette of 16.7 million colors is available.

The PS 390 is priced from $43,200.

Evans & Sutherland, P.O. Box 8700, 580 Arapeen Drive, Salt Lake City, Utah 84108.

Modgraph, Inc. has announced the **GX-1105-19**, a 19-in. version of its GX-1105 color graphics terminal.

The terminal is said to offer a 1,024- by 768-pixel display and a selection of 16 colors from a palette of 4,096. It offers emulation of the Tektronix, Inc. 4105/4010/4014 standard graphics commands. As an alphanumeric terminal, it emulates the VT100/VT52 with a 5- by 9-dot character size.

The GX-1105-19 is priced at $6,495.

Modgraph, 149 Middlesex Tnpk., Burlington, Mass. 01803.

Power supplies

L/F Technologies has introduced the **VDT Guardian Terminal Pak**, an on-line, uninterruptible power supply designed for VDTs.

The VDT Guardian comes with a 2.7 ampere-hour battery, providing 15 min of battery backup. In the event of a blackout, VDT Guardian provides enough time for the user to close all files and exit cleanly from the system, the vendor said.

VDT Guardian installs under the base of the terminal. According to the vendor, a user plugs the terminal power cord into the VDT Guardian enclosure and plugs the VDT Guardian into the wall.

The VDT Guardian Terminal Pak is priced at $149 per terminal.

L/F Technologies, 2800 Lockheed Way, Carson City, Nev. 89701.

RTE Deltec Corp. has added 8- and 10-kVA models to its 7000 series **Uninterruptible Power System** product line.

The systems are said to assure on-line, regulated, continuous single-phase ac power for computers and other critical equipment. Standard features include LED status indicators, digital readout, smart static transfer switch and a manual bypass switch.

The 8- and 10-kVA models are priced from $12,000.

RTE Deltec, 2727 Kurtz St., San Diego, Calif. 92110.

Auxiliary equipment

Gryphon Systems has introduced the **Temperature Sentry**, a temperature-monitor response-control device for Digital Equipment Corp. VAX computer rooms.

The Temperature Sentry is said to perform as a guard against unanticipated changes in temperature by reporting any increases through warning messages and, as a programmable option, shutting down the computer system when the temperature deviates from acceptable levels.

The Temperature Sentry costs $1,395.

Gryphon Systems, 611 Wiget Lane, Walnut Creek, Calif. 94598.

Input devices

Eastman Kodak Co. has announced the **Kodak Reliant bar code scanner** and **Kodak bar code DE software** modules.

The Reliant bar code scanner for the Kodak Reliant intelligent microfilmer 2000 and Kodak bar code DE software modules for the Kodak KAR-6600 and KAR-8800 information systems are said to allow simultaneous microfilming and data entry in one pass. The scanner interprets bar codes that can be preprinted on forms to provide indexing information for later computer-assisted retrieval. Data such as invoice numbers can be captured automatically without operator key entry.

The bar code software for the KAR-6600 or KAR-8800 costs $8,500. The scanner for the Reliant 2000 costs $15,500.

Kodak, 343 State St., Rochester, N.Y. 14650.

Maintenance equipment

Allied Electronic Services, Inc. has announced the **Twinaxial Cable Tester**.

The cable tester can test a single cable before installation or one or more cables connected in a series with display stations or printers on the IBM System/34, 36 or 38 or IBM 5260, 5280 or 5290 computers. It consists of a packet-size terminating box, a hand-held test selector box and an optional hand-held ohmmeter.

Cable conditions that the tester can diagnose include open shield, open copper wire, open silver wire, copper wire shorted to the shield and silver wire shorted to the shield.

The Twinaxial Cable Tester costs $98.95 alone and $124 with ohmmeter.

Allied Electronic Services, P.O Box 819, Lebanon, N.H. 03766.

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FASTER PROBLEM SOLVING

With Symbolics systems, programs can be written from 5 to 50 times faster than on conventional workstations. This reduces costs by improving programmer productivity. And it decreases your time-to-market for new software products, giving you an edge on your competition.

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Symbolics has over 40 times as many precoded Lisp functions as systems that offer just a Common Lisp compiler. By acting like prewritten "mini programs" these functions add speed and reliability. Your development time is shortened and programs are much more reliable because programmers can use pre-tested, built-in facilities such as user-interface programs and formatted output packages.

Automatic data-type checking

Symbolics systems solve data-type problems, not the programmer. The architecture of the system provides automatic run-time data-type checking with no performance penalty. Programmers spend their time making the application work; they don't waste time making the computer work.

Advanced debugging

Symbolics' advanced debugging facilities allow you first to examine the state of the run-time environment, and then choose either to abort the execution or modify intermediate results and continue. Also, unlike other systems, Symbolics' multi-processing environment allows you to use the editor and all other programming tools to determine the cause of an error, without throwing away the error context.

Fastest edit-compile-debug loop

To make a change to a program on conventional systems, the changed file must be written to disk, compiled, linked with other files, loaded, and then executed. To do this for every bug and change is very time consuming. With Symbolics, only the change is recompiled; linking and all other steps are eliminated. Where conventional systems might require hours to relink and reload hundreds of files for one change, it takes Symbolics only seconds.

Rapid prototyping

Built-in facilities, automatic data-type checking, advanced debugging, and fastest edit-compile-debug loop give Symbolics systems the best environment for prototyping applications. While others are still writing specifications, on a Symbolics system you can be showing a customer a demo or prototype application.

Smart garbage collection

Garbage collection is an essential attribute of all Lisp systems. Symbolics' advanced hardware and software provide it fast, and in parallel with other operations. Smart garbage collection means programmers need only manage applications, not memory. This increases programmer productivity and the runtime speed of applications because there's no need to slow down or stop to collect garbage. Some programs can even run faster with garbage collection turned on.

32-bit data *turbo charged*

The performance of garbage collection and data-type checking are improved by Symbolics' unique 36-bit design. Dedicated bits are used to reduce the size of data storage and to establish and check data-types. Simultaneously, Symbolics supports IEEE standard 32-bit floating point formats.

Faster program maintenance

All of the above allow you to periodically update your software quickly, accurately, and incrementally, while consuming a minimum amount of programmer hours and investment dollars.

EASE OF INTEGRATION

No other AI system or workstation vendor offers the ease of integration into heterogeneous computer environments like Symbolics. If you own a multivendor network, the best AI workstation for you is a Symbolics.

Largest installed base for AI

Symbolics has over 3000 systems installed in a wide range of applications; that's 2 times as many as our closest competitor.

Transparent networking

Upwards of 90% of all Symbolics systems delivered to date are used in heterogeneous environments. That's because Symbolics is the only vendor that networks *transparently* to UNIX,™ Digital™ and IBM.® One simple command is all it takes to access information from those systems, because the Symbolics workstation is "intelligent" enough to initiate the proper protocols. Also, Symbolics supports

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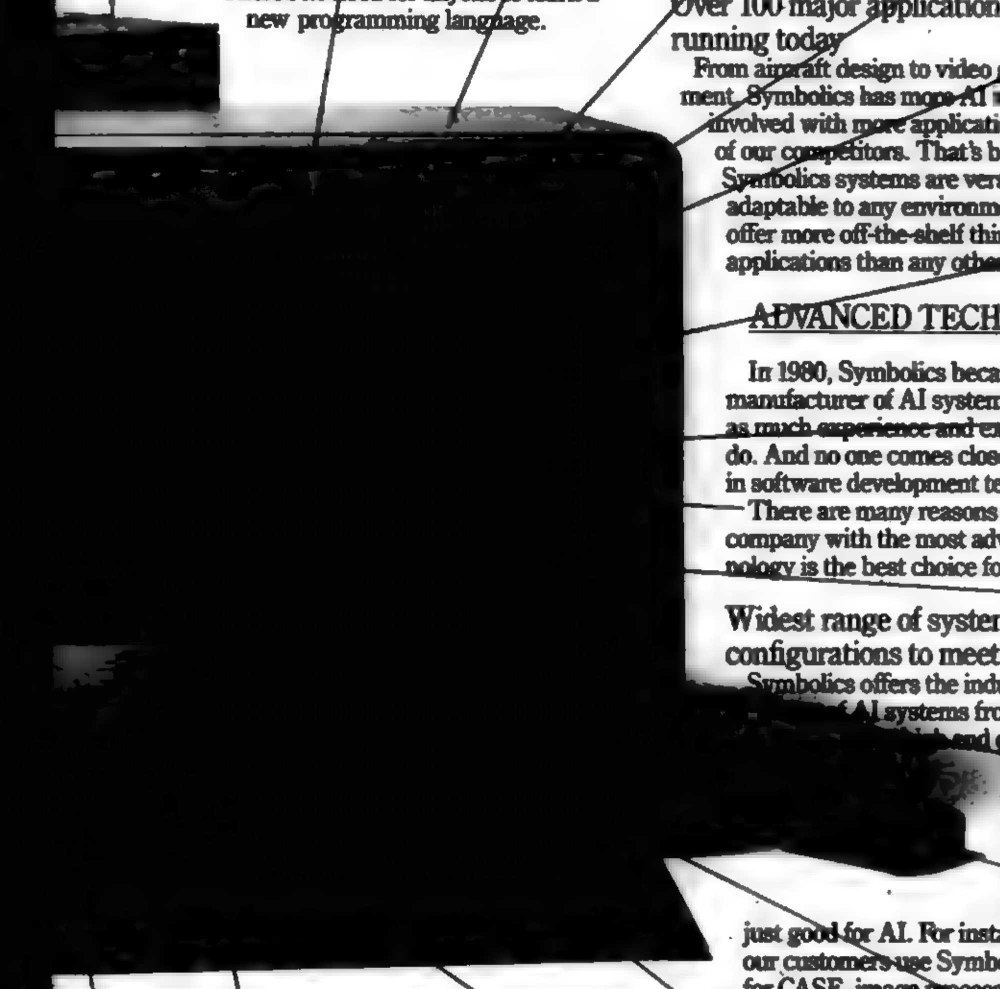
pect for $36,000?

Ethernet, TCP/IP, DECnet,™ and SNA standards to integrate AI into existing environments.

Comprehensive integration of standard computer languages

Symbolics offers full support of a range of industry standard languages. Using Symbolics workstations, software can be written in Common Lisp, Prolog, Fortran-77, Pascal and Ada.® No matter which language you use, you'll still be able to take advantage of Symbolics' built-in facilities, rapid prototyping and reduced maintenance features.

There's no need for anyone to learn a new programming language.



Current software investment protection

Your current software written in standard languages can still be used on a Symbolics system. And using Symbolics workstations, you'll be able to upgrade your software with AI functionality in Lisp or Prolog.

Best team-oriented software development

Symbolics systems allow programs or program updates to be distributed to all developers as they're written, continuously integrating the work of individual contributors.

Similar benefits apply where both users and developers of a program are working together in the same network environment. Users can choose a supported version, and developers can choose the latest experimental one.

Over 100 major applications running today

From aircraft design to video game development, Symbolics has more AI workstations involved with more applications than any of our competitors. That's because Symbolics systems are versatile, and adaptable to any environment. And we offer more off-the-shelf third party applications than any other AI vendor.

ADVANCED TECHNOLOGY

In 1980, Symbolics became the first manufacturer of AI systems. No one has as much experience and expertise as we do. And no one comes close to Symbolics in software development technology.

There are many reasons why the company with the most advanced technology is the best choice for you.

Widest range of system configurations to meet your needs

Symbolics offers the industry's broadest range of AI systems from low end to high end development. And our technologically advanced workstations aren't just good for AI. For instance, many of our customers use Symbolics systems for CASE, image processing and database management. So you can buy Symbolics knowing there's a system that's right for your application.

Investment in R&D

Symbolics' investment in R&D is significantly larger than the industry average. That's why we're the industry leader in developing advanced technology. And why customers can depend on us to keep them on the leading edge with fully compatible systems.

Best training in the industry

The best way to become an expert in Lisp and advanced software design and development systems is to learn from the experts: Symbolics. We've trained more people in Lisp than any other company.

Excellent consulting services

Worried the most advanced AI technology might be too advanced for your needs? Symbolics consultants can implement a cost-effective system that makes sense for you today, while allowing for your company's increasing needs tomorrow. We can help get your system up-and-running fast, giving you any necessary help along the way.

BEST PRICE PERFORMANCE

Each Symbolics system, from low end to high end, offers the best price performance in its class. And each has the features mentioned above. You can purchase the best system for your application, confident that no other is as cost efficient.

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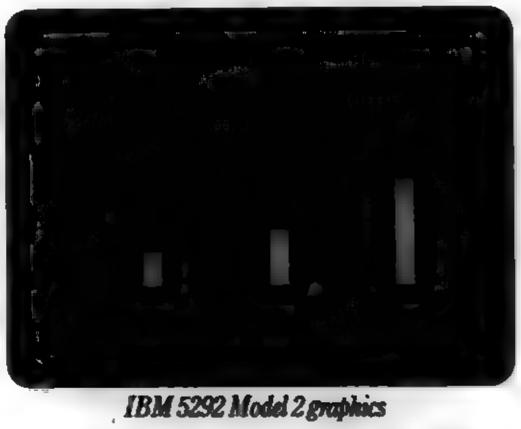

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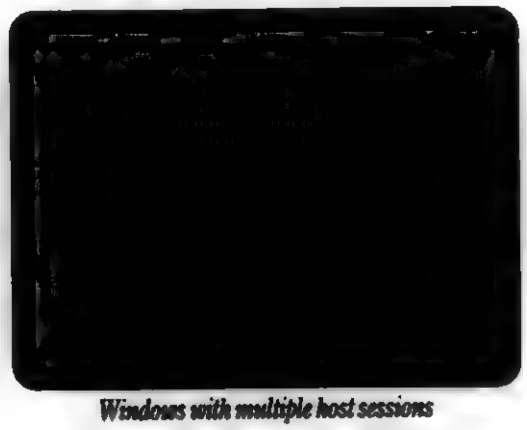
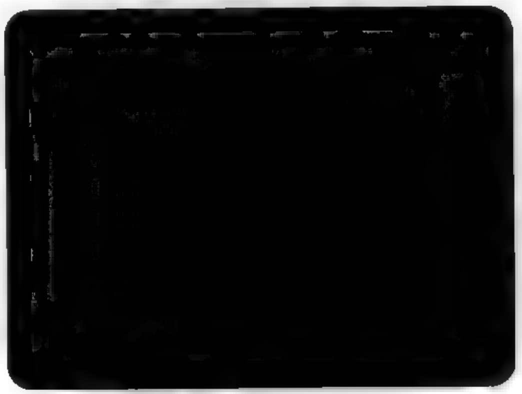
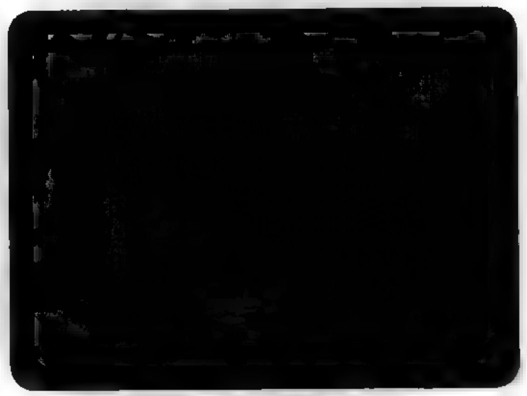


Windows with multiple host sessions



IBM 3180 terminal emulation



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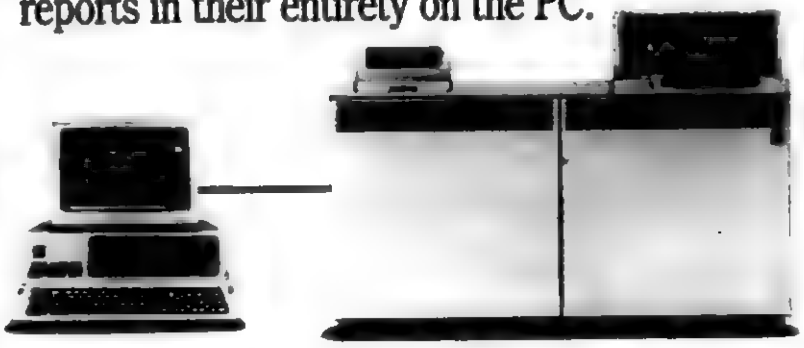

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Fighting for the user

Human engineering, once seen as the paint at the end of the project, is now understood to be the steel frame on which to build the structure

BY BEN SHNEIDERMAN

Frustration and anxiety are a part of daily life for many users of computerized information systems. These users struggle to learn command language or menu selection systems that are supposed to help them do their jobs. Some people encounter such serious cases of computer shock, terminal terror or network neurosis that they avoid using computerized systems. These electronic-age maladies are growing more common, but help is on the way.

Researchers have shown that redesign of the human-to-computer interface can make a substantial difference in learning time, performance speed, error rates and user satisfaction. Information and computer scientists have been testing design alternatives for the impacts on these human performance measures. Commercial designers recognize that systems that are easier to use will have a competitive edge in information retrieval, office automation and personal computing.

Programmers and quality assurance teams are becoming more cautious and paying greater attention to the implementation issues that guarantee quality user interfaces. Computer center managers are realizing that they must play an active role in ensuring that the software and hardware facilities provide high-quality service to users. In short, the diverse use of computers in homes, offices, factories, hospitals, electric power control centers, hotels, banks and so on is stimulating widespread interest in human factors issues. Human engineering, once seen as the paint put on at the end of the project, is now understood to be the steel frame on which the structure is built.

Stand up for users

However, an awareness of the problems and a desire to do well are not sufficient. Designers, managers and programmers must be willing to step forward and fight for users. The enemies include inconsistent command languages, confusing operation sequences, chaotic display formats, inconsistent terminology, incomplete instructions, complex error recovery procedures and misleading or threatening error messages.

I believe that progress in serving users will be rapid because as examples of excellence proliferate, users' expectations will rise. The designers, managers and researchers who are dedicated to quality and to nurturing the user community will have the satisfaction of doing a good job and the appreciation of the users they serve.

The battle will not be won by angry arguments over the user friendliness of competing systems or by biased claims that "my design is more natural than your design." Victory will come to people who take a disciplined, iterative and empirical approach to the study of human performance in the use of interactive systems. More and more, system developers, maintainers and managers are collecting performance data from users, distributing subjective satisfaction surveys, inviting users to participate in design teams, conducting repeated field trials for novel proposals and using field-study data to support organizational decision making.

Marshall McLuhan once observed that "the medium is the

Shneiderman is an associate professor of computer science at the University of Maryland at College Park and head of the Human-Interaction Library at the university's Center for Automation Research. This article is excerpted from B. Shneiderman, *Designing the User Interface*, 1987, Addison-Wesley Publishing Co., Reading, Mass. Reprinted with permission.

• Beating terminal terror and network neurosis

• Designers' real concern for users pays off

• The human form: A poor model for a computer

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message." Designers send a message to users by the design of interactive systems. In the past, the message was often an unfriendly and unpleasant one. I believe, however, that it is possible to send a much more positive message that conveys the concern a designer has for users. If the users feel competent in using the system and can easily correct errors and accomplish their tasks, then they will pass on the message of quality to the people they serve, to their colleagues and to their friends and families. In this way, each designer has the possibility of making the world a little bit warmer, wiser, safer and more compassionate.

Overcoming animism

The emergence of computers is one of the fundamental historical changes. In his book, *The Third Wave* (William Morrow & Co., 1980), Alvin Toffler describes this third wave as the successor to the agricultural and industrial revolutions. Such upheavals are neither all good nor all bad, but rather the amalgam of many individual decisions about how a technology is applied. Each designer plays a role in shaping the direction. The computer revolution has passed its infancy, but there is still tremendous opportunity for change.

The metaphors, images and names chosen for systems play a key role in designers' and users' perceptions. It is not surprising that many computer system designers still derive their inspiration by mimicking human or animal forms. The first attempts at flight were to imitate birds, and the first designs for microphones followed the shape of the human ear.

Eventually, human needs and the underlying technology shape products to maximize service and reduce cost. Such primitive visions may be useful starting points, but success comes most rapidly to people who move beyond these fantasies and apply scientific analyses. Except for amusement, the goal is never to mimic human form but to provide effective service to the users in accomplishing their tasks. Lewis Mumford, in his classic book *Technics and Civilization* (Harcourt Brace Jovanovich, Inc., 1934), characterizes the problem of "dissociation of the animate and the mechanical" as the "obstacle of animism." He describes Leonardo da Vinci's attempt to reproduce the motion of birds' wings, then Ader's bat-like airplane as late as 1897 and Branca's steam engine in the form of a human head and torso. Mumford notes that "the most ineffective kind of machine is the realistic mechanical imitation of a man or another animal. . . . For thousands of years animism has stood in the way of . . . .development."

Choosing human or animal forms as the inspiration for some projects is understandable, but significant advances will come more quickly by recognizing the goals that serve human needs and the inherent attributes of the technology employed. Hand calculators do not follow human forms but serve effectively for arithmetic. Designers for championship chess-playing programs no longer imitate human strategies. Vision systems researchers realized the advantages of radar or sonar range finders and retreated from using human-like stereo depth recognition.

Robots provide an informative case study. Beyond stone idols and voodoo dolls, we can trace modern robots back to the devices built by Pierre Jacquet-Droz, a Swiss watchmaker, from 1768 to 1774. The first child-size mechanical robot, called The Scribe, could be programmed to write any message up to 40 characters long. It had commands to change lines, skip a space or dip the quill in the inkwell. The second, called The Draughtsman, had a repertoire of four pencil sketches: a boy, a dog, Louis XV of France and a pair of portraits. The third robot, The Musician, performed five songs on a working pipe organ and could operate an hour and a half on one winding.

> MANY COMPUTER system designers still derive their inspiration by mimicking human or animal forms. The first attempts at flight were to imitate birds, and the first designs for microphones followed the shape of the human ear.

These robots made their creators famous and wealthy, since they were in great demand at the court of the kings and in public showings. Printing presses became more effective than The Scribe and The Draughtsman, and tape players and phonographs superior to The Musician.

Robots of the 1950s included electronic components and a metallic skin, but their designs were also strongly influenced by the human form. Robot arms were of the same dimension as human arms, and the hands had five fingers. Designers of modern robots have finally overcome the obstacle of animism and now construct arms whose dimensions are appropriate for the steel and plastic technology. Two fingers are more common than five on robot hands, and the hands can often rotate more than 270 degrees. Where appropriate, fingers have been replaced by rubber suction cups with vacuum pumps to pick up parts.

In spite of these improvements, the

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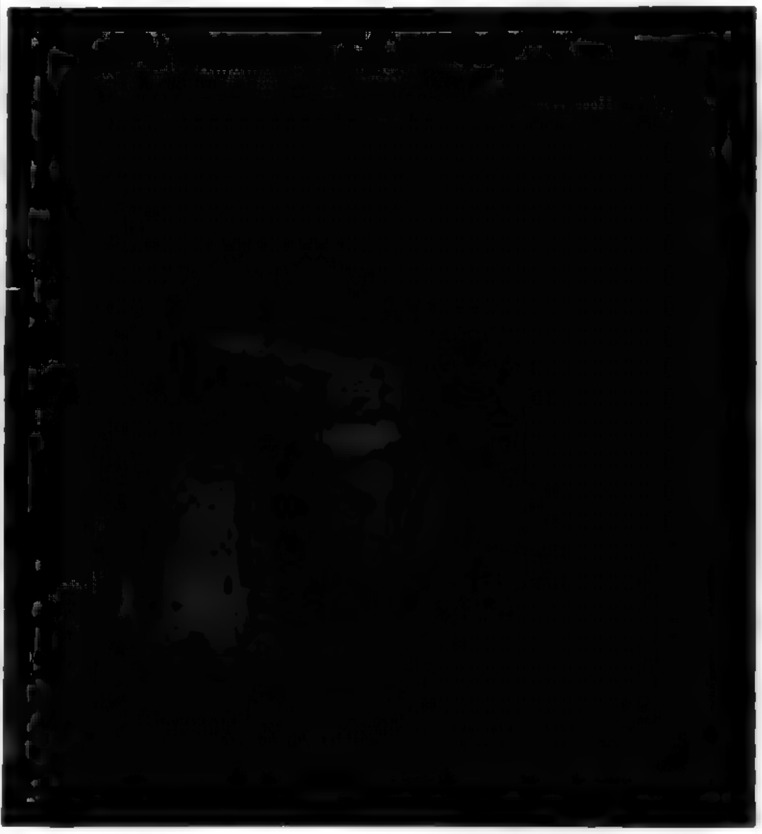

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metaphor and terminology of human form can still mislead the designers and users of robots. In their article, "The language of robotics: Use and abuse of personification" ("IEEE Transactions on Professional Communications," 1982), Ellen McDaniel and Gwendolyn Gong note that programmers of one industrial robot were so disturbed by the labels "upper arm" and "lower arm" on the control panel that they scratched them out. They felt that the anthropomorphic term misled their intuitions about how to program the robot. The term "programmable manipulators" or the broader "flexible manufacturing systems" are less exciting but more accurately describe the newer generation of robot-like systems.

The banking machines offer a simple example of the evolution from anthropomorphic imagery to a service orientation. Early systems were given such names as Tillie the Teller or Harvey Wallbanker and were programmed with such phrases as "How can I help you?" These deceptive images rapidly gave way to a focus on the computer technology with such names as The Electronic Teller, Compucash, Cashmatic or Compubank. Over time, the emphasis moves toward the service provided to the user: Cashflow, Money Exchange, 24-Hour Money Machine, All-Night Banker and Money Mover.

The computer revolution will be judged not by the complexity or power of technology but by the service to human needs. By focusing on the user, researchers and designers will generate powerful yet simple systems that permit users to accomplish their tasks. These tools will enable short learning times, rapid performance and low error rates. Putting the user's needs first will lead to more appropriate choices of system features, a greater sense of mastery and control and the satisfaction of achievement. At the same time, the user will feel increased responsibility and may be more motivated to learn about the tasks and the interactive system.

Sharpening the boundaries between people and computers will lead to a clearer recognition of computer powers and human reason, Joseph Weizenbaum notes in his book *Computer Power and Human Reason* (W. H. Freeman and Co., 1976). Rapid progress will occur when designers accept that human-to-human communication is a poor model for human-to-computer interaction.

People are different from computers, and human operation of computers is vastly different from human relationships. Vital factors that distinguish human behavior include the diversity of skills and backgrounds across individuals; the creativity, imagination and inventiveness incorporated in daily actions; the emotional involvement in every act; the desire for social contact; and the power of intention.

Ignoring these primitive but enduring aspects of humanity leads to inappropriate technology and a hollow experience. Embracing these aspects can bring about powerful tools, joy in learning, the capacity to realize goals, a sense of accomplishment and increased social interaction.

Controlled experiments

Clear goals are useful, not only for system development but also for educational and professional enterprises. Workers in human-to-computer interaction have three primary goals: influencing academic and industrial researchers; providing tools, techniques and knowledge for commercial systems implementors; and raising the consciousness of the general public.

Early research in human-to-computer interaction was done largely by introspection and intuition, but this approach suffered from lack of validity, generality and precision. The techniques of controlled psychologically oriented experimentation can lead to a deeper understanding of the fundamental principles of human interaction with computers.

The reductionist scientific method follows this basic outline:

- Lucid statement of a testable hypothesis.
- Manipulation of a small number of independent variables.
- Measurement of specific dependent variables.
- Careful selection and assignment of subjects.
- Control for biasing.
- Application of statistical tests.

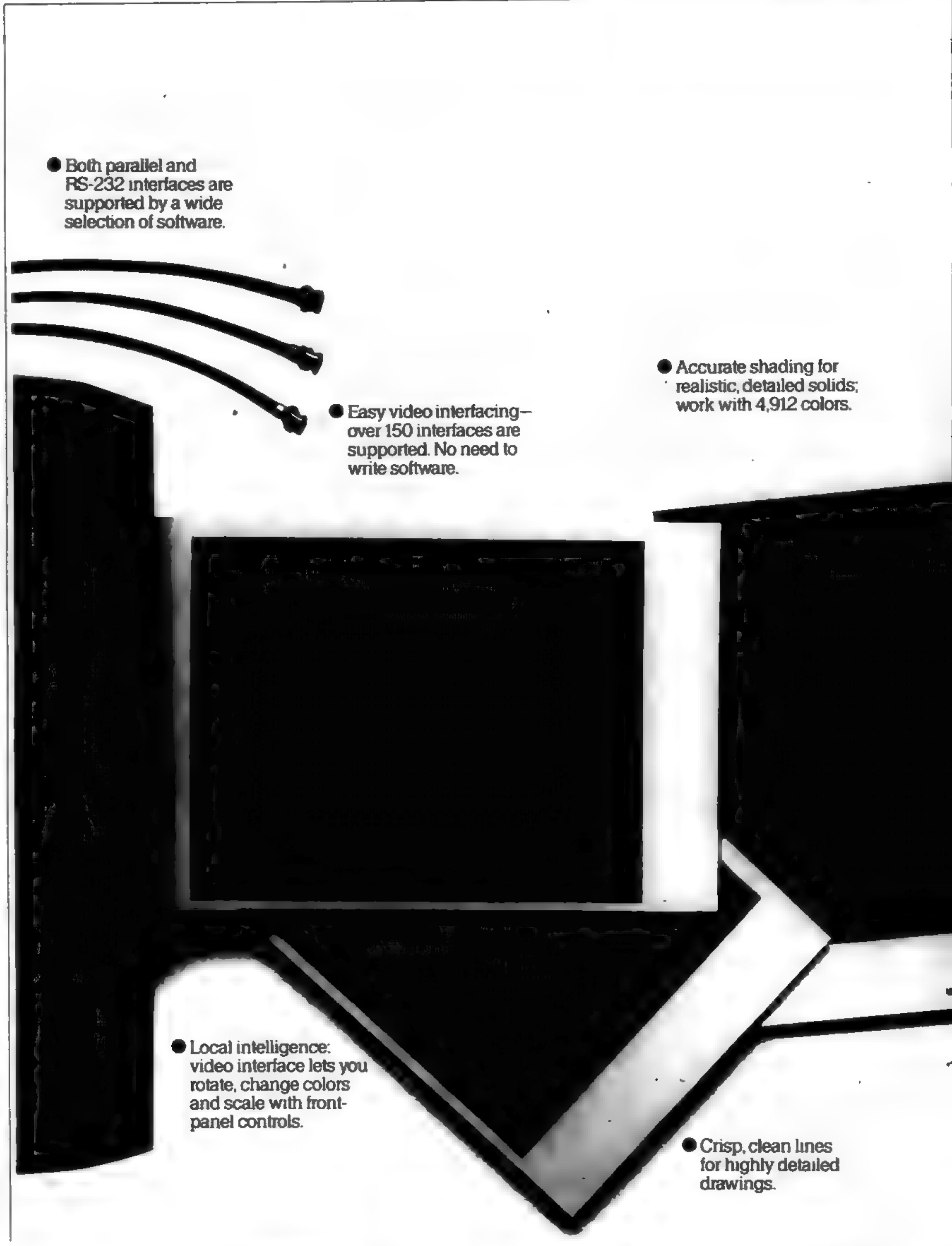
Materials and methods must be tested by pilot experiments, and results must be validated by replication in variant situations.

Of course, the highly developed and structured method of controlled experimentation has its weaknesses. It may be difficult or expensive to find adequate subjects, and laboratory-like conditions may distort the situation so much that the conclusions have no application.

When results for large groups of subjects are arrived at by statistical aggregation, extremely good or poor performance by individuals may be overlooked. Furthermore, anecdotal evidence or individual insights may be given too little emphasis because of the authoritative impact of statistics.

In spite of these concerns, controlled experimentation provides a productive basis that can be modified to suit the situation. Anecdotal experiences and subjective reactions should be recorded; thinking aloud or protocol approaches should be employed; field or case studies with extensive performance data collection should be carried out; and the individual insights of researchers, designers and experimental participants should be captured.

Within computer science, awareness of the need for greater attention to human factors issues is growing. Researchers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who propose new programming language or data structure constructs are more aware of the need to match human cognitive skills. Developers of advanced graphics systems, robots, computer-assisted design systems or artificial intelligence applications increasingly recognize that the success of their proposals depends on the construction of a suitable human interface. Researchers in these and other areas are making efforts to understand and measure human performance.

In psychology, there is a grand opportunity to apply the knowledge and techniques of traditional psychology and such recent subfields as cognitive psychology to the study of human-to-computer interaction. Psychologists are investigating human problem-solving with computers to gain an understanding of cognitive processes and memory structures. The benefit to psychology is great, but psychologists also have the golden opportunity to dramatically influence an important and widely used technology.

Researchers in information science, business and management, education, sociology and other disciplines are benefiting and contributing by their study of human-to-computer interaction. There are so many fruitful directions for researchers that any list can only be a provocative starting point. Here are several potential research directions:

Reducing anxiety and fear of computer usage. Although computers are widely used, they still serve only a fraction of the population. Many people avoid using such computerized devices as bank terminals or word processors because they are anxious or even fearful of breaking the computer, making an embarrassing mistake or being incapable of succeeding. Interviews with nonusers of computers would help determine the sources of this anxiety and lead to design guidelines to alleviate the fear. Tests could be run to determine the effectiveness of redesign of systems and of improved training procedures.

Graceful evolution. Although novices may begin with menu selection, they may wish to evolve to faster or more powerful facilities. Methods for smoothing the transition from novice to intermittent, knowledgeable user to frequent expert could be studied. The differing needs of novices and experts in prompting, error messages, on-line assistance, display complexity, locus of control, pacing and informative feedback all need investigation.

Menu selection. Menu selection is offered on many systems for novice users, but there is little data to support design guidelines. The content, number, placement and phrasing of menu choices could be studied with attention to titling of menu frames, effectiveness of instructions, availability of type-ahead strategies or menu shortcuts, backtracking and graphic design to show hierarchical organization. Much progress could be made in this area with modest experimental efforts. An opportunity also exists to investigate software architectures for menu-management systems that dramatically reduce the amount of code while permitting end users to develop and maintain their own menus.

Command languages. This traditional style of interaction is another excellent candidate for research to understand the importance of consistency in syntactic format, congruent pairings of commands, hierarchical structure, choice of familiar command names and parameters, suitable abbreviated forms, automatic command completion and interference from multiple routes to accomplish the same task.

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The impact of response time and novel hardware display and entry devices on the command set is another worthy topic in this category.

Direct manipulation. Visual interfaces in which the user operates on a representation of the objects of interest are extremely attractive in computer-assisted design and manufacturing, video games, data base query, electronic spreadsheets, display editors and so on. Empirical studies would refine our understanding of what is an appropriate analogical representation and the role of rapid, incremental, reversible operations.

Hardware devices. The plethora of keyboards, displays and pointing devices presents opportunities and challenges to system designers. The heated discussions about the relative merits of light pens, touch screens, the mouse, voice input, function keys or high-resolution displays could be resolved through extensive experimentation with multiple tasks and user communities. Underlying issues include speed, accuracy, fatigue, error correction and subjective satisfaction.

Response time, display rates and operator productivity. Many computer professionals believe in the simple principle that faster is always better. Evidence from several IBM studies and other sources suggests that programmers are more productive when system response time is kept within the one-second range or even faster. On the other hand, isolated studies have shown that in some business decision-making tasks, computer-assisted instruction, complex order entry and introductory sessions with novices, rapid performance leads to poorer learning.

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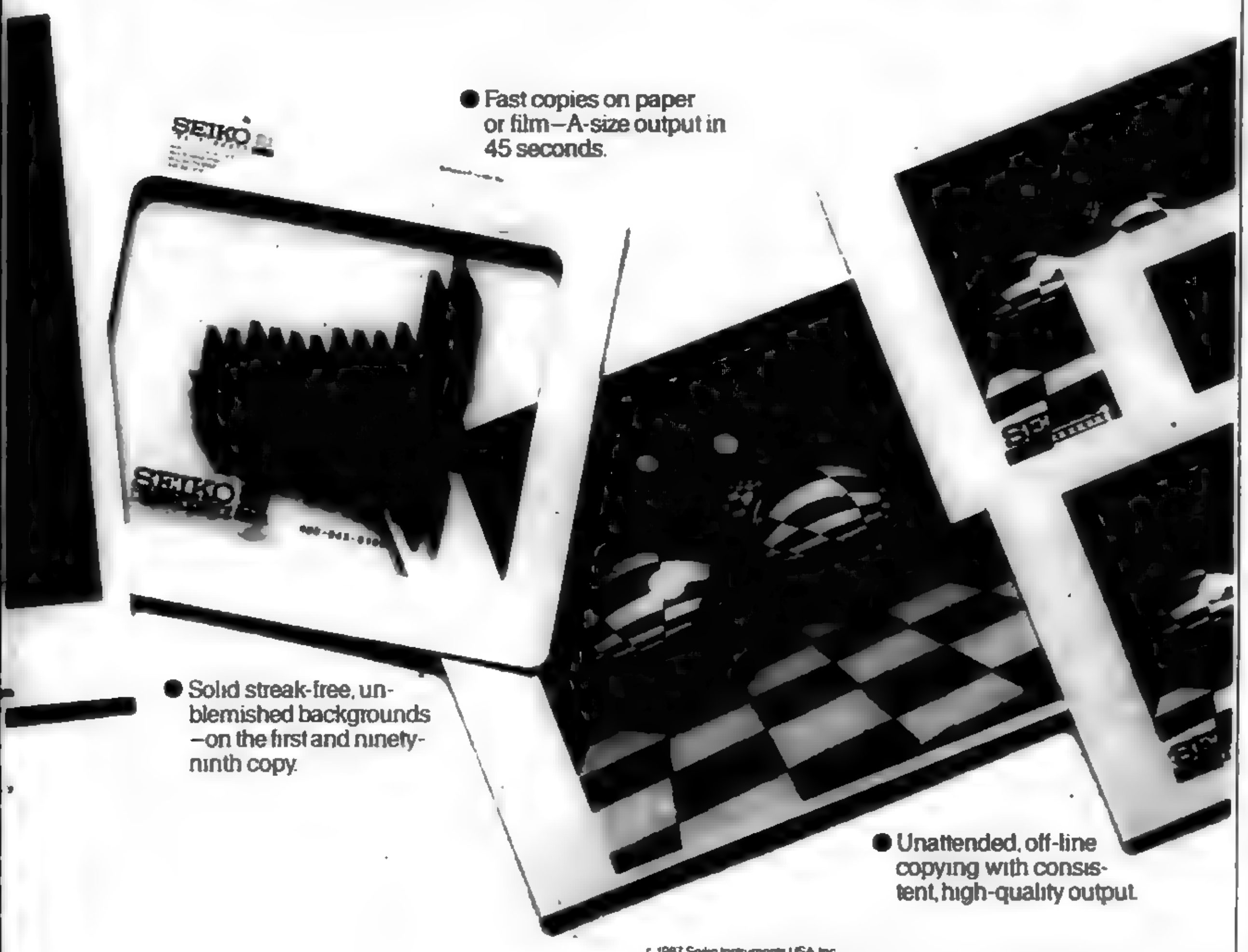
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less effective decisions, higher error rates and occasionally decreased satisfaction.

A thorough study of multiple tasks with a variety of user communities would shed light on which situations would be improved with shorter response times or faster display rates. Understanding psychological issues of short-term memory load, decision-making strategies and information overload would help in preparing design guidelines for systems implementers.

On-line assistance. Although many systems offer help or tutorial information on-line, there is limited understanding of what constitutes effective design for novices, intermittent knowledgeable users and experts. The role of these aids and on-line user consultants could be studied to assess their impact on user success and satisfaction. The utility of a separate display or window for assistance or tutorials should be contrasted with the common approach of entering a separate subsystem that displaces the current display of work.

Specification and implementation of interaction. Most interactive systems are constructed with traditional procedural languages, but novel techniques could reduce implementation times by an order of magnitude. Specification languages and dialogue-management systems have been proposed, and some commercial packages are available. Advanced research on tools to aid interactive systems designers and implementers might have substantial payoff in reducing costs and improving quality.

Tools for developers

Commercial systems managers, designers and implementers are emerging from benign neglect of human engineering. There is a great thirst for knowledge, software tools, design guidelines and testing techniques. New dialogue-management software packages provide support for rapid prototyping and system development while aiding design consistency and simplifying evolutionary refinement.

Guideline documents are being written for general audiences and for specific applications. Many projects are taking the productive route of writing their own guidelines specifically tied to the problems of their application environment. These guidelines are constructed from experimental results, experience with actual systems and some knowledgeable guesswork.

Pilot, iterative and acceptance testing are appropriate during system development. Once the initial system is available, refinements can be made on the basis of on-line or printed surveys, individual or group interviews or more controlled empirical tests of novel strategies.

Feedback from users during the development process and for evolutionary refinement can provide useful insights and guidance. An on-line electronic mail facility allows users to send comments directly to the designers. On-line user consultants and telephone hot-line workers can provide not only prompt assistance but also much information about the activities and problems of the user community.

> MANY PEOPLE are uncomfortable with computers. When they do finally use a bank terminal or word processor, they may be anxious about damaging the equipment, worried about feeling incompetent or threatened by the computer "being smarter than I am."

Raising public consciousness

The media is so filled with stories about computers that raising public consciousness may seem unnecessary. In fact, however, many people are uncomfortable with computers. When they do finally use a bank terminal or word processor, they may be fearful of making mistakes, anxious about damaging the equipment, worried about feeling incompetent or threatened by the computer "being smarter than I am." These fears are generated, in part, by poor designs that have complex commands, hostile and vague error messages, tortuous and unfamiliar sequences of actions or a deceptive anthropomorphic style.

One of my goals is to encourage users to translate their internal fears into action. Instead of feeling guilty when they get a message like SYNTAX ERROR, they should express their anger at the system designer who was so inconsiderate and thoughtless. Instead of feeling inadequate or foolish because they cannot remember a complex sequence of commands, they should complain to the designer who did not provide a more convenient mechanism or should seek another product that does.

As examples of successful and satisfying systems become more visible, the crude designs will appear increasingly archaic and become commercial failures. As designers improve interactive systems, some of these fears will recede, and the positive experience of competence, mastery and satisfaction will flow in. Then the image of computer scientists and data processing professionals will change in the public's view. The machine-oriented and technical image will give way to one of personal warmth, sensitivity and concern for the user. ●

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February 2, 1987 Volume XXI No. 5 $44/Year

COMPUTERWORLD

IBM revs up 309

Lack of advance notice riles users

BY JEAN S. BOZMAN

A wave of anger rippled through the IBM user community last week as some of IBM's largest and most loyal customers criticized the vendor for failing to tell them in advance about its plans and for limiting field-engineering upgrades to its most powerful line of mainframes.

"The first things I learned about the new products were in the next day's Wall Street Journal," said one large Midwestern user who did not wish to be identified. "If IBM can't share information with me about what's coming then they should be prepared to suffer the consequences."

That remark was echoed by other users, many of them Fortune 100 companies, each of which has invested millions of dollars in large IBM mainframes and associated operating systems software. Many of the [illegible]

relationships with IBM. [illegible] were among the first to install the IBM [illegible] Models 200 and 400, [illegible] learned that their [illegible] would have to be upg [illegible] higher E models in ord [illegible] the new performance [illegible]

'Frosted'

One MIS manager, [illegible] expects to upgrade [illegible] 400 to a Model 600E at a [illegible] date, described himself as [illegible] and said, "One of the things that frosted me was that we have a Model 400 on-site, and the only way we can go is up. Going to a 400E would mean 10 million instructions per second. I could really use 10 more MIPS for a little more work over a weekend."

Another major user, whose company has already adopted a multivendor approach and has yet to acquire a 3090 model, said the upgrade strategy presents a fundamental problem to both MIS and IBM.

"Buying IBM is no longer the safe decision," according to the user who requested anonymity. "This is going to diminish IBM's market position as other compa

Continued on page 6

[illegible] performance [illegible] of up to [illegible] compared with the current 3090 line. It also features increased expanded storage and, in some cases, doubled main memory.

The company also announced enhancements to its VM operating system (see story page 9) and to the entry-level versions of its 3088 Multisystem Channel Communication Unit and 3800 laser printer. A 4248 line printer version was also unveiled.

Four of the six 3090E models are enhanced versions of existing models, while two — the 3090 Model 600E and Model 300E — are new machines. The Model 600E uses six central pro

IBM high end

charges foot-dragging on

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In [illegible]

Application development gets a machine of its own

How one project moved out and found happiness on a VAX

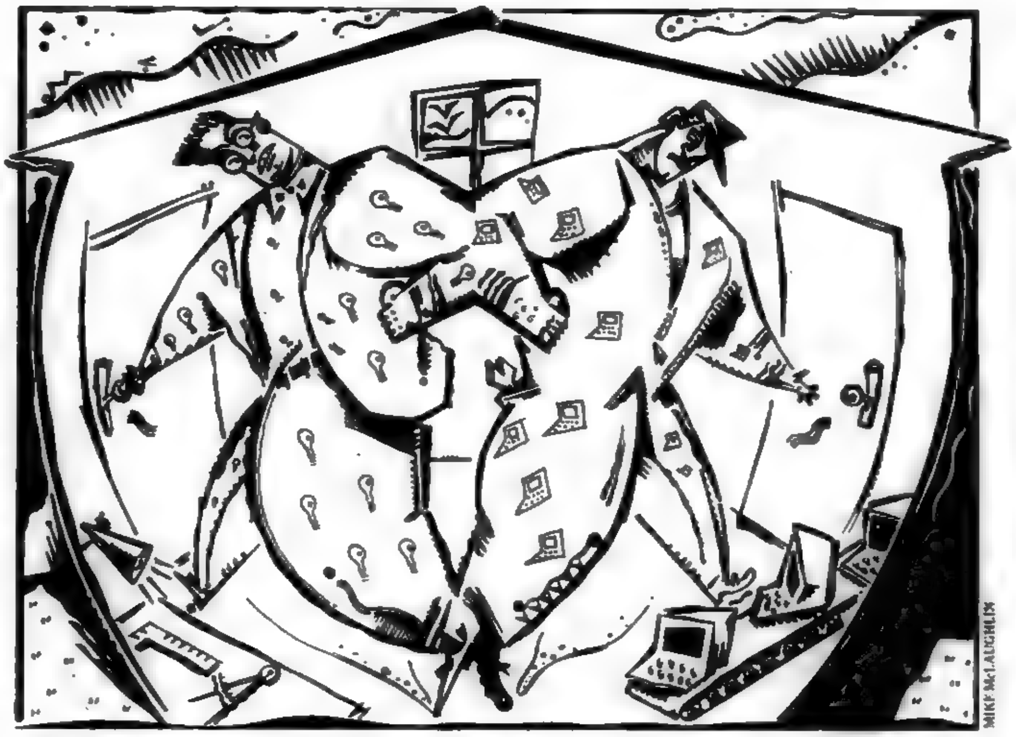
BY DANIEL NOLAN

Most problems with application software occur when development runs on the same machine as production. Development and production are incompatible siblings, constantly fighting for resources and priority. The security that is indispensable for production proves to be an obstacle to development.

Whenever production and development are placed on the same machine, production — the commercial operation — will always prevail over development.

A development project attempted on a machine that is running production tasks is handicapped from the start. Projects running into difficulty generally will not receive the attention they need to overcome problems until it becomes apparent that deadlines will be missed. The time needed to redirect development means that the necessary priority and resources will not arrive before the final stages of testing.

By the time all of these difficulties are resolved, most of the problems the system will develop are already incorporated in the design. From that point on, the system will behave like a petulant adult obsessed with the misfortune of being raised as a neglected stepchild.


MIKE McLAUGHLIN

The advantage of a development machine — a machine that provides an environment allowing total concentration on the new system's problems without interference from other work in progress — becomes evident when put to the test, as systems emerge faster, cleaner and with fewer errors.

The reason firms do not use development machines more often is not a technical one but rather a combination of politics and economics.

More quality; less cost

Corporate management, which is paying for development, would like the projects to be completed as soon as possible. It views purchasing a separate machine and justifying its expense as a tacit commitment to never-ending development. While users may not actually come out and say they dislike programmers, they certainly wish the technicians would finish up so they can get some work done.

The diminishing price of machines has done much to dispel any economic objections. What we are now concentrating on is the more difficult issue: earning the confidence of developers by assuring them the machine will be used only to produce superior application systems, on time and error-free.

When the large commercial IBM relational data base management systems became available in Digital Equipment Corp. VAX minicomputer versions, the opportunity presented itself to resolve this issue once and for all by giving development its own machine.

Although the objective of moving development to a separate computer is to improve quality — which the development machine will do by magnitudes — this move continues to deliver cost savings.

When the development machine is set up properly, it will no longer require the constant presence of attendants or technicians. In most cases, the one-time cost is approximately the same as the annual salary of a trained programmer; recurrent costs for every year thereafter can be measured in the cost of the electricity the machine consumes.

What follows is the story of how the first development machine — a computer set up for no other purpose than to serve new applications — was built.

Like many structures, the first development machine was put together in layers. First the plan, then the foundation, was laid. Walls went up next, and the roof put on. Running throughout were systems that supported the

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Nolan is an Annandale, Va.-based computer scientist specializing in DBMS and fourth-generation languages.

……

• Dedicated hardware can decrease infighting

• Develop IBM software on a VAX

• Quality-control solution: End-of-day reviews

installation standards and procedures. Like plumbing and heating systems in an office, these support systems made the development machine a comfortable and productive place to work.

The effort began with the purchase of a DEC VAX-11/750 and Software AG of North America, Inc.'s Adabas and Natural relational DBMS for application development. The overall cost of computer, peripherals, terminals and software was less than $150,000 — today, a better site can be built for a fraction of that amount.

After all the pieces were assembled, bolting the machine together and installing the operating system took less than a week. The DBMS and language were added on the last day. The next week, more than a quarter of a million lines of fourth-generation language source code and 100 logical DBMS files were moved from the development side of the IBM to the VAX.

All files were reconstructed from scratch on the VAX, test data was loaded where necessary, and the programs were recompiled. Although recompilation was done primarily to avoid interface problems, other benefits soon appeared.

> BECAUSE the VAX offers fewer memory and speed resources than the IBM, it is less able to tolerate inefficient code. Programs that happily ran on large IBM mainframes showed signs of disturbance on the VAX.

The development VAX immediately began finding problems in programs that were known to be clean, chiefly in areas associated with performance. Because the VAX offers fewer memory and speed resources than the IBM, it is less able to tolerate inefficient code, and programs that happily ran on large IBM mainframes showed signs of disturbance on the VAX. A moral can be found in this: As computers get smaller and faster, it becomes increasingly difficult for errors to find places to hide.

Many of the IBM systems contained inefficient code routines that the larger machines had absorbed as part of their overhead. Enough inefficiencies congregating in an operating computer will cause degradation. Generally, such degradation goes unnoticed until the situation becomes desperate. When the repairs made to the VAX versions were similarly applied to the IBM, the larger machine reciprocated by magnifying the improvements correspondingly, making the resulting system even more efficient.

By focusing the development tools that were built to support projects on the system, developers could examine thousands of programs in minute detail. Patterns that indicated problems and inefficiencies quickly emerged, and standard ways of dealing with them could be applied. For example, a program that read many records but updated only a few could be replaced with the more efficient "hydroplane" technique — stay above the data until you see the records you want, then dive like a pelican to update those few.

Keeping things simple

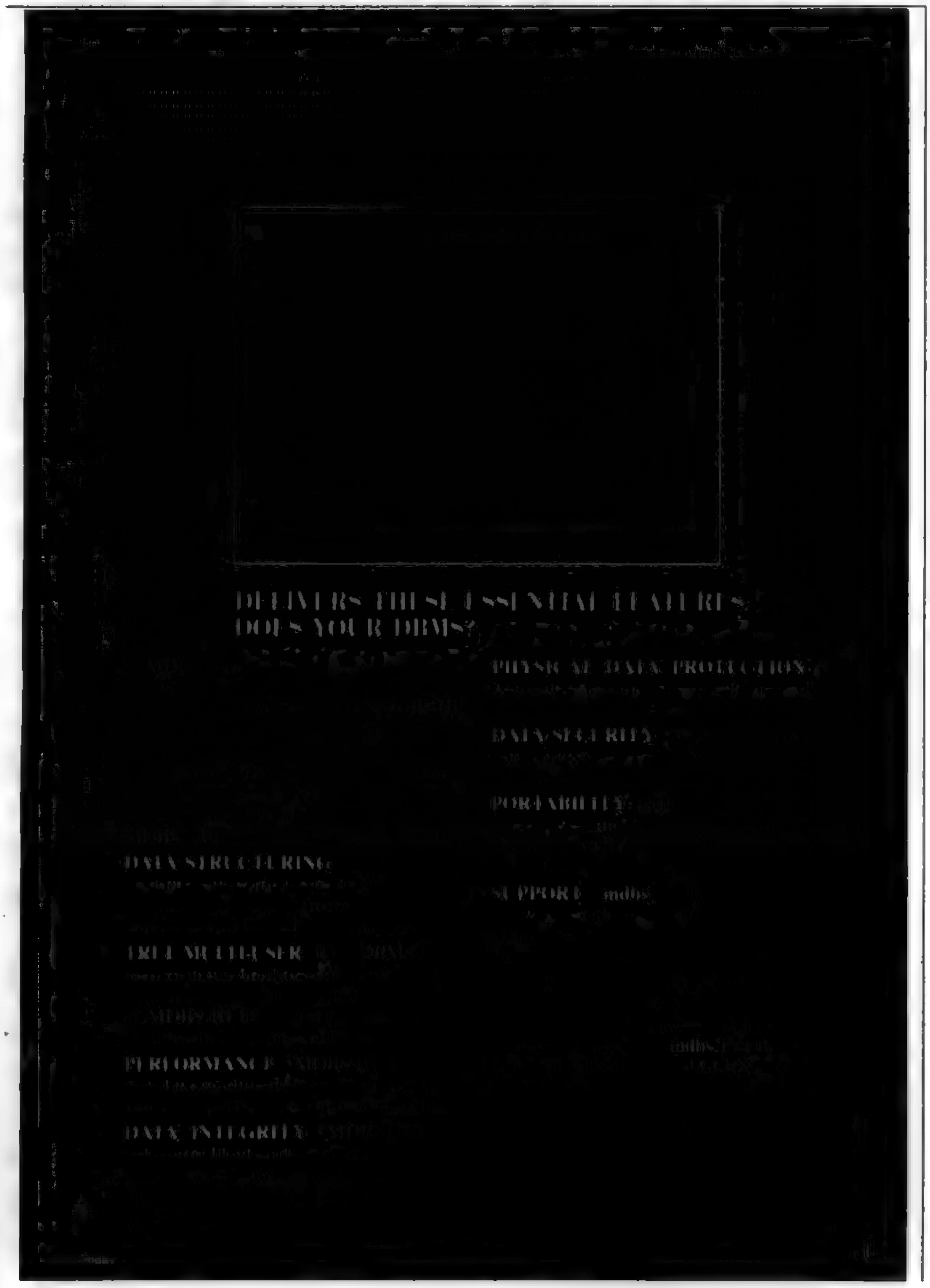
Setting up the larger IBM machines to run without constant monitoring is not a simple matter. From repeated experiences of spending months setting up machines to run without attendance and turning them over to the customer, only to find they fell apart in a week, I am forced to admit that IBM's computers cannot run unattended when constructed according to the manufacturer's recommendations.

DEC, by contrast, designs its VAX computers so that they can be pretty much left to themselves. In keeping with the ideal that a well-running system needs little attention, the development system was set up with as few modifications to the initial version as possible. In addition, the developers, as well as other personnel who would be dealing with the machine, were trained in the rudiments of system programming. This ideal required that new software versions barely affect the system and could be rapidly installed without disrupting ongoing development work.

The only time anyone would be in the computer room was when there was a problem. For example, the VAX arrived with a sophisticated text editor that could be modified extensively to allow all manners of processing up to and including full word processing. However, the more modifications made to the text editor, the more difficult installing new versions would be. Since the text editor was used by the word processor and new versions of the operating system would be installed by novices, the editor was not tailored.

Security was handled in a similar way. Other than logging off the inactive terminals, the security of the VAX and data base systems proved to be more than adequate. To avoid the logistical struggles of identifying and maintaining elaborate security, access was provided for managers, developers and guests. Each new user was identified as belonging to one of these categories and invited to set up his own security within the implied limitations. No further precautions were taken; and the system was never penetrated despite the hundreds of attempts, or wrong numbers, recorded during the year.

Automatic procedures were set up that preserved each developer's program



as diligently as if it were a payroll record and eased the task of reconstructing lost or damaged programs. Where the commercial value in production is usually described in terms of records, the value on a development machine exists in its lines of code.

Security was aimed at those outside the organization, and protection was controlled from inside. The developers working on the machine were professionals in their own right, so few barriers were erected.

However, to ease the burden of housekeeping, account for work accomplished and make certain that machine resources were well used, monitoring was done after the backups at night and after the appropriate professionals were informed of the need for any software or hardware adjustments.

Development philosophy

Hardware and software installation proved to be less of a critical issue than did programming productivity support.

To get the most out of a development machine, developers needed a philosophy to replace the innate prejudices and limitations imposed during the two decades when development worked alongside production. Where personnel had developed considerable skill at one method of changing tires, they had to learn the benefits of first stopping the car.

Before work began in the more liberal environment, the following basic guidelines had to be understood.

- Quality control and production restrictions are critical, but enforcement of these must occur at the proper time.
- Programmers cannot be expected to remember every standard.
- No single individual is expected to examine every line of code every day.
- Any automated method put into place must be passive. Compliance checking can neither alter programs nor interfere with the work of programmers as they enter code.
- File generation and alteration must be placed directly in the hands of developers in such a way that changes are made safely and without distracting people from the primary work of writing programs.
- To limit program versions, library controls must be simple. Programmers must be able to create and delete programs as needed without restriction. At the same time, all code must be protected against inadvertent loss.
- Programmers' egos should be considered. Any incentive for denying mistakes and concealing errors must be removed by minimizing the error's effect.

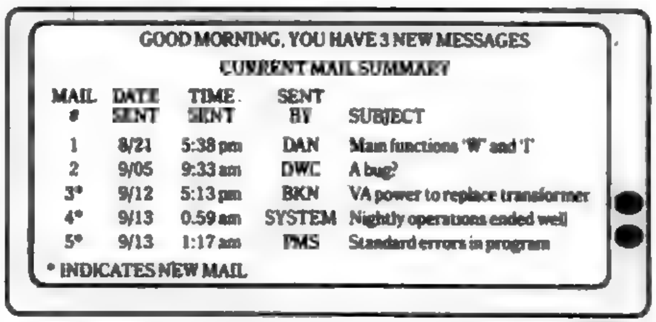
The cost of recovery is in direct proportion to the deed: Early detection minimizes costs. One person's misadventure should not inconvenience dozens.

- The system should harbor no mysteries or hidden bugs; cause and effect should be directly associated.

Developers who control the machine on which they work can see errors and inefficiencies better and can shut down the system, repeat and slow down the processing for a minute, detailed examination.

Sample screen: Quality control mail

"Autopilot" software inspects each program under development for compliance with standards. This review occurs at night and automatically generates mail for the programmers.



```
GOOD MORNING, YOU HAVE 3 NEW MESSAGES
        CURRENT MAIL SUMMARY
MAIL  DATE   TIME     SENT
 #    SENT   SENT     BY      SUBJECT
 1    8/21   5:38 pm  DAN     Main functions 'W' and 'I'
 2    9/05   9:33 am  DWC     A bug?
 3*   9/12   5:13 pm  BKN     VA power to replace transformer
 4*   9/13   0.59 am  SYSTEM  Nightly operations ended well
 5*   9/13   1:17 am  PMS     Standard errors in program
* INDICATES NEW MAIL
```

CW CHART

Freed from tedium

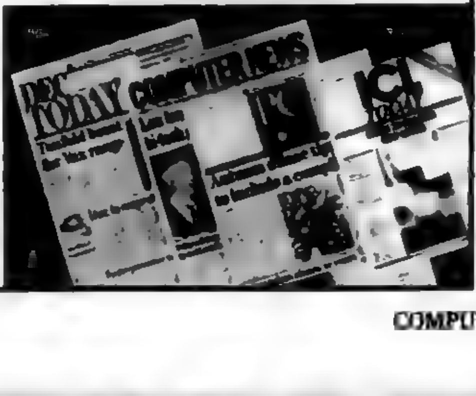
Attempting development without the proper tools is like trying to blow bubbles through a fork. The environmental needs of development in this installation were satisfied with the addition of two pieces of supporting software that would always be available to developers when needed.

First, an on-line, menu-driven "developer's workbench" was built to allow operation of DBMS utilities to create and alter files. Developers could control their own environments from definition to completion without assistance or extraordinary programming skills.

With the workbench, developers could create a file and provide a data dictionary from a simple data definition language (DDL), both of which can easily be altered. In addition, special requirements imposed by some applications could be simulated during testing; developers used workbench options to change terminal sessions, fourth-generation language parameters or DBMS characteristics to match production equipment.

To complement the workbench, autopilot routines were installed to review all aspects of the machine. Each night the software did everything from comparing DBMS file allocations to inspecting each program for compliance with standards. The computer monitored itself and called for attention only when required.

Developers were thus freed from much of the tedium of maintenance so they could concentrate on a development project and assist the development teams in more critical issues. Project work progressed without any of the delays that arise when technical operations must be performed by qualified



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people. Developers could work freely, secure in the knowledge that they would not be bothered by the needs of the computer system or other projects. While all development team members were aware of and agreed to certain standards, oversights could not be eliminated. Each program still had to be reviewed for compliance.

Quality control

If this review were to occur during programming, or too soon in the development process, it would probably inhibit the experimentation needed to complete development. Consequently, allowing the fourth-generation language compiler to check for standards would not be acceptable.

At the same time, a deferred review carries the risk of ending up with technically correct but impractical software that must be redone. This is usually discovered when there is not enough time to properly make repairs. Waiting until the acceptance-testing phase to check for compliance is also unacceptable.

> ATTEMPTING development without the proper tools is like trying to blow bubbles through a fork.

The solution for this project was to review work automatically at the end of each day. Quality control programs were installed to examine every program worked on that day. Precise quality control checks were generated from a number of sources, including proven standards, rules discovered during the first phase of construction and exceptions developed for specific sites.

This last source included detecting differences in statements that would work on some machines, such as the VAX, but not in IBM production environments. When such an anomaly was detected, the workbench would send the code's author a confidential mail message, which would pop up when the author next signed onto his terminal (see chart page 85). The autopilot program would also provide line-by-line detail of any discrepancies found.

The messages continued to appear until the problem was resolved, either by correcting the program or by determining, via a walk-through, whether the situation was an exception to the rule or proved to be an entirely new rule. If either of these two instances were the case, new rules were established, standards expanded and the checking programs modified to allow for the situation.

The program was not actually changed by quality control audit. One of the first rules established in enforcing standards was to never allow a change in the program without the author being present. Whether the change was made by another programmer or occurred automatically in the system, there would be hell to pay when any problem arises, even in the unlikely event that it was not caused by the change.

The first versions of the quality control programs resulted in simple modifications to code, such as indenting and renaming variables. Because this distracted more than benefited developers, automatic alterations were confined mainly to resequencing line numbers and resolving backward references to renumbered lines. These routines were moved to the workbench, where they were used with increasingly less frequency as personnel became aware of the advantages of writing neat code at the outset.

In a production environment, utilities must be entrusted to a staff of specialists trained to analyze the problem and plan the solution in a series of safe steps. Data integrity and application utility must be protected at all costs.

Dangerous delays

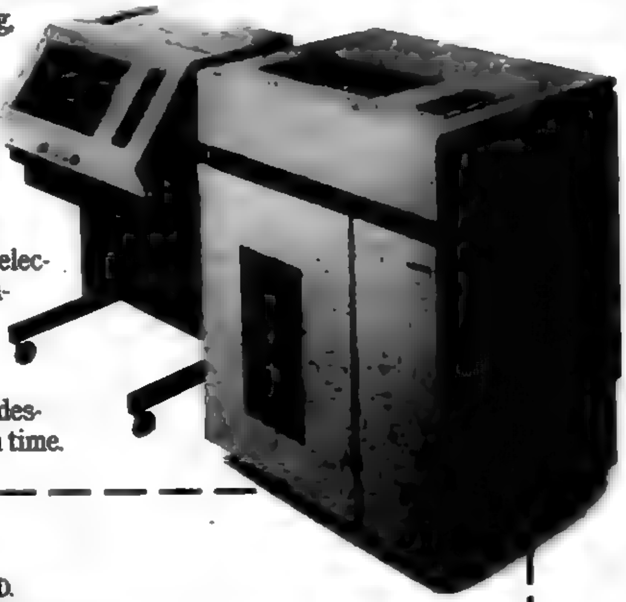
The needs of development are directly the reverse: There is no data to protect and no utility until the development is done. Therefore, any delay in resolving a problem will jeopardize the entire project.

All problems manifest themselves as program errors, even when — or especially when — the problems may have been produced by inaccurate file descriptions, typographical errors in the data dictionary, out-of-balance operating system parameters or garbage in the data.

Finding themselves caught between confronting a problem that needs immediate attention and the necessary utilities' being protected by the National Guard, developers will invariably program "around" the problem. This tactic produces most of the computer errors that emerge in production. When the file or dictionary is finally corrected, the program no longer works; the fix has become a bug.

Developers need to be able to fix problems at the source. To do this, they require the same level of control of the files and dictionary as they maintain with their code. Fourth-generation and DBMS languages, being far more powerful than older Cobol, Fortran and the like, require developers to wield the same power and flexibility in development files that data base administration specialists use when working with production files. And, since the development machine is so far removed from production, there is no reason developers cannot be entrusted to use the same utilities against their own development files.

In this particular instance, the critical roles of a separate data base administration staff were examined, and production restrictions were removed. Every



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developer could be trained in the fundamentals of the utilities. The developer's workbench let workers be self-sufficient when making changes to their files and dictionaries.

Self-protection

Some critical utilities were installed to protect the machine against contention and the errors that occur when someone yanks a file out from under a person just as that person is about to use it. The idea was to allow the machine to protect itself.

The utilities were built into a logical menu-driven format that corresponded to the phase of development the system was in. Utilities and special programs were placed in the appropriate category as either start-up, turnover, maintenance or review. Each selection after the initial screen was then followed by requests for details and further menus when necessary.

Applications were well protected by backups, so developers could experiment freely. People were encouraged to first discuss changes among themselves and guard against making a change that would cause problems for others. If they chose not to cooperate, problems were resolved by peer pressure.

> **THE CONSEQUENCE of total absence of control over program versions is mechanical anarchy. Constant confusion will reign as to which program version is correct at any given time.**

The development machine experienced fewer incidents of programmers claiming that others changed their code than typically occurs at the more common sites that segregate application programmers by project. Developers also obtained and gave assistance within broadly defined areas of responsibility.

Along with these aspects, developers could monitor the effect of their work on the machine and other programs in the system to see where efficiency could be improved. Workbench utilities walked developers through steps that address some of these concerns.

Each utility's screen provided full operational instructions. There were no shortcuts to any operation and no way to avoid seeing the screen repeatedly. This was done because these operations are serious, never to be performed casually.

In addition, the screens described any changes in the system or increased functionality that may have been added since the last time it was used. No provision was made for streamlining the system functions. The workbench's operation was sporadic; when a file is finally correct, people stop modifying it.

Library controls

Practically speaking, source code should never be permitted on a production machine. The investment in data and dependence on the utilities' constant availability is sufficiently high to justify banning compilers from the production machine to prevent misadventure.

On the other hand, the predominant activity in development is code writing. Typically, a single program is generated against an entire logical file, which is part or all of one or more physical files, and is then changed to suit the requirements. Frequently, a change does not work, in which case the programmer needs to return to a previous version, assuming that it can be found.

Since there is no limit on the number of program versions the machine will allow, developers typically maintain these versions using naming conventions and sequences in an order that makes sense only to themselves. Not only will someone walking unescorted into another programmer's development library not know where to begin, but he also will not be able to recognize the solution when he reaches it.

The consequences of total absence of control over program versions is mechanical anarchy. Constant confusion will reign as to which program version is correct at any given time.

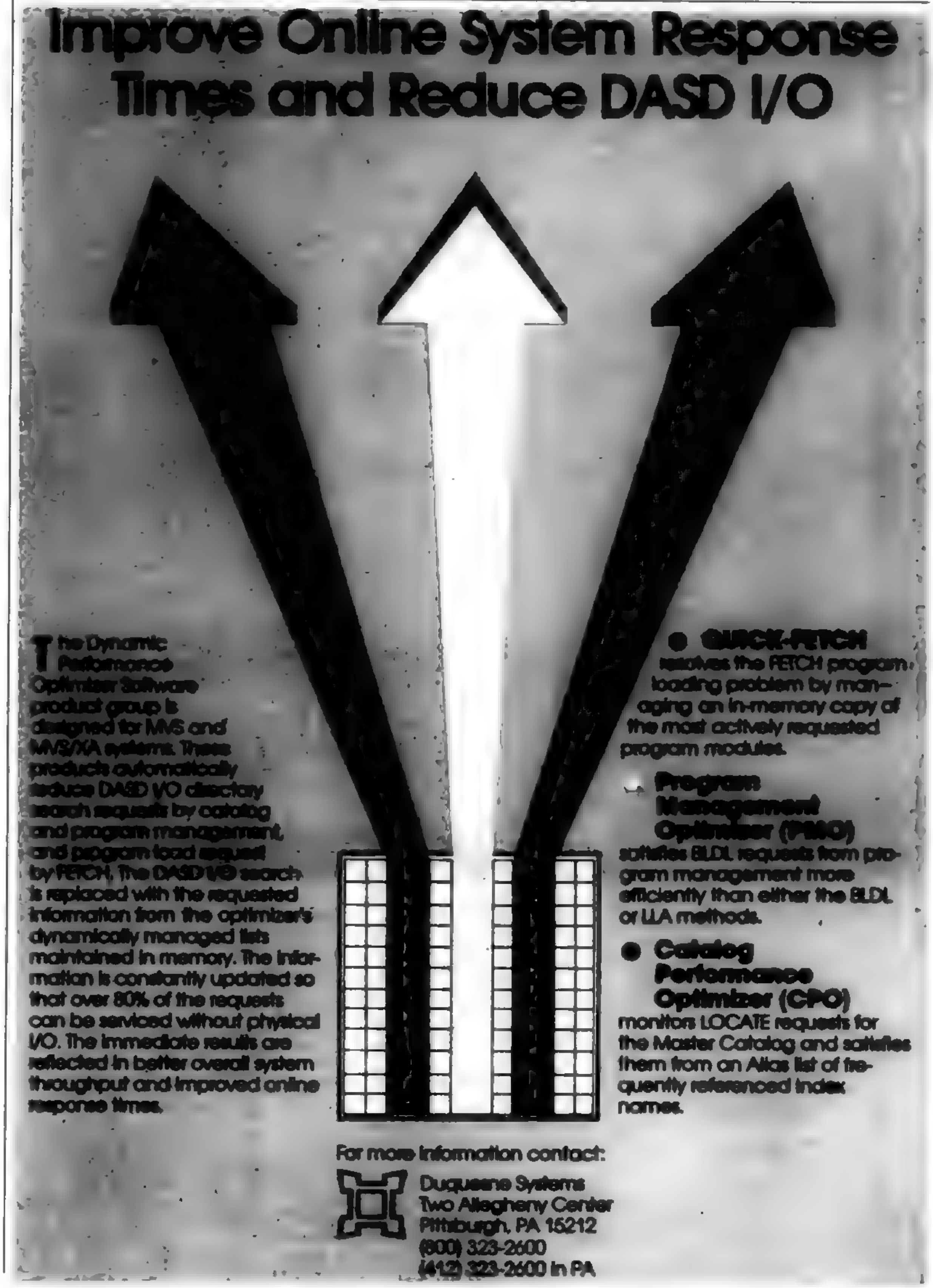
While some claim that information on versions will be needed only in the event that the author wins the lottery and departs for sunnier climes, countless hours are wasted by developers trying to identify the most recent changes and authors working on wrong versions of their own programs. Rather than forcing the project to halt while the missing code is located, developers often attempt to reconstruct it from scraps of paper and memory.

Whether a development or production system, the best rule is to allow only one program to exist for any given function at any time. Maintaining one version of programs protects the work more securely.

Losing time and risking error is unacceptable, particularly when one considers that the correct version is so near to hand.

On this development machine, the solution was provided with a workbench routine called Lazarus that allowed programmers to restore code from the previous day's status. Programmers could work securely with the assurance that the program could quickly be restored to its former state, dispelling any incentive for saturating a library with different versions of the same program.

Because the workbench was on a development machine, changes could be made as rapidly as is required to support a project. In other words, the development machine could take advantage of the same



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benefits it gives a project. It could be changed to suit each project without the regard for performance or production.

The final step in construction of the development machine was to train everyone involved with the machine to mount a tape and activate the Lazarus routine, triggering the nightly operations. This removed bottlenecks caused when implementing features that eliminated constant attendance and initiated protection.

Late at night, the Lazarus routine would check for active terminals. On finding none, it would quickly check the machine, files and programming code, back up the system and send messages on corrections to designated people.

The development VAX provided developers with further protection against power failure. When power is restored, all work would be repeated automatically at the terminal; nothing important is lost.

> RELAXING production standards for development is not advocating anarchy. Like some "people's democracies," the development environment may, in the long run, prove to be a more difficult place to live in than the ordered bureaucracy of production.

The first development machine is now complete. Ongoing development work on new systems is continually under way. Data base administration and quality assurance staffs are relieved from the necessity of constantly monitoring details of the system, and project management is simplified to make certain that schedules are reasonable and the work is effective.

The finished product of a development machine is a system that is fully operational on the production machine. This means that each piece of code, every procedure and all the files must be supported by and maintained in the production environment. This is optimally done at the source code level.

To ensure compatibility, systems are constantly shuttled back and forth between production and development in source form. Source DDL is used to establish the files and install the data dictionary. Program source code is moved into libraries and compiled before final acceptance testing begins.

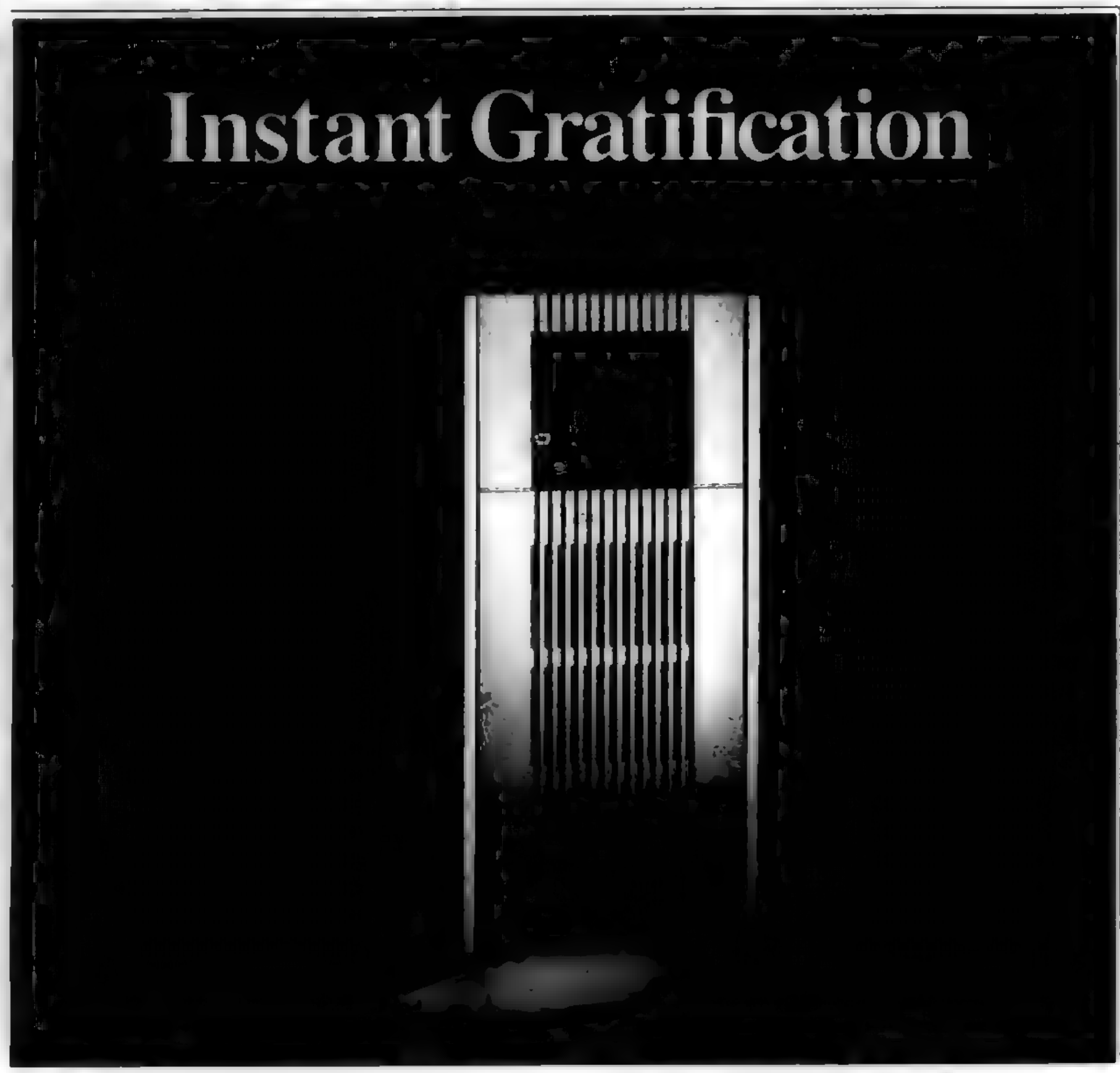
While installation of the development machine will be slower the first time it is done, practice will make subsequent operations flow more smoothly. As with a good prototyping effort, the project should remain fully staffed throughout final testing until the system has been installed and tuned for production work load.

Users considering a development installation tend to voice many of the same concerns about whether one could be installed at their location. Through the experience of building the first development machine, they may find some answers to their questions as well as some precautions.

The first installation may have been difficult because there was no recipe to follow and the outcome was uncertain, but subsequent development machines have been installed more easily. Much of the work that was done on the earliest versions of DBMS systems and attempts at very high-level languages have left techniques that proved invaluable to those willing to go to the trouble of sifting through other discarded and obsolete software to find them.

Care must be taken to adhere to standards and quality. Relaxing production standards for development is not advocating anarchy. Like some "people's democracies," the development environment may, in the long run, prove to be a more difficult place to live in than the ordered bureaucracy of production.

Developers reveling in the respite from stiff-necked production rules cannot afford to forget that there will come a judgment day. Someday, installation will have to be done. Customers will want something to show for their money. If it cannot be delivered, the development machine will not have been justified, and everyone will have to return to the low-priority mode of attempting to develop in the unused nooks and crannies of somebody else's computer. ●



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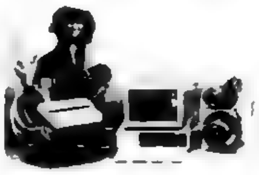

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TAKING CHARGE

David Ludlum

Bourbon Street beat

The pervasive revelry of the last three days of Mardi Gras in New Orleans earlier this month provided a fitting backdrop for the seventh annual gathering of the Association for Computer Operations Managers (AFCOM). The tone of the conference organizers and many of the computer operations managers who attended the show was decidedly upbeat, if more subdued than the carrying on of the costumed celebrants who painted Bourbon Street red that week.

For starters, the conference drew 700 attendees. That's not a big deal next to the annual migrations of some larger computer management groups, but it marked continued, steady growth in AFCOM's turnout; 100 showed up for its first conference in 1981.

More to the point, the theme of this year's gathering was "New Responsibilities, Roles and Opportunities," and the operations managers on hand were clearly upbeat about the changes going on in their workplaces.

Continued on page 93

Dialing for data on air freight

BY DAVID A. LUDLUM
CW STAFF

Seeking to stay aloft in the increasingly information-intensive delivery business, Emery Air Freight Corp. has forged a link to its customers with a system that lets its dial into a mainframe to track Emery shipments.

Emery officials said their system's direct-access dial-in service is the first in the air freight industry.

Any Emery customer worldwide with a personal computer, communications software and password can reach the company with a telephone call via the Tymnet public data-network and capture information on deliveries, shipping rates and required documentation. The data can reportedly be printed or downloaded for analysis.

Emery's Bohannon

To provide added capabilities, Emery sells customers a PC and software that allow them to communicate with the Emery host as well as print labels and shipping documents. The latter features generally are not available overseas.

Either way, customers assigned a mailbox can automatically receive daily reports on their shipments culled from Emery's mainframe, as well as send and receive messages.

Emery must provide customers with such timely information on their shipments to keep abreast of competitors such as Federal Express Corp., according to John Pincavage, a securities analyst with Painewebber Group, Inc. "It's something they have to have to keep competitive with everyone else. If they don't offer it and everybody else does, it's an obvious lack on their part," Pincavage said.

Last year, Emery lost $5.2 million on sales of $888 million while Federal Express, which specializes in overnight delivery, earned $153 million on sales of

Continued on page 92

AMR lands foreign reservation deal

Reflects drive to reap computer service profits from travel agencies

BY DAVID A. LUDLUM
CW STAFF

AMR Corp., parent company of American Airlines, has closed a deal to provide a fledgling European airline with computer services and has also formally launched a joint venture to offer reservation services in Japan.

The moves reflect a drive by AMR to reap computer service profits from foreign airlines and travel agencies. In the U.S., 90% of travel agencies already have computerized reservation systems, according to company spokesman Joe Stroop. "Quite honestly, the growth in the U.S. is going to be fairly limited," he said. Furthermore, rival reservation services offered by foreign airlines are less functional than those operated by American carriers, Stroop said.

Last November, 21 European airlines agreed to sponsor a study of the feasibility of developing a joint reservations system and agreed not to make deals to use American carriers' systems before the study is done.

The first phase of the study, which is being conducted by the New York consulting firm Simat, Heilsen and Eichner, will be presented to the European Airlines Association in Brussels on Friday, said Michael Friedman, a consultant with the firm.

Earlier this month, AMR said it signed an agreement to provide computer services to London-based Air Europe, which was launched as a charter service in 1979 and currently provides scheduled flights on three international routes and plans to add service to seven European cities in the next year.

Continued on page 94

Feds form advisory DP panel

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The federal government, a user organization with a $16 billion information systems budget, has established an expert advisory committee to help improve the use of computer technology at federal agencies.

The Office of Management and Budget (OMB) recently announced the formation of the OMB Information Technology Advisory Committee, which will include data processing managers from the private sector and provide advice on how to solve DP problems shared by all users.

Although many agencies have created advisory committees to obtain private-sector advice on technical subjects, this committee is believed to be the first with a governmentwide interest in data processing.

The committee will provide opportunities for the productive application of information technology, the impediments to effective use of technology and the remedies to mutual problems experienced by the federal government and the commercial sector.

Inside

- **DPMA sets computer-crime guidelines. Page 95.**
- **Investigators' group bids for revival. Page 95.**

Shell sleuths solve error mystery, save millions

BY JEFFRY BEELER
CW STAFF

NAPA, Calif. — By launching a formal program to boost the quality of its services, Shell Oil Co.'s in-house computing group claims to have chopped the error rate for one of its crucial systems by a factor of three.

In so doing, the organization saved itself $5 million in unnecessary costs, according to Linda Pierce, manager of quality improvement in Shell's Information & Computer Services unit.

Roughly 70% of the savings resulted from the correction of just one recurring problem — a hardware defect that kept a key Shell system's downtime at unacceptably high levels.

Pierce, who spoke here recently during the Diebold Group, Inc.'s 70th Plenary Meeting, credited the unit's cost reductions partly to a fundamental shift in the organization's approach to resolving bugs. In the past, members of the company's internal computing staff were usually content to respond to systems glitches with little more than quick fixes.

Although the strategy produced short-term payoffs, it created more problems in the long run than it solved, because it treated only symptoms and not their underlying causes.

Systems woes frequently spring from an inherent design flaw in some basic process or procedure. Left unremedied, a hidden imperfection that plagued a system in the past "will inevitably produce the same problems or errors over and over again in the future," Pierce said.

So the Shell employees who designed the Information & Computer Services quality-improvement effort adopted "root-cause analysis" as one of their guiding principles, she added. In other words, they dumped their former quick-fix style of troubleshooting in favor of an alternative method that stresses the importance of tracing problems to their source and addressing them there.

Another practice that forms one of the quality-improvement effort's conceptual cornerstones is an increased emphasis on teaching end users the effective use of their analytical tools, or application programs.

"Lack of training or ineffective training is very frequently a root cause of recurring systems problems," Pierce said. "Because some of our clients have never been taught how their tools operate and how they all fit together, they often inadvertently introduce errors as they struggle to use the programs correctly."

Instituted more than two years ago, the computing group's quality-improvement program was never formally mandated by Shell's senior corporate executives. Instead, impetus for the effort came entirely from within the Information & Computer Services unit.

"We implemented a quality-improvement process because we realized it would force us to do many of the things that needed to be done if we were to continue providing cost-effective services," Pierce recalled.

"Some of the goals that we hope to achieve through our effort include moving closer to our clients, increasing our focus on defining specifications and requirements and improving the ways we develop and support our systems," she stated.

Although the unit is seeking to raise the level of its services across the board, the organiza-

Continued on page 94

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Now, with the announcement of the Universal Network Architecture (UNA) strategy, Novell has set forth yet another standard, another

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milestone: using LAN technology to give PC users total computer connectivity. UNA will make it possible for computers of all kinds to seamlessly communicate and share data with each other.

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Milestones Ahead.

Dialing

FROM PAGE 89

$2.9 billion. According to an analyst who requested anonymity, Emery has lagged behind Federal Express and other rivals in the ability to trace packages or documents.

But Emery's new systems bring an advance — direct customer access to data. Federal Express' Supertracker system employs innovative hand-held scanner-terminals that drivers use to enter shipment data, which is relayed from trucks to headquarters by radio and leased lines. However, customers generally must talk to a Federal Express operator to get information from the system regarding their shipments.

Federal Express is conducting experiments aimed at outfitting customers with scanners, terminals and printers that would provide direct exchange of shipment information, according to company spokeswoman Shirlee Clark.

One Emery customer using a mailbox is Ciba-Corning Diagnostics Corp. in Medfield, Mass., which employs the air freight company to deliver some of the medical instruments it ships.

With its mailbox, Ciba-Corning gets customized daily reports that show the time packages were delivered and who signed for them, allowing Ciba-Corning to check up on part or all of a day's shipment, gather data on rates and required documents and monitor Emery's performance, noted James Vaughn, Ciba-Corning's distribution supervisor.

Ciba-Corning also has the Federal Express equipment for accessing data on shipments, but it only provides the time of delivery, Vaughn added. Emery's service gives him all the data he needs and does not require "baby-sitting," he said.

Emery developed its new system, which went into full operation in January, through a joint effort of its Business Development and Information Systems departments, according to Raymond Young, director of Business Development.

It grew out of a more cumbersome service that began about five years ago, and required customers with a modem to directly dial one of six Emery concentrators in the U.S.

Emery also helped pave the way for the new service when it began electronically transmitting shipment data to headquarters from its overseas offices in 1984.

Emery's Young

The enhancements for the present systems were developed in-house, requiring the better part of six-months, according to Robert Bohannon, Emery's vice-president of Information Systems.

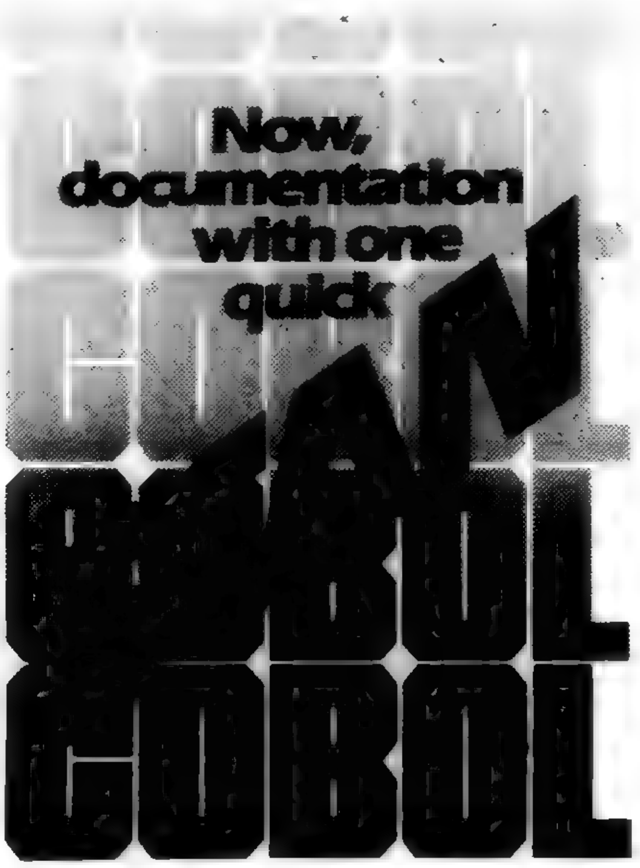
The system is hosted by an IBM 3090 Model 180 mainframe at Emery headquarters in Wilton, Conn., which runs on MVS and is front-ended by IBM 3725 controllers with an X.25 interface. Emery's Systems Network Architecture employs a pair of 9.6K bit/sec. lines.

Data on about 10% of shipments is entered with diskettes provided by customers that have the PC systems supplied by Emery, Bohannon explained. The diskettes are picked up with shipments and flown to Dayton, Ohio, where the data is transmitted to Wilton. Emery personnel key in data on other shipments in Dayton.

The systems Emery supplies employ Relay Gold PC communications software from VM Personal Computing in Danbury, Conn., which Emery recommends for customers who contact its mainframe using their own PCs.

One difficulty in deploying the system was accommodating differences in national packet-switched telecommunications networks, Bohannon pointed

Continued on page 96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Bourbon Street

CONTINUED FROM PAGE 89

As the evolution of technology has shaken up the data processing world, nowhere have the reverberations been more far-reaching than in the operations department. The advent of on-line processing, end-user computing and increasingly sophisticated operating systems is turning data centers from production-oriented facilities to service-oriented places, and that is changing the roles of the operations manager and staff.

A principal impact on many operations departments has been a demand for managers and staff with both greater technical abilities and better people skills. That may not augur well for more inert operations managers and workers and some would-be operations personnel. But the focus of those at the conference was on opportunities — new career paths and at least the hope of greater compensation, perhaps even a significant narrowing of the gap between the pay for programming and that accorded to operations.

On one hand, the technological advances are whittling down operations departments' needs for data entry clerks, traditional operators and production-control personnel.

At the same time, however, some departments have picked up the more skilled functions of systems and maintenance programming from the other side of the organization chart.

Some departments seek the same sort of skills to fill the new position of operations analyst, which has been spawned by the departments' growing complexity. Some have taken on the similarly demanding roles of managing networks and staffing data center help desks. This last job emphasizes an additional dimension. While the other new roles call for relatively sophisticated technical skills, manning the help desk demands strong people skills to help nontechnical end users manage more of their own information needs.

The major lesson in this for those contemplating their role in operations is that higher education has become increasingly important. One bank operations manager who attended the conference said the importance of higher education is already evident in job interviews at his department.

The operations manager's role

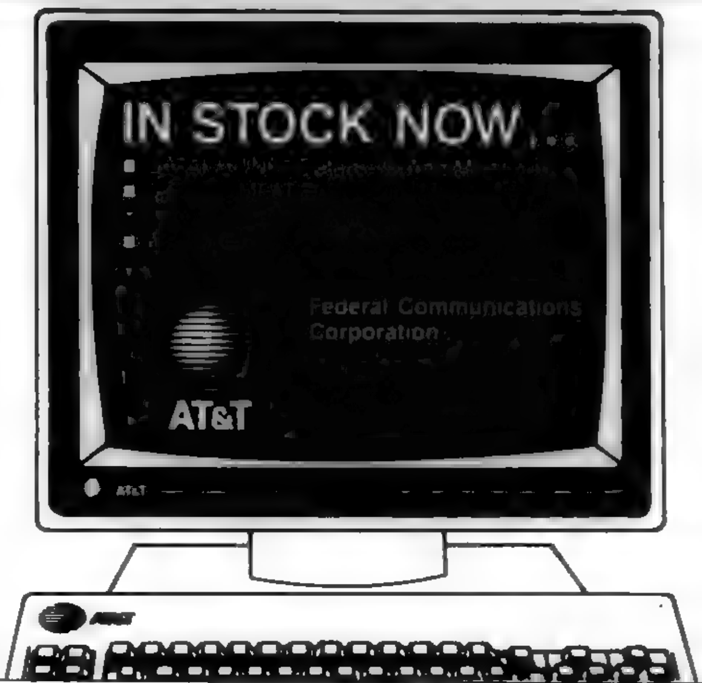
The role of the operations manager is changing as well. In the past, he often spent most of his day in the computer room, fighting fires with production jobs going on, in the words of AFCOM President Leonard Eckhaus. Now he, too, is more likely to be out of the computer room interacting with users and upper management — "and not just to explain why something went wrong," Eckhaus told the conference.

Rather, he might discuss applications that are to be developed, work out service-level agreements with users or take a more active part in purchasing decisions. As with the staff, the new roles mean managers often need better training, communications skills and education than they did in the past.

The managers also have battles to fight in capitalizing on some of the gains their departments have already made. Just as the energy of the all-day Mardi Gras celebration rapidly dissipated after the last parade on Tuesday evening, managers at the conference grew restrained in their optimism when considering whether their new responsibilities have won their departments better compensation — or even more recognition. When it comes to that, one said, the changes are not really being felt by the industry at this time.

The operations managers can only hope that they and their colleagues will win greater wages in light of their growing responsibilities before they gather for AFCOM's eighth annual conference a year from now in Las Vegas.

Ludlum is *Computerworld's* senior editor, management.



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AMR lands

CONTINUED FROM PAGE 89

Through its AMR Information Services subsidiary, AMR will provide Air Europe with computer services for reservations and ticketing and related accounting and reporting as well as proper loading of freight and baggage.

The agreement is the first one for an American airline company to provide reservation services for a European airline in a multihost fashion, with the European airline using the American company's central computer as the host for its own reservation system.

The American companies currently provide numerous carriers, foreign and domestic, with more limited service that allows travelers to book flights on the airlines through the companies' reservation systems.

AMR provides multihost automation services to Pan American World Airways, Braniff, Transtar Airlines and Empire Airlines as well as the national carriers of Costa Rica and El Salvador.

It also is the leading supplier of reservation systems to travel agents in the U.S. and the leading American supplier to travel agents in Europe.

Last month, AMR Senior Vice-President Max Hopper visited Japan to formally launch the company's previously announced reservations joint venture with All Nippon Airways.

Under the joint venture, the 1,700 travel agencies that use All Nippon's reservation system will be able to use the Sabre reservation system with the flip of a switch.

"We've added 1,700 sales outlets to the distribution channel," Stroop said.

All Nippon is the largest domestic carrier in Japan and the fifth largest in the world in terms of passengers boarded, Stroop said.

Last week, Hopper was in Europe pursuing sales of Sabre services to travel agencies and airlines and seeking joint ventures with European carriers.

Allegis Corp., parent company of United Air Lines, may soon announce deals with a European airline or airlines regarding use of its reservation system, according to spokesman Mark Brand.

Shell sleuths

CONTINUED FROM PAGE 89

tion is especially interested in seeing how its quality-improvement programs affect the performance of one particular system. Pierce declined to discuss either the system's configuration or applications other than to characterize the system as a tool for "sophisticated technical processing."

In November 1984, when it first became a target for quality-improvement, the system was suffering a 33% "bomb rate," which was costing the firm an estimated $12 million a year, Pierce said. Problems were forcing Shell's computing staff to interrupt and restart one of every three processing jobs the system undertook.

Because of the system's critical importance to Shell's business, Information & Computer Services personnel quickly seized upon it as a test of their newfound quality-mindedness. In keeping with their heightened awareness of root-cause analysis, they scrutinized the tool's activities and identified 12 categories of problems that were contributing to its dismal performance.

> PROBLEMS were forcing Shell's computing staff to restart one of every three processing jobs the system undertook.

One by one, the unit began attacking the problems in the order of their perceived priority. By far the most serious contributor to the system's many troubles was a recurring hardware bug that was periodically causing crashes.

Shell had long known of the defect but had never insisted on pinpointing the gremlin's origin.

"Whenever the system went down, we'd simply call in a service technician, who'd tell us that the interruption was due to a bad board and that he had replaced it," Pierce said.

Through root-cause analysis, Shell tracked the problem to a flawed production process at one of the vendors that supplies chips to the system's manufacturer. When these faults were removed, the board-related crashes vanished.

The resulting rise in system availability has enabled the unit to reclaim $3.5 million worth of lost processor time.

Since then, the Information & Computer Services team has applied the same quality-improvement techniques to some of the other items on its list of identified problems, including a few that reside in the system's software and application programs. Correction of the nonhardware errors added an additional $1.5 million to the group's overall cost savings.

Altogether, Shell's crusade for heightened quality has slashed the system's bomb rate from 33% to 10%, Pierce said.

"Our experiences thus far have been like losing weight," Pierce said. "The first 20 pounds are easy. The rest comes off only after tenacious persistence."

But while the hardest part of its work awaits, the unit intends to continue trying to upgrade its quality. In the problems that still afflict the system lies the potential for additional cost reductions estimated at $7 million.

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Information targeted as focus of computer crime

BY DAVID A. LUDLUM
CW STAFF

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) has adopted a Model Computer Crime Act to be used as a guideline in the drafting of computer crime legislation.

The DPMA Executive Council voted earlier this month to adopt a position statement that emphasizes the need for a special set of laws governing crimes related to information technology.

Most current laws focus on computer hardware, while the model act stresses information as the key resource vulnerable to abuse, theft or destruction.

"We don't feel [legislators] should consider the computer as anything more than the weapon that is used," says Terry Felker, the association's vice-president for public affairs.

The association will research computer crime legislation to determine which states might need to strengthen their laws, DPMA President Robert A. Hoadley explains.

While most states have covered computer crime in one way or another, several have outdated laws, says Richard Cashion, chairman of the DPMA Computer Crime Committee.

The model act stresses that computer crime laws should cover the following activities when they are unauthorized:

- Use or access of computer resources, including the computer and the information stored in it.
- Release of computerized information.
- Copying or use of proprietary computer software and information.
- Modification of computer resources including the computer, software and information.
- Denial of access to computer resources including the computer, computer software or information.

Investigators' group bids for revival

A computer security professional has launched an effort to reincorporate the International Association of Computer Crime Investigators, which has been dormant for two years because of the death of its founder.

The association will be aimed at advancing the professional development and ethical conduct of computer crime investigators, according to Jack Bologna, president of Computer Protection Systems, Inc. in Plymouth, Mich., and acting executive director of the association, who announced the bid to reincorporate.

Bologna said he envisions a global perspective and membership for the association.

While it became inactive after the death of Bruce Goldstein, its founder and executive director, interest in the association has continued to grow, Bologna said.

"The association was moving along rather well under Bruce's guidance. Unfortunately, none of the founding members were free to take on his responsibilities when he passed away."

He added, "I have been contacted by professionals in the fields of law, accounting, [electronic data processing], investigation and security and asked to organize an effort to professionalize computer crime investigation.

"The need for such expertise grows with each passing day. Yet there is no real training, nor certification nor ethical standard setting mechanism. With the deactivation of the association, even the informal network we had put together came apart. I believe the time is now ripe to reactivate," Bologna said.

The association will certify members who pass a series of examinations as Certified Computer Crime Investigators, Bologna said. He said the examination will cover such topics as computer science, criminal justice, investigative and electronic DP audit procedures, the law of evidence, criminal statutes involved in computer crimes and the use of expert witnesses in high-tech prosecutions.

Dialing

FROM PAGE 92

out. "Most of it is standard, but there are little nuances from country to country," he said.

Another concern was adjusting parities for customers who use dumb terminals rather than PCs.

Developing security measures for customers and Emery also slowed the development.

Young said it would be premature as well as unrealistic to assess the financial return from the system because it is so key to the air freight business.

"It's as much a business of information as doing the transportation," he said. "As I've seen the business evolve over five years, more and more customers are requiring this kind of capability as a condition for doing business. They need pretty much instant access to information about where their shipments are."

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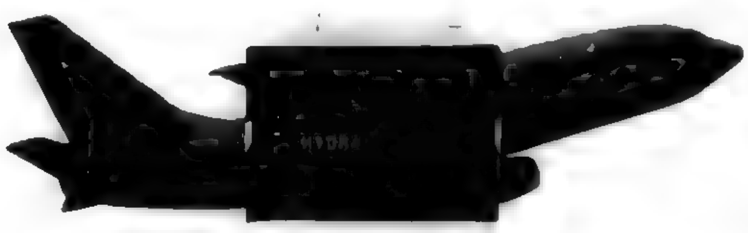

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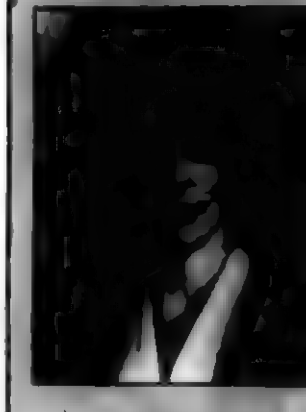

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DPMA backs bills for Section 1706 repeal

BY DAVID A. LUDLUM
CW STAFF

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) has formally backed congressional bills to delay and repeal Section 1706 of the Tax Reform Act of 1986, which bars many computer consultants from working as independent subcontractors.

The DPMA has taken the stand partly on behalf of members who work or who used to work as independent computer consultants, according to Terry Felker, who acts as the association's vice-president for public affairs.

DPMA members who are data processing managers have not reported any serious impact on their work from the new tax law, says Felker, who is director of the U.S. Army's Information Systems Command in Fort Lee, Va. "We've heard nothing from any of the DP managers to indicate there's any concern on their part," he says.

Tax disadvantage

Section 1706 applies to certain technical service workers, including computer consultants, programmers and analysts, who work independently as subcontractors through a firm that acts as their broker or representative.

It requires them to be treated as employees of the broker for tax purposes, a less advantageous status than independent contractor, unless they can demonstrate on the basis of 20 common-law standards that they truly function as independent businesses with broad control over how they do their work.

"For employment and tax purposes, computer consultants should be treated no differently than individuals in other professions," a DPMA statement says.

DPMA President Robert Hoadley, data processing director for the city of Raleigh, N.C., says the association's position stems from concerns about procedure and fairness.

Delaying Section 1706

"These targeted technical service workers were not granted the opportunity to give input before the decision was made," Hoadley says.

According to Felker, "Delaying the implementation of Section 1706 is the least Congress should do."

"Congress can then hear from the computer industry and the Internal Revenue Service and determine if Section 1706 should be implemented," Felker says.

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CALENDAR

MARCH 29-APRIL 4

66th ADAPSO Management Conference. Orlando, Fla., March 29-April 1 — Contact: Christopher Carleton, ADAPSO, Suite 300, 1300 North 17th St., Arlington, Va. 22209.

EFTA Expo. Las Vegas, March 29-April 1 — Contact: Kristi Gasaway, Electronic Funds Transfer Association, Suite 1000, 1726 M St. N.W., Washington, D.C. 20036.

The Inevitable Partnership: Leaders Achieving Business Goals Through Technology. New Orleans, March 29-April 1 — Contact: Life Office Management Association, 5770 Powers Ferry Road, Atlanta, Ga. 30327.

Management Information Systems for Strategic Advantage. Philadelphia, March 29-April 3 — Contact: Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School, University of Pennsylvania, Philadelphia, Pa. 19104. Also being held Sept. 20-25 in Philadelphia.

Interface '87. Las Vegas. March 30-April 2 — Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

1987 National Conference on Data Processing Quality Assurance. Chicago, April 1-3 — Contact: Quality Assurance Institute, 9222 Bay Point Drive, Orlando, Fla. 32819.

1987 Computer Dealers & Lessors Association Spring Meeting. Orlando, Fla., April 1-4 — Contact: Computer Dealers & Lessors Association, Inc., 1212 Potomac St. N.W., Washington, D.C. 20007.

Networking: The Large Organization Perspective. Melbourne, Fla., April 2-3 — Contact: Harris Briefing Center, 1025 W. Nasa Blvd., Melbourne, Fla. 32919.

APRIL 5-11

Human Factors in Computing Systems & Graphics Interface 1987. Toronto, April 5-9 — Contact: Wendy Walker, CHI & GI '87 Conference Office, Computer Systems Research Institute, University of Toronto, 2002-10 Kings

College Road, Toronto, Ont., Canada M5S 1A4.

CAD/CAM Data Bases '87: Users Take Charge. San Francisco, April 6-7 — Contact: Kim Takita, Management Roundtable, Inc., Reservoir Executive Park, 824 Boylston St., Chestnut Hill, Mass. 02167.

1987 Facsimile and Image Communications Conference. Boston, April 6-8 — Contact: Jean O'Toole, CAP International, One Snow Road, Marshfield, Mass. 02050.

1987 Eastern Simulation Conferences. Orlando, Fla., April 6-9 — Contact: The Society For Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

International Programmable Controllers Conference and Exposition and International Computer Graphics Conference and Exposition. April 6-9, Detroit — Contact: Engineering Society of Detroit, 100 Farnsworth Ave., Detroit, Mich. 48202.

The Comten Users' Exchange Spring Conference. Washington, D.C., April 6-10 — Contact: Dave Beran, NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Fourth Annual International Conference on Technology and Education. Fort Worth, Texas, April 7-9 — Contact: Jimmie Thompson, ICTE, 1400 One Tandy Center, Fort Worth, Texas 76102.

New Directions in Information Management. New York, April 8-9 — Contact: The Conference Board, 845 Third Ave., New York, N.Y. 10022.

Sixth Annual Conference on Trends in Technology for Education and Industry. St. Paul, Minn., April 8-9 — Contact: Combase, Inc., Suite 890, 333 Sibley St., St. Paul, Minn. 55101.

California Educational Computing Consortium. San Jose, Calif., April 9-10 — Contact: Alexis Devlin, NADM-358, Accounting Data, San Francisco State University, 1600 Holloway Ave., San Francisco, Calif. 94132.

Satellite Communications Status '87: Technology, Applications & Markets. New York, April 9-10 — Contact: Susan Smith, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

APRIL 12-18

COACH Conference XII. Toronto, April 12-15 — Contact: The Canadian Organization for Advancement of Computers in Health, No. 1200, 10460 Mayfield Road, Edmonton, Alta., Canada T5P 4P4.

Long Range Information Systems Planning. Atlanta and San Francisco, April 13-16

Continued on page 98

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SQL/DS	VAX/RDB	PC/DOS	Novell
IDMS	DBMS	Wang/VS	AT&T Starlan
ADABAS	VS/DMS	UNIX	IBM PC Net
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Cleveland, OH May 5
Columbus, OH May 12
Des Moines, IA Apr 29
Detroit, MI Apr 7, Apr 30
Grand Rapids, MI Apr 28
Indianapolis, IN Apr 14
Kansas City, MO May 20
Madison, WI Apr 21
Milwaukee, WI May 12
Minneapolis, MN May 28
Omaha, NE Apr 1
St. Louis, MO May 6
Toledo, OH Apr 23

NORTHEAST AND MID-ATLANTIC
Boston, MA Apr 24
Buffalo, NY May 21
Framingham, MA May 28
Harrisburg, PA Apr 30
Hartford, CT Apr 16
Smithtown, NY Apr 8
Manchester, NH May 7
Morristown, NJ May 12
New Haven, CT May 6
New York, NY Apr 2, May 13
Philadelphia, PA May 7
Pittsburgh, PA Apr 23
Portland, ME Apr 30
Providence, RI May 14
Tarrytown, NY Mar 31

SOUTH AND SOUTHEAST
Atlanta, GA May 20
Baltimore, MD Apr 27
Baton Rouge, LA Apr 28
Birmingham, AL Apr 28
Charlotte, NC Apr 10
Columbia, SC May 5
Ft. Lauderdale, FL May 5
Jackson, MS Apr 7
Nashville, TN May 27
New Orleans, LA Apr 30
Orlando, FL Apr 16
Raleigh, NC May 15
Richmond, VA Apr 16
Tampa, FL May 13
Washington, DC Apr 7, May 22

SOUTHWEST
Austin, TX May 6
Dallas, TX Apr 23
Denver, CO Apr 16
Houston, TX Apr 1, May 19
Oklahoma City, OK May 6
Phoenix, AZ Apr 15
San Antonio, TX May 5
Tulsa, OK May 5

WEST AND HAWAII
Honolulu, HI May 21
Los Angeles, CA Apr 23, Apr 30, May 13
Portland, OR May 1
Sacramento, CA May 11
Salt Lake City, UT May 5
San Diego, CA May 7
San Francisco, CA May 6
San Jose, CA May 13
Seattle, WA Apr 30

CANADA
Calgary, AB Apr 28
Montreal, PQ Apr 15
Ottawa, ON Apr 16
Toronto, ON Apr 2, May 19
Vancouver, BC Apr 29

Just call (212) 736-0842 collect. Ask for the FOCUS Seminar Coordinator.

Continued from page 97

— Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Commercial Crime Conference. Hong Kong, April 13-17 — Contact: Nelson P. C. Tse, Computer Services, Hong Kong Productivity Council, 12th Floor, World Commerce Centre, 11 Canton Road, Tsimshatsui, Kowloon, Hong Kong.

Software Panorama. Atlanta, April 14-16 — Contact: Data Processing Management Association, Atlanta Chapter, P.O. Box 34, Atlanta, Ga. 30301.

Optica '87 (First International Meeting for Optical Publishing and Storage). Amsterdam, April 14-16 — Contact: Jean Mulligan, Learned Information Ltd., Woodside, Hinksey Hill, Oxford, England OX1 5AU.

APRIL 19-25

The National Information Management Users Conference. Dallas, April 21-22 — Contact: Eastern regions: Jan O. Ward, Quality Information Consultants, Inc., 11204 Angus Place, Potomac, Md. 20854. Western regions: Ann K. Anderson & Associates, P.O. Box 4157, Foster City, Calif. 94404.

DEC Review: The Digital Challenge. Cambridge, Mass., April 21-22 — Contact: Diane Szretter, International Data Corp., 5 Speen St., Framingham, Mass. 01701.

Standards: The Ties That Bind. New York, April 22-23 — Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114.

The Artificial Intelligence and Advanced Computer Technology Conference and Exhibition. Long Beach, Calif., April 22-24 — Contact: Tower Conference Management Co., 331 W. Wesley St., Wheaton, Ill. 60187.

APRIL 26-MAY 2

1987 Association for Systems Management Annual Conference. Louisville, Ky., April 26-29 — Contact: Richard B. McCaffrey, ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

National Workshop & Computer Systems Demonstrations. Kansas City, Mo., April 26-29 — Contact: Management Systems Committee, American Trucking Associations, 2200 Mill Road, Alexandria, Va. 22314.

Cinteract '87. San Diego, April 26-30 — Contact: Cincom Systems, 2300 Montana Ave., Cincinnati, Ohio 45211.

Expo Bank Asia 87 Conference. Osaka, Japan, April 27-28 — Contact: Expo Bank Asia 87 Conference, E. J. Krause & Associates, Inc., Japan, 11-14 Akasaka 3-Chrome, Akasaka Bergo Hoei 805, Minato-Ku, Tokyo, Japan 107.

The Branch of the Future, The Future of the Branch. Dallas, April 27-29 — Contact: Bankers Institute, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

1987 Association for Information and Image Management Show. New York, April 27-30 — AIIM, Suite 1100, 1100 Wayne Ave., Silver Spring, Md. 20910.

Speech Tech '87. New York, April 28-30 — Contact: Margo Kelly, Media Dimensions, Inc., 42 E. 23rd St., New York, N.Y. 10010.

IBX Users Group Association 12th Meeting. Irvine, Calif., April 29-May 1 — Contact: Elizabeth Stockwell, Wang Laboratories, Inc., Mail Stop 013-038, One Industrial Ave., Lowell, Mass. 01851.

Corpcon. Chicago, April 28-30 — Contact: Linda Morris, Corpcon, P.O. Box 3727, Santa Monica, Calif. 90403. Also being held Sept. 21-23 in Los Angeles.

Dexpo South '87. Nashville, April 28-30 — Contact: Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

BMC Software User Group's Second Annual Meeting. Houston, April 29-May 1 — Contact: Marianne Levandoski, AT&T, Room 50-51A40, 30 Knightsbridge Road, Piscataway, N.J. 08854.

19th Annual International Management Information Systems Conference. Cambridge, Mass., April 29-May 1 — Contact: Paper Industry Management Association, 2400 E. Oakton St., Arlington Heights, Ill. 60005.

MAY 3-9

AUUA (Sperry Users) Spring Conference. Orlando, Fla., May 3-7 — Contact: Randal L. Leonard, Gay & Taylor, Inc.,

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BLIS/COBOL Users Group Annual Meeting. Orlando, Fla., May 3-7 — Contact: BLIS/COBOL Users Group, Suite 110, 222 S. Westmonte Drive, Altamonte Springs, Fla. 32715.

Eighth Annual Meeting of the International Association of Synercom Users. Houston, May 3-7 — Contact: Gary Carson, Synercom, 10405 Corporate Drive, Sugar Land, Texas 77478.

Second International Conference on Supercomputing and First World Supercomputer Exhibition. Santa Clara, Calif., May 3-8 — Contact: Lana Kartashev, Dynamic Computer Architecture, Inc., Suite B-309, 3000 34th St. S., St. Petersburg, Fla. 33711.

Computers & Communications in the Healthcare Industry. Dallas, May 4-5 — Contact: Carol Every, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Eastern Communications Forum 87. Stamford, Conn., May 4-6 — Contact: ECF, 505 N. Lake Shore Drive, Chicago, Ill. 60611.

BankAI. Brussels, May 5-6 — Contact: Society for Worldwide Interbank Financial Telecommunications, AI Business Unit, Avenue E. Solvay 81, 1310 La Hulpe, Belgium.

Eighth National Online Meeting. New York, May 5-7 — Contact: Learned Information, Inc., 143 Old Marlton Pike, Medford, N.J. 08055.

18th Annual Meeting of the ASI Users' Group. New Orleans, May 5-8 — Contact: University of Michigan, Data Systems Center, 2021 Administrative Services Building, Ann Arbor, Mich. 48109.

Second International Optical Storage Forum. Denver, May 6-8 — Contact: Cartlidge & Associates, Inc., Suite M259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

1987 International Conference & Exhibition on Health Industry Bar Coding. Atlanta, May 6-8 — Contact: Automatic Identification Manufacturers, Inc., 1326 Freeport Road, Pittsburgh, Pa. 15238.

MAY 10-16

APL87. Dallas, May 10-14 — Contact: APL87 Registrar, Suite 210, 440 Northlake Shopping Center, Dallas, Texas 75238.

VIP '87 — Duquesne Systems International Users Group. Chicago, May 11-12 — Contact: Donna Bartko, Duquesne Systems, Inc., Two Allegheny Center, Pittsburgh, Pa. 15212.

Audit Managers' Symposium IX. Hilton Head Island, S.C., May 11-13 — Contact: Jane Evans, MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

CD-I/The Future Conference. San Francisco, May 11-13 — Contact: Carol Peters, Online International, Inc., 989 Avenue of the Americas, New York, N.Y. 10018.

Desktop Publishing '87. San Francisco, May 11-13 — Contact: Carol Peters, Online International, Inc., 989 Avenue of the Americas, New York, N.Y. 10018.

Intercompany Networks: Strategy and Implementation. New York, May 12-13 — Contact: William Smulsky, The Yankee Group, 200 Portland St., Boston, Mass. 02114.

Infobase '87 — International Database Exhibition and Congress. Frankfurt, West Germany, May 12-14 — Contact: Messe Frankfurt GmbH, Ludwig-Erhard-Anlage 1, POB 97 01 26, D-6000, Frankfurt 97, West Germany.

Network Users Association Spring Meeting. Atlanta, May 13-15 — Contact: Network Users Association, Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

Federal Conference on Electronic Publishing. Bethesda, Md., May 13-15 — Contact: Cahners Exposition Group, P.O. Box 3833, 999 Summer St., Stamford, Conn. 06905.

Eighth Annual Computer Law Institute. Los Angeles, May 14-15 — Contact: University of Southern California Law Center, University Park, Los Angeles, Calif. 90007.

Infoweek '87. May 17-20, Dallas — Contact: UCCEL, Marketing Communications c/o Financial Systems Division, P.O. Box 660054, Dallas, Texas 75266.

International Communications Association 1987 Conference & Exposition. New Orleans, May 17-22 — Contact: ICA, Suite 710, LB-89, 12750 Merit Drive, Dallas, Texas 75251.

Hammer Forum West — Harnessing New Technology: From Vision to Reality. Los Angeles, May 18-20 — Contact: Michael Hammer, Hammer Forum West, 5 Cambridge Center, Cambridge, Mass. 02142.

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Start with the newly updated "A Basic Guide To Exporting," published by the Department of Commerce and available from your local Government Printing Office (GPO) outlet for $8.50. This guide explains the numerous government programs devoted to helping U.S. exporters.

The scope of services provided by the Commerce Department is vast and yet often overlooked by many businesses. There are trade missions, trade shows, seminars and counseling services. Exhibitors at last year's National Computer Conference (NCC) rated the department's Foreign Buyer Program as "the best new aspect of NCC for 1986," and it will be repeated this year at NCC and Comdex/Fall '87.

Lest you fear that this will require a lot of red tape, be advised that you can get one-stop shopping for these services at offices of the U.S. and Foreign Commercial Service, which are located in most major cities.

Next, subscribe to the Commerce Department's monthly magazine for international trade, called *Business America*. It costs $57 a year from the GPO.

This is not the prettiest magazine in the world, nor the most objective. But if you read between the lines, there is a lot of foreign market intelligence to be had. A careful reader will find prospects for direct sales, joint ventures and marketing agreements.

The department gets its information from cables sent to Washington, D.C., by a network of trade officials in U.S. embassies and U.S. and For-

Continued on page 109

Fujitsu, Fairchild nix buy-out

Firms claim technical swap, distribution partnership will continue

BY JAMES A. MARTIN
CW STAFF

Although the controversial acquisition of Fairchild Semiconductor Corp. by Japanese giant Fujitsu Ltd. has been canceled by mutual agreement, the two semiconductor companies plan to continue their partnership in several strategic areas.

"There won't be any equity involved now, but otherwise, the agreement is still pretty much the same," Donald W. Brooks, Fairchild's president and chief executive officer, said last week.

In a surprise announcement early last week, Schlumberger Ltd., the French owner of Silicon Valley semiconductor pioneer Fairchild, and Fujitsu jointly stated they would bow to U.S. government and industry pressure and scrap plans for Fujitsu to buy Fairchild. The acquistion was first announced last fall [CW, Nov. 3].

In Japan, Fujitsu officials said the rising political controversy in the U.S. regarding the joint venture made it unlikely that the buy-out of Fairchild could be completed in a reasonable time.

"We feel it is deplorable to be forced by government intervention to withdraw from the joint venture," said Fujitsu President Takuma Yamamoto.

Instead, Fairchild and Fujitsu will continue with their plans to join forces in all other areas, including technology exchange, second-sourcing and foundry agreements. In theory, Fairchild would benefit from Fujitsu's manufacturing savvy and advanced memory chip technology, while Fujitsu would gain access to Fairchild's U.S. distribution system as well as its high-speed logic chips.

Fairchild's top management is exploring the possibility of a leveraged buy-out from Schlumberger, which is not expected to maintain financial interest in Fairchild. The buy-out proposal would cost between $200 million and $400 million, analysts said.

Such a buy-out might require Fairchild to seek outside capital investment in the form of a public offering, Brooks said, but no specifics have been planned.

Fairchild, once an industry leader and the first major Silicon Valley semiconductor company, has continued to lose money in an unstable industry. As a result, Fairchild will find it hard to con-

Continued on page 104

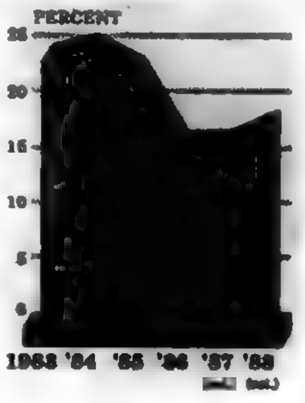
Inside

- Students learn their lesson at entrepreneurial society conference. Page 107.
- European lessees sue IBM over alleged pricing, maintenance breaches. Page 106.
- Having passed the $100 million revenue mark, SAS aims to redefine its market. Page 109.

Data View

IBM: A long road back

IBM pretax profit margins, 1983 to 1988



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CW CHART: SUSAN ALDAM

Networkers merge, eye user markets

BY ELISABETH HORWITT
CW STAFF

MALVERN, Pa. — Planning to target the burgeoning enterprise networking market, communications vendors Rabbit Software Corp. and Micro Plus II, Inc. announced last week that they have entered an agreement in principle to merge.

Under the terms of the agreement, Boca Raton, Fla.-based Micro Plus would become Rabbit's subsidiary, and the two companies would jointly market "complete networking solutions to Fortune 1,000 companies and OEMs," according to Charles Robbins, Rabbit senior vice-president of development.

Rabbit specializes in software products connecting multitasking and multiuser microcomputers and IBM mainframes using IBM communications protocols such as LU6.2 and Document Interchange Architecture. Micro Plus's hardware offerings link IBM Personal Computers with IBM's Systems Network Architecture and bisynchronous environments, as well as with X.25-compatible packet-switching networks.

The merger's two-pronged product strategy will be to add value to IBM and industry standard Open Systems Interconnect communications protocols and to "help the chief information officer do enterprisewide networking of applications," Robbins explained.

The two companies said they also hope to combine Rabbit's OEM connections with mainframe companies such as IBM and Unisys Corp. with Micro Plus's OEM and large end-user sales channels.

Upon completion of the merger, Micro Plus shareholders will receive approximately two million shares of Rabbit common stock, according to company officials.

Financial details of the merger were not disclosed at the time of the announcement.

A tentative completion date for the merger is set for May, Rabbit said.

Smaller drives bound for glory

Analysts say 3½-in. disks will sell twice as much as larger floppies by '90

BY JAMES A. MARTIN
CW STAFF

Although sales in the 3½-in. microfloppy disk drive industry are today mainly confined to a few desktop microcomputer and several laptop vendors, analysts predict that by the early 1990s, the smaller storage medium will sell twice as much as its predecessor, the now-standard 5¼-in. drive.

"The 3½-in. microfloppy disk will absolutely be the data-transfer medium of choice as we get further into the decade," says Phil Devin, senior data storage analyst for Dataquest, Inc. in San Jose, Calif.

The 3½-in. floppy disk drive industry stands to gain its greatest momentum when IBM begins phasing in the microfloppy as a standard for its future Personal Computer family members. Exactly when that will happen, however, remains a mystery to everyone but IBM.

Last year, IBM unveiled its PC Convertible laptop using the smaller disk size and announced an internal 3½-in. microfloppy disk drive as an option for the PC XT Model 286. Analysts predict that IBM will unveil on April 2 an Intel Corp. 8086-based PC aimed at the education market that will have at least one standard 3½-in. microfloppy. Two advanced PC ATs are expected to have the smaller floppy drive as an option.

Boom around corner

Regardless of when IBM bestows the 3½-in. floppy-disk technology with standard status, the small disk drive industry is preparing for a boom. The majority of companies manufacturing 3½-in. diskette drives are Japanese, with Sony Corp. in the lead followed by such competitors as NEC Information Systems, Inc. and Mitsubishi Electronics America, Inc.

In 1983, Hewlett-Packard Co. introduced its HP 150 microcomputer using a 3½-in. floppy disk drive, considered to be an industry first. Worldwide per-unit shipments that year of 3½-in. drives were 107,000, according to Dataquest. A year later, Apple Computer, Inc.'s Macintosh debuted using the smaller size disks; 272,000 units were shipped that year.

Sales have continued to escalate in this rapidly expanding industry. In 1986, 890,000 3½-in. floppy units were shipped, with 2 million expected this year, 4 million in 1988 and 8 milbon in 1989.

In contrast, shipments of 5¼-in. floppy disk drives are expected to begin declining by 1988. In 1986, Dataquest estimates, 10 million units were

Continued on page 106

Fujitsu

FROM PAGE 103

vince potential investors to cough up the funds, according to Michael Kubiak, a semiconductor analyst with Kidder, Peabody & Co. in San Francisco.

Even though Fujitsu will not own 80% of Fairchild, as originally planned, the alliance will continue to be scrutinized by the government and competitors.

Brooks, however, said the relationship was no different from earlier-announced partnerships between American-based Motorola, Inc. and Toshiba Corp..

Sematech unaffected

The cancellation to acquire Fairchild should not have any direct bearing on the future of Sematech, the consortium of semiconductor companies recently announced to help protect the U.S. industry against competitive pressures from overseas, Brooks said. He added that Fairchild has no plans to join.

Schlumberger is preparing to abandon Fairchild at the point that its subsidiary is on the verge of a financial turnaround, said Mel Thomsen, an industry analyst for Dataquest, Inc. in San Jose, Calif.

"It's too bad Schlumberger is going to sell them now at a time when they've invested so much and they're just about to realize some of that investment," he added. Thomsen said the semiconductor industry is making a mild comeback this year from which Fairchild will benefit.

Because Fairchild is a major vendor of bipolar gate-array technology used in classified high-speed military weapons, the Reagan administration grew increasingly concerned that the merger would leave the U.S. vulnerable to foreign forces for strategic technology. Most recently, Secretary of Commerce Malcom Baldrige and Secretary of Defense Caspar Weinberger called for a Cabinet-level review of the pending acquisition.

If Fujitsu had approached Fairchild two years ago, there would have been much less opposition, analysts said. Recent heated exchanges between Japan and the U.S. regarding the 1986 anti-chip dumping trade accords, along with weakened U.S. semiconductor companies and the strength of the yen, have escalated fears that Japan will gain an ever-greater lead in the chip industry at America's expense. "In business, timing is everything, and the Fairchild-Fujitsu announcement was poorly timed," Kidder, Peabody's Kubiak said.

Mini modem rights bought

BY CLINTON WILDER
and ALAN J. RYAN
CW STAFF

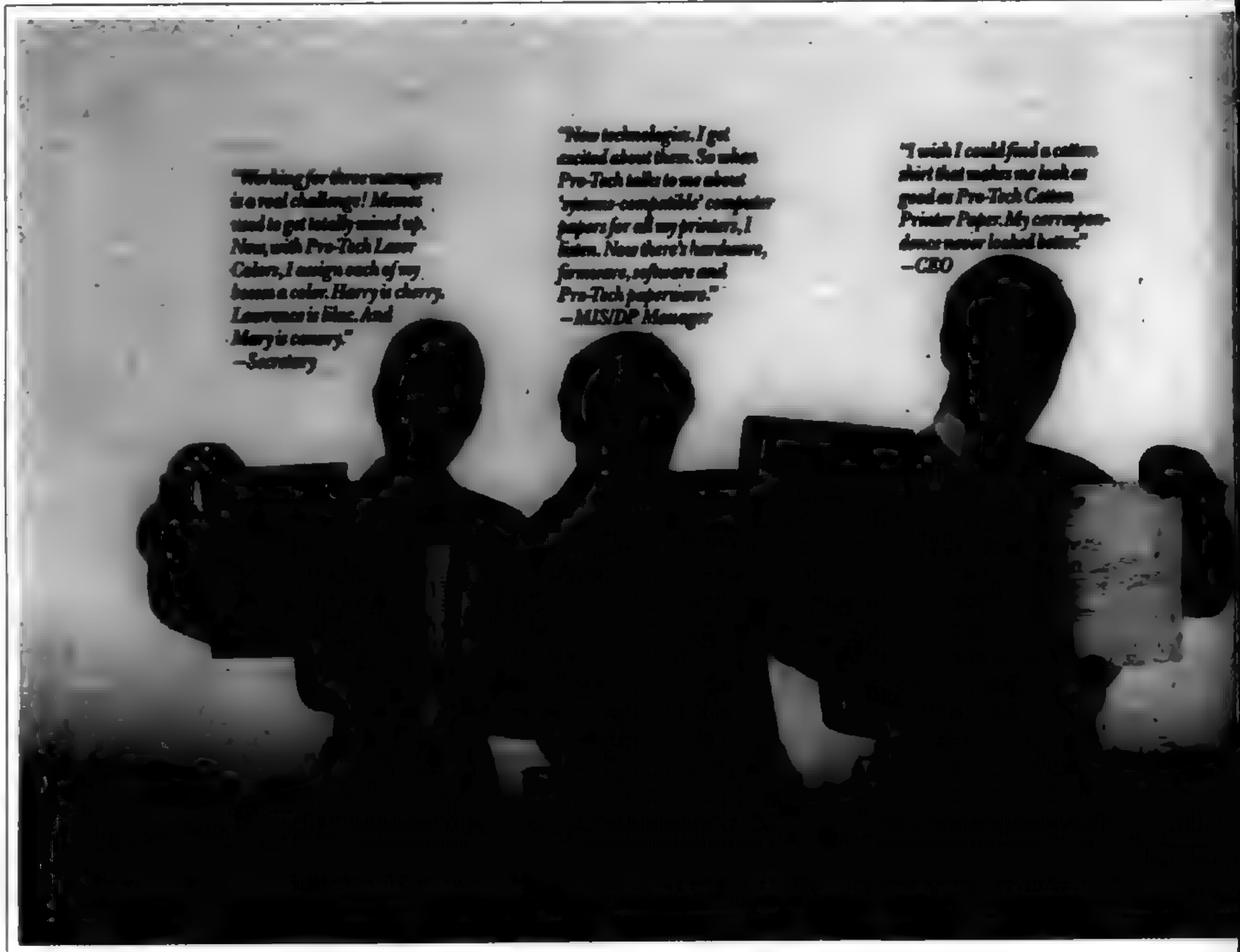
SUFFERN, N.Y. — Apparently taking aim at Migent Software, Inc. and other vendors of compact modems, Rapitech Systems, Inc., based here, recently declared it has acquired all rights to the basic patent for what is called the pocket modem.

Rapitech, heretofore a vendor of Fortran-to-C and Cobol-to-C conversion tools, acquired the 1985 patent from inventor Randy Brandt, a data communications consultant in Orange, Calif. Rapitech has no product yet but will be contacting Migent in Incline Village, Nev., and other vendors about possible licensing agreements, according to Larry Woodruff, Rapitech's vice-president of marketing.

Rapitech stated that it now owns exclusive rights to license and build the cigarette pack-size modem, which plugs into an RS-232 serial port. "Rapitech is prepared to license its technology so that modem manufacturers can avoid subsequent litigation," a Rapitech statement said.

But Migent, which has been building a pocket modem of its own since late last year, claimed that its modem is very different from the pocket modem developed by Brandt.

Independent systems designer Ken Krechmer of Palo Alto, Calif., who designed the modem for Migent, said he does not believe Migent's modem is in conflict with the Rapitech modem. Rapitech disagreed.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NICKELS & DIMES

American Management Systems, Inc. announced revenue for the year ended Dec. 31 of $135.5 million, compared with $112.2 million in the previous year. Profits were $5.2 million, or $1.02 per share, compared with $5 million, or 74 cents per share, in the year-ago period.

Fourth-quarter revenue was $37.1 million, compared with $31.6 million a year ago. Profits were $1.7 million, compared with $1.4 million in the previous year.

Intelogic Trace, Inc. announced revenue for the second quarter ended Jan. 24 of $33.7 million, compared with $39.6 million a year ago. Profits were $435,000, compared with $5 million, or 28 cents per share, in the same period a year ago.

Novell, Inc. reported revenue for the first quarter ended Jan. 31 of $29.9 million, compared with $14.5 million a year ago. Profits were $3.5 million, or 31 cents per share, compared with $2.1 million, or 20 cents per share, in the year-ago period.

American Software, Inc. reported revenue for the third quarter ended Jan. 31 of $13.1 million, compared with $8.9 million in the previous year. Profits were $2.9 million, or 42 cents per share, compared with 1.3 million, or 19 cents per share, in the like period a year ago.

ELXSI Ltd. announced revenue for the fourth quarter of $4.1 million, compared with $8 million in the previous year. Net loss was $2.9 million, or 4 cents per share, compared with a net loss of $19.9 million, or 34 cents per share, in the like period a year ago.

Revenue for the year was $22.4 million, compared with $28.6 million a year earlier.

Pansophic Systems, Inc. announced net income for the third quarter ended Jan. 31 of $6.2 million, or 70 cents per share, on revenue of $34.6 million. This compares with net income of $4.9 million, or 56 cents per share, on revenue of $25.1 million in the previous year.

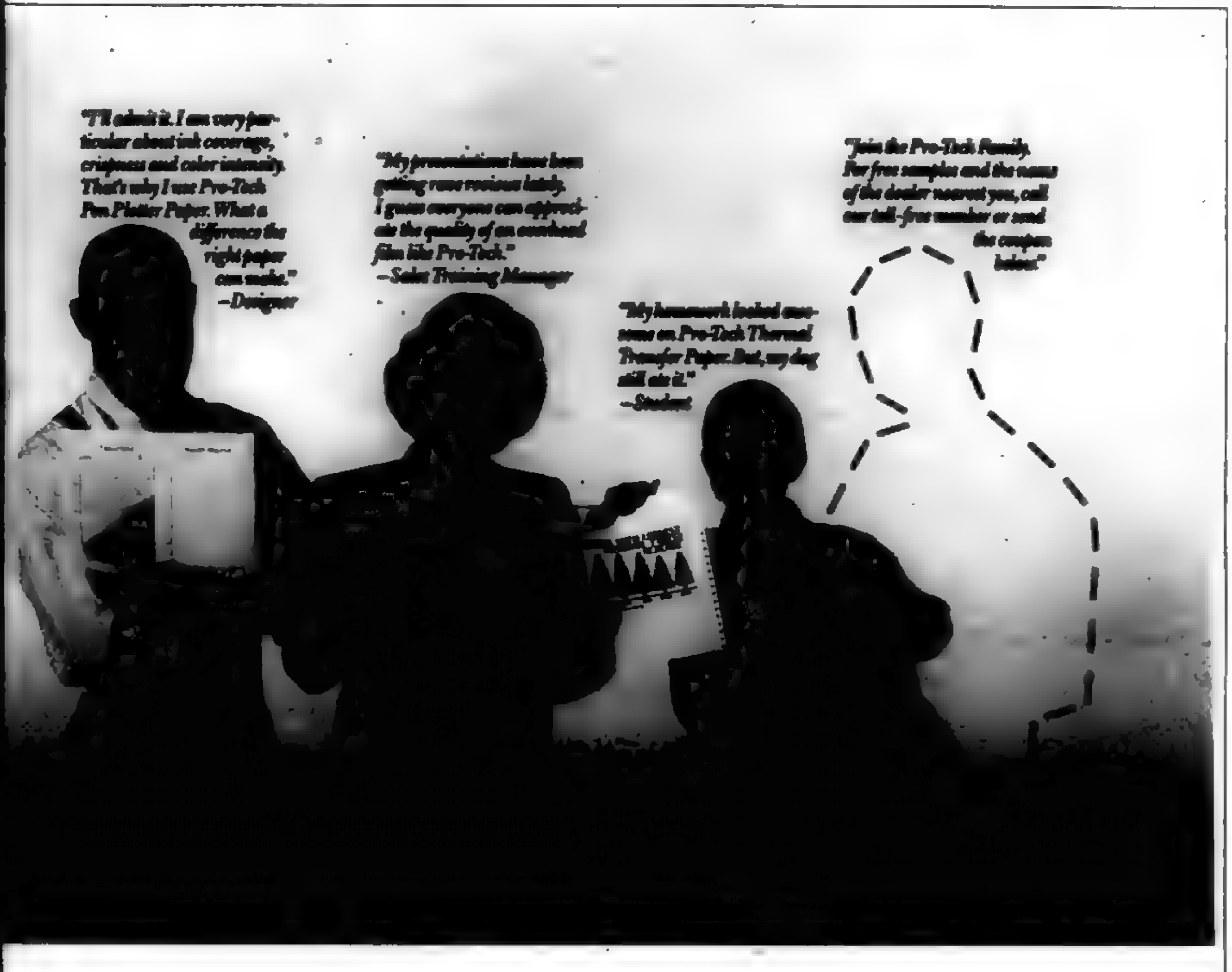
Televideo Systems, Inc. reported revenue for the first quarter ended Jan. 30 of $23.8 million, compared with $22.3 million in the previous year.

Profits were $400,000, or 1 cent per share, compared with $300,000, or 1 cent per share, in the like period a year ago.

Mohawk Data Sciences Corp. reported net income for the third quarter ended Jan. 31 of $1.9 million, or 12 cents per share, compared with a loss of $5 million, or 33 cents per share, for the like period last year. Revenue for the third quarter was $22.1 million, compared with $51.2 million for the third quarter last year.

Floating Point Systems, Inc. reported revenue for the first quarter ended Jan. 31 of $24.3 million, compared with $26.5 million in the previous year. Profits were $203,000, or 2 cents per share, compared with $1.3 million, or 15 cents per share, in the year-ago quarter.

Telex Corp. announced revenue for the third quarter ended Dec. 31 of $212.5 million, compared with $176.5 million a year ago. Profits were $18.3 million, or $1.24 per share, compared with $15.8 million, or $1.21 per share, a year ago.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Smaller drives

FROM PAGE 103

shipped worldwide, a figure that will be increasing to 11 million this year, dropping to 10 million in 1988 and to 8.4 million in 1990. By 1991, shipments of 3½-in. floppy drives are anticipated to be 14 million, twice the 7.3 million expected for 5¼-in. disk drives.

The 3½-in. hard disk drive industry is expecting a boom as well. With the advent of laptops offering hard disks and the demands from users for smaller footprint microcomputers, sales of 3½-in. hard drives are expected to reach $1 billion this year and to double in size every year through the end of the decade, according to Andrew Neff, a storage analyst with Montgomery Securities in San Francisco.

Within the 3½-in. hard disk-drive industry, there are a number of American companies that stand to gain from the expected gain in momentum for that storage medium.

Shipments to double

The recently announced Compaq Computer Corp. Portable III, for example, features a 3½-in. hard disk from Conner Peripherals, a young San Jose company specializing in the smaller Winchester drives. Conner Peripherals is shipping some 3,000 hard disks per day and says it expects to double that amount within six months.

Miniscribe Corp. in Longmont, Colo., the industry leader in 3½-in. hard disk drives, says it is anticipating exponential growth. In 1986, revenue from the company's 3½-in. hard disk drives totaled $51.9 million; revenue is expected to reach $112 million this year. By the fourth quarter, sales of Miniscribe's 3½-in. hard disk drives should contribute 50% of the firm's annual revenue, matched by the sales of 5¼-in. drives.

"With the shrinking we're expecting in the 5¼-in. hard disk-drive market, those vendors who want to continue are going to have to offer 3½-in. disks as well," says Bob Katzive, vice-president of Disk/Trend, Inc., a consulting firm that publishes an annual report on disk drive technologies.

Several hard disk drive manufacturers have announced plans to enter the downsized market. Seagate Technology, the leading 5¼-in. hard disk manufacturer, says it is coming out with six 3½-in. hard disk drives for low- to high-end performance. A spokesman for Maxtor Corp., another leading Winchester disk drive company, says his firm will announce plans for the micro disk drive sometime this year.

The main obstacle to widespread acceptance by OEM vendors of the 3½-in. hard disk drive industry is performance. At this point, most of the smaller hard disks do not quite hold the capacity of the 5¼-in. disks, analysts say. They predict, however, that the micro hard disk drive technology will significantly improve within the next few years.

The 3½-in. floppy disk drive industry still has a few more hurdles to jump, however. One problem is the large number of 5¼-in. floppy disk-based PCs that exist already. Few corporations and businesses will abandon their current PCs in favor of a new generation just to take advantage of smaller disk technology.

In addition, the amount of software currently available on 3½-in. microfloppy format is minor. "There's no real mass distribution of software other than that for the Macintosh," Devin says. "The medium is more expensive than the 5¼-in., and most software companies are trying to keep their costs as low as possible. They're going to resist distributing software on that medium, at least for the time being, but they'll eventually come around."

Microsoft Corp.'s Microsoft Word, Lotus Development Corp.'s 1-2-3 and Ashton-Tate's Dbase III are a few of the programs available today, most of which were announced in conjunction with IBM's PC Convertible.

Hedging bets

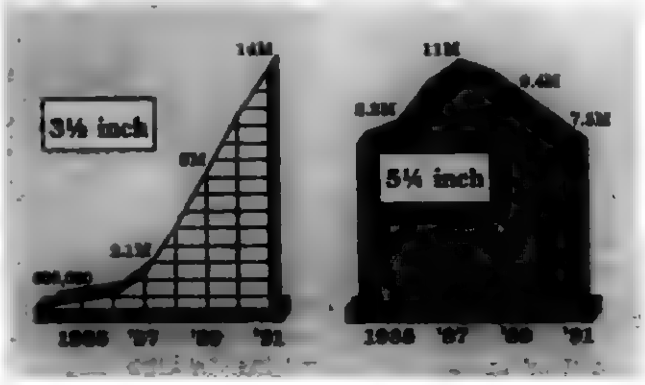
More recently, Computer Associates International, Inc. announced that it would release microcomputer software, such as Supercalc 4, on both formats.

In the long run, 3½-in. storage media is not going to be the last word. Dataquest predicts that 3½-in. floppy disk drives will peak around 1992 and will begin to lose ground afterward to the integrated-circuit card, roughly the size of a credit card, which contains memory chips for storage purposes.

The integrated-circuit card has its origins in automated teller machine cards used by many financial institutions today. Panasonic Industrial Co. and NEC Corp. are reported to be developing this technology.

Conflicting standards

Estimates of microcomputer storage media shipments



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Students quiz entrepreneurs at show

BY DONNA RAIMONDI
CW STAFF

CHICAGO — The halls of the Marriott Hotel resounded with hearty greetings, sincere congratulations and a multitude of business questions, such as the following:

- "What did it feel like to take down your first million?"
- "How do you hire good people when you are growing so fast?"
- "What kind of a computer can keep up with such rapid growth?"

Strange questions from a group of college students. But the questions were directed at successful businessmen who not too long ago were themselves students and many of whom are involved in computer-related companies.

It was the recent fourth annual international convention of the Association of Collegiate Entrepreneurs (ACE). The students hanging out in the whirlpool looked like any other college-age people, but they did not sound the same. The focus here was on business problems — specifically, on the management of multimillion dollar businesses, many of them computer-related, that grew from nothing to millions of dollars in revenue in a short period of time, sometimes months. The top 100 entrepreneurs chosen at the convention were responsible for more than $4 billion in revenues in 1986.

Growth isn't everything

"Entrepreneurs shouldn't be sucked in by the mentality that says growth is everything," advised Michael Brown, founder and president of Central Point Software in Portland, Ore. Brown started his $13 million personal computer hardware and software business almost by accident when he was a college junior. At the time, he worked in a computer store that sold Apple Computer, Inc. computers and the copy-protected Software Arts, Inc. Visicalc software package invariably sold with the Apple products.

Customers, unused to maintaining diskettes, were always ruining them, Brown recalled. They would come to the store complaining that it would cost them another $40 to get a new Visicalc disk, so Brown came up with a software package for the store that would replicate the disks cheaply for disgruntled customers.

From that package, almost despite his efforts, grew Central Point Software. The company now sells a couple of Apple and IBM clones that were jointly developed and are jointly marketed with Video Technology in Hong Kong. It also sells several software packages for micros and expects to grow to an $18 to $20 million company in the next fiscal year.

Brown, now 29, was one of 700 attendees at the ACE convention. Many of the young entrepreneurs are high school and college students who have started businesses already and came to the convention to learn from their successful predecessors. The cut-off age for participation in the group is 30, although successful entrepreneurs of any age are invited to speak.

"You have to put 100% of your heart and soul into a new business," said another Michael Brown, no relation. Brown and his high school and college buddy, Mark Callegari, at the ages of 22 and 21, respectively, started writing data base and file-management software for Vector Graphic, Inc. microcomputers. The pair worked out of their basements and had no funding when they first started Innovative Software Co. "We were living on a shoestring, but this is one industry where you can do that and be successful," Brown said. In the last fiscal year, Innovative Software's pretax profit was $2.7 million.

"We decided to go into computer software because the products that were available at the time were packaged in ziplock baggies and had mimeographed documentation," Brown said. We realized that while we didn't know much about this industry, we could deliver a much more professional product than what was out there. And that's what we did." The resulting software was introduced in 1980.

From classroom to boardroom

For entrepreneurs Jeffrey Bernstein and Brian Hinman, who created Pictel Corp. in Peabody, Mass., turning over the business to professionals was not difficult. In fact, it was one of the first moves they made. The two started their picture telephone business right out of MIT in the summer of 1984. Bernstein had just received a master's degree at age 22.

Bernstein, now 25, said the business has pulled in more than $1 million dollars in sales since releasing the product last fall. When the business was only a few months old, the pair released their first public offering, raising $4 million in the process. "We didn't set out to do that public offering, but initially we did not get a very good reaction from venture capitalists," Bernstein said.

Having your own business is a lot of work, Bernstein concluded. "It takes constant effort. I work probably 80 to 100 hours a week, and my personal life is not so great. That is one of the disadvantages."

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800 Delaware Ave. Buffalo, N.Y. 14209, Attention: TECHNOLOGY RESEARCH FORUM).

Conference site gets info center

DALLAS — Infomart last week announced plans to establish market-specific educational centers at the conference and exhibit facility here.

Two centers will be open by September, and a number of current vendor tenants, such as IBM and AT&T, have committed to these projects, Infomart indicated.

"We are looking at technologies that we feel will command everyone's attention," an Infomart spokeswoman said. "Infomart has a need for something that specifically focuses on these areas."

The Electronic Publishing Orientation Center will be open in May, and the Integrated Display of Enterprise Automation Center, which will focus on manufacturing and engineering applications, will open in September, according to Infomart.

Each center is slated to include displays and educational materials. Actual hands-on demonstrations will be done at participating vendors' showrooms, a spokeswoman explained.

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Lessors sue IBM in Europe

BY ALAN CHEESEMAN
SPECIAL TO CW

AMSTERDAM — Three leasing companies are suing IBM for alleged breaches of regulations on pricing and maintenance. In the first action against IBM to come to court since 1984, Atlantic, IBL and Econocom recently filed charges in court here.

Steve Mason, managing director of Atlantic, confirmed the action. "A subsidiary of ours in Holland is involved in legal action with IBM over market practices," he said, adding that the suit involved two other problems in addition to the one over pricing but that the proceedings were confined to Holland.

The European Computer Leasing Trade Association is watching the case closely, as it was the last organization to attempt a court case against IBM. Evidence was filed with West Germany's monopolies commission, as late as August, 1986, but a case has not been started.

Andrew Fitton, former chairman of Eclat UK, said the charges fell under Dutch competition laws.

Cheeseman is a writer for *Computer News*, a CW Communications British publication.

MERGERS & ACQUISITIONS

Nynex Corp. announced the purchase of **Business Intelligence Services Ltd.** (the BIS Group). A British company, headquartered in London, the BIS Group offers computer software, professional services and other business services.

The company was acquired by Nynex in exchange for approximately 1.65 million shares of Nynex common stock.

Econocom-USA announced the acquisition of **Michael K. Vargo Cos.** in Utica, Mich., resulting in the formation of **Econocom-Great Lakes.**

Econocom-Great Lakes marks the sixth marketing company to be established under the "Agency Concept" being implemented by Econocom-USA. Econocom-Great Lakes will be responsible for the marketing of Econocom-USA products and services in Michigan, Ohio, Indiana and part of upstate New York.

Michael Vargo, now head of Econocom-Great Lakes, started his own company in the late seventies after leaving CMI Corp., where he was executive vice-president with responsibilities in marketing and development.

Cromemco, Inc. has been acquired by **Dynatech Corp.** in Burlington, Mass.

Cromemco retains its name and continues to operate out of Mountain View, Calif. Dynatech is a diversified, high-technology company founded in 1959.

Scientific Micro Systems, Inc. announced the acquisition of **Supermac Technology**, a rapidly growing supplier of enhancement products and disk drive subsystems for the Apple personal computer market.

Scientific Micro Systems acquired all the common stock of Supermac in exchange for 1,050,000 shares of its common stock. The business combination will be accounted for as a pooling of interests.

Supermac Technology, headquartered in Mountain View, Calif., markets its products, including the Dataframe series of small computer systems interface hard disk drives, through more than 1,000 computer retailers across the nation. The privately-held firm reported a profit of $300,000 on revenue of $9.5 million in fiscal 1986.

Convergent Technologies, Inc. and **Oakleaf Corp.** in Chatsworth, Calif., announced that the companies have reached an agreement in principle for Convergent to acquire Oakleaf as a part of its wholly owned subsidiary, **Convergent Business Services.**

When completed, the agreement will mark Convergent's second acquisition of a company providing turnkey solutions and services to automobile dealers. In August 1986, **Display Data Corp.**, a leading supplier of automotive computer systems, was acquired.

Hogan Systems, Inc. announced the acquisition of **Systems 4, Inc.** in Durango, Colo., for $1.7 million.

Systems 4 provides integrated application software and processing services to community banks with assets of up to $200 million. The company has annualized revenue of $1.5 million and a customer base of 30 banks.

Systems 4 markets a comprehensive range of software products under the name Exceed.

Delta Data Systems Corp., a manufacturer of computer systems for the federal government **Tempest** market, and **Televideo Systems, Inc.** announced that they have signed a letter of intent for Televideo to purchase a 51% equity interest in Delta Data for a cash price of $4 million.

Delta Data has agreed to modify certain Televideo products to meet Tempest requirements and to sell those products into Delta Data's government markets. A definitive agreement formalizing the investment transaction is expected to be signed by the end of April.

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SAS passes $100M mark, looks ahead

BY CHARLES BABCOCK
CW STAFF

CARY, N.C. — The privately held SAS Institute, Inc. crossed the $100 million mark in revenue last year, up from $75 million the year before, a 33% jump.

To Jim Goodnight, chairman and single largest stockholder, that means the software company near North Carolina's Research Triangle Park is selling more than just statistical analysis applications, as it did when SAS started out in 1976. Revenue for that year was $200,000, and the firm created its name as an abbreviation for its base in statistical analysis software.

Today, SAS should be viewed more as a data management company, Goodnight says; one of the key moves furthering that goal was the acquisition in December, 1986 of Lattice, Inc., the Glen Ellyn, Ill., maker of C compilers.

SAS is in the process of rewriting its line of analysis, reporting and data management tools in the C programming language, a project that began three years ago. In the process of looking for a C mainframe compiler, the firm concluded that Lattice offered the best — and bought the company, Goodnight relates.

Adding micro muscle

This evidence of growing financial muscle is likely to be put to use in a number of ways. One will be to make the firm a larger player in the microcomputer software market, in which SAS already enjoys a substantial presence.

"I read in computer publications about Lotus Development Corp. and Ashton-Tate. But I never see the SAS Institute mentioned as a microcomputer software vendor," Goodnight says.

Since its first micro software product was released in 1985, SAS has rapidly increased the number of offerings available to run on IBM PC-DOS and Microsoft Corp. MS-DOS machines, and sales in that arena now represent 15% of total revenue. In a similar vein, the firm was quick to sense an interest in running the SAS System on Digital Equipment Corp. VAXs.

Jumping into mini market

That interest topped the list one year in SAS's annual ballot of customer wishes, and SAS began issuing its first systems running under DEC's VMS in 1984, a well-timed entry into the mini software market. The mini arena now includes Prime Computer, Inc. and Data General Corp. systems as well and constitutes 20% of annual revenue.

The firm's traditional fields of IBM mainframe software running under MVS and VM still account for 65% of revenue, Goodnight says.

Having broadened both the scope of its applications and the number of machines on which those applications run, SAS finds redesigning the SAS System components from PL/1 and assembler to C crucial so that the languages are both portable across operating systems and a more

Continued on page 111

Exporting?

CONTINUED FROM PAGE 103

eign Commercial Service posts around the world.

In Washington, there are desk officers assigned to follow trade developments in virtually every country.

For example, the following tidbits were gleaned from recent issues of the magazine:

- The West German market for computer-aided design systems has leveled off, with annual growth rates expected to be in the neighborhood of 10% rather than the 50% level of years gone by.
- The port authority in Colombia invites foreign consultants to bid on a contract for improving MIS operations.
- Belgium is a good market for U.S. data communications equipment, computer software and robots.
- Sweden is good for software. Italy is a good market for all hardware and software, and U.S. vendors have an excellent reputation there.
- Laos is a rotten market for anything from U.S. firms.
- In Taiwan, sales will be brisk for digital private-branch exchanges, local-area networks and all types of computers and peripherals.
- Honduras has a small, developing market for computers in the government, banking, educational, commercial and industrial sectors, with excellent prospects for rapid growth.
- Nearby Belize (a country the size of New Hampshire, located next to Guatemala) has a growing demand for personal computers.
- A West German firm wants to have its data security product manufactured in the U.S. under license.
- A company in Fiji is seeking U.S. buyers of sea shells.

All right, so you don't care about sea shells, but you get the point.

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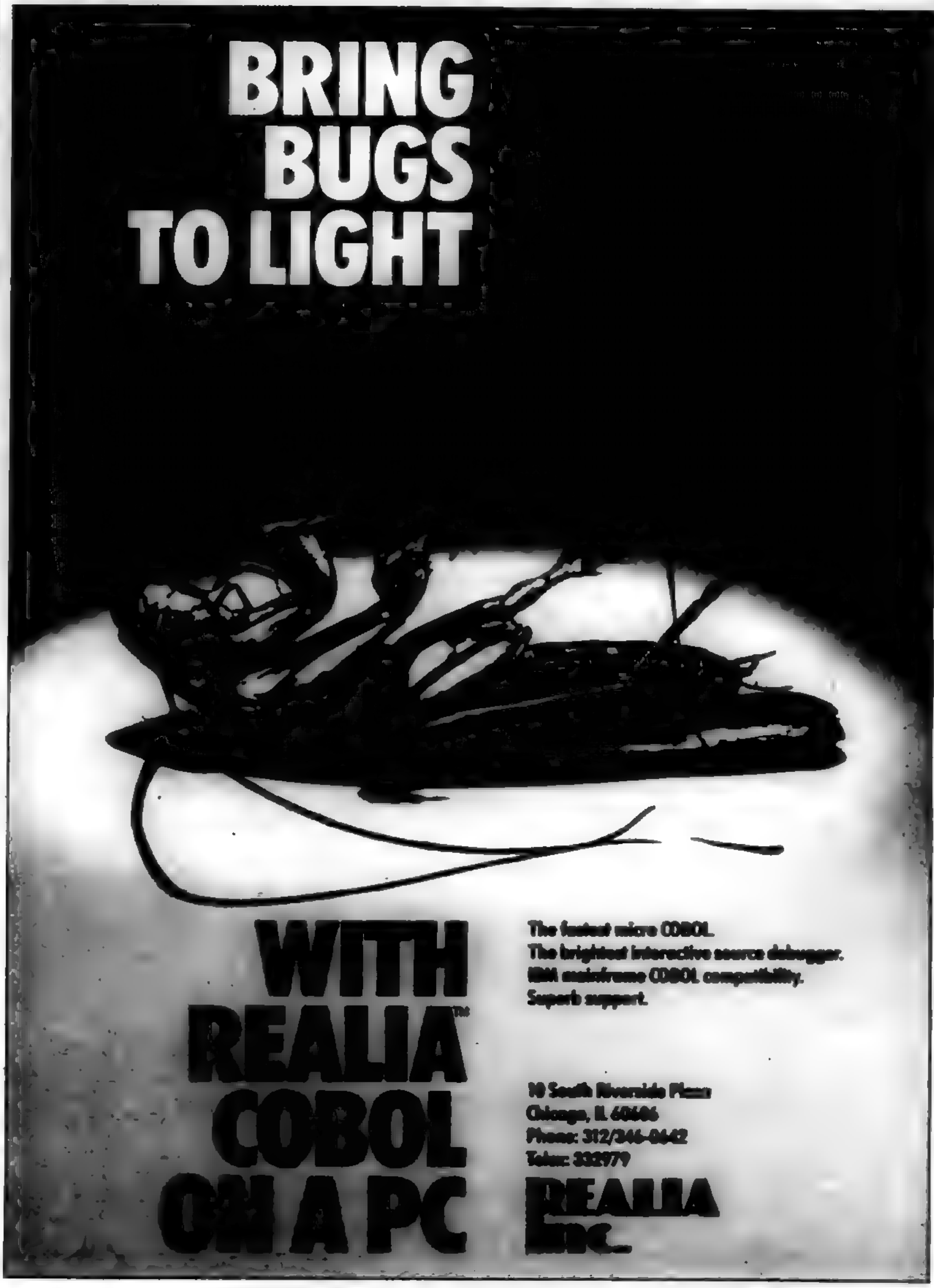
Betts is *Computerworld's* Washington, D.C., correspondent.



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EXECUTIVE CORNER

James Cannavino, a 24-year veteran of **IBM**, was named president of the company's Data Systems Division (DSD).

Prior to his appointment, Cannavino was DSD vice-president and general manager of IBM's Poughkeepsie, N.Y., manufacturing and development facility. He succeeds IBM Vice-President Edward Davis, who will retire June 30.

Cannavino joined IBM in 1963 and held several staff and management positions within Big Blue.

IBM's DSD is responsible for worldwide development and U.S. manufacturing of IBM's large systems and associated software.

H. L. "Sparky" Sparks, who developed the original dealer distribution strategy for IBM Personal Computers, has been named president of **Amdek Corp.**, a supplier of IBM PC-compatible monitors. Sparks was also appointed a vice-president of Wyse Technology, Amdek's parent company.

Sparks' predecessor, **Lawrence Lummis**, a founder and director of Wyse, has served as Amdek's president on an interim basis since Jan. 7.

John M. Toups retired from his post as chairman and chief executive officer of **Planning Research Corp.** and was elected to the **Emhart Corp.** board of directors. Emhart acquired Planning Research in December 1986.

Wayne Shelton, Planning Research president, was also elected a vice-president of Emhart and named to head Planning Research.

Daniel R. Carter resigned his positions as president and director of **Cordata Technologies, Inc.**

Arthur J. Hedge Jr. and **Ned C. Lautenbach** were elected **IBM** vice-presidents by the company's board of directors.

The board also elected **John H. Manningham** as IBM secretary. Manningham will assume the responsibilities of IBM secretary from **Thomas C. Irwin**, who will retire July 1.

Marc Bailey was named president and chief operating officer of **Samna Corp.** Bailey was recently vice-president and general manager of Informatics Legal Systems.

Said Mohammadioun, the company founder, will continue as chairman of the board and chief executive officer.

Andrew S. Grove, president and chief operating officer of **Intel Corp.**, will become chief executive officer beginning next month. Grove succeeds **Gordon E. Moore**, a cofounder of the company and chief executive officer since 1975. Moore will continue working as chairman of the board.

Advanced Micro Devices, Inc. announced the promotion of three executives. **Gary Ashcraft** was promoted to vice-president of the communication products division, **George Rigg** to vice-president of the processor products division and **Fred Roeder** to vice-president of the interface and logic products directorate.

Thomas G. Foley has been appointed vice-president and corporate controller of **Honeywell, Inc.'s** Information Systems Division. Formerly, Foley was controller of the Small Computer and Office Systems Group.

IBM Vice-President **Michael H. Quinlan** has been named assistant group executive of plans and controls for the IBM World Trade Asia/Pacific Group headquartered in Tokyo.

Also, **Robert J. LaBant** has been named president of the North-Central Marketing Division, succeeding Quinlan.

LaBant was previously vice-president of field operations for the marketing division.

The Computer Dealers and Lessors Association announced that **Paul R. Rupert** has been named assistant executive director. Rupert will be responsible for communicating the association's concerns on legislative and tax-related issues to Congress. In addition, he will direct the association's Political Action Committee. Formerly, Rupert served as legislative assistant to Senator John C. Danforth (R-Mo.).

Richard D. Stewart has been appointed president, chairman and CEO of the **Computer Corporation of America.** Stewart was formerly president and chief operating officer of GCA Corp., a Bedford, Mass.-based manufacturer of equipment for integrated circuit production and factory automation.

Robert P. Collins has been named the first president and CEO of **GE Fanuc Automation North America, Inc.**, one of three operating subsidiaries of the new GE Fanuc Automation Corp.

Formerly, Collins served as vice-president and general manager of General Electric Co.'s Automation Controls Operations in Charlottesville, Va., and an officer of GE.

Computer Task Group, Inc. has announced three promotions. **William P. Adamucci**, **Clifford G. Baer** and **J. David Ehlke** were promoted to executive vice-presidents.

Vico E. Henriques, president of the **Computer and Business Equipment Manufacturers Association** since 1977, has announced his resignation. Henriques, who joined the association in 1970, says he will continue his duties as president until a successor is selected by the association's board of directors.

Arthur B. Branstine has been named vice-president and general manager of the systems and equipment division of **TRW, Inc.'s** Electronic Components Group. Branstine joined TRW a year ago from Silicon General, Inc..

Optical Fiber Technologies, Inc. in Billerica, Mass., announced the appointment of **Kenneth Bowes** as president and CEO. Bowes replaced **Thomas W. Tamulevich**, who left the company to pursue other interests. Bowes joined Optical Fiber Technologies from Fibronics International, Inc., where he served as general manager.

Hyo-Bin Im has been appointed CEO of **Cordata Technologies, Inc.** Hyo-Bin will succeed Cordata President **Daniel Carter**, who has resigned his position as CEO. Hyo-Bin previously served as executive managing director for the Daewoo Group's Planning and Coordination division.

Artel Communications Corp. announced the election of **Robert L. Bowman** to the positions of chairman of the board and CEO. Bowman was formerly chairman and CEO of Telco Systems, Inc.

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UNITECH

SAS passes

FROM PAGE 109

unified system to develop.

"The conversion will give us a single system to maintain. It will certainly cut our unit cost down. We can spend more of our dollars on research and development and less on maintenance," Goodnight observes.

Version 5 of the SAS System minicomputer product now consists of a million lines of code, and a special team of 20 SAS development staffers is trying to compress that mass into a smaller, faster version of the base product, SAS officials acknowledge. Version 6 will be written in C and is expected to be available sometime in 1988 for beta-site testing.

Low entry point

One of the hidden factors in the rapid growth of the company — and one that bodes well for its competitiveness in the microcomputer field — is the low entry-level cost of using the SAS System.

> IN THE process of looking for a C mainframe compiler, SAS concluded that Lattice, Inc. offered the best — and bought the company.

The SAS System for an IBM 3090 has a first-year license fee of $12,000; the firm then collects $6,000 for each additional year, providing a continual revenue stream.

In a similar vein, the first-year license for a microcomputer SAS System is $1,500, with a $1,000 fee collected each succeeding year.

With its users more broadly scattered through their corporations, SAS has initiated what amounts to a site-license fee of $7,500 for up to 500 workstation users, with an annual renewal fee of $5,000.

For a site with 500 users, that amounts to $15 per user the first year and $10 per user for each succeeding year, Goodnight points out.

Some might argue that those fees add up, while the purchase of other suppliers' microcomputer products are one-time fees, even if they amount to several hundred dollars. Goodnight explains, however, that updates of the micro spreadsheets or data bases require another one-time fee and come out with a regularity that outstrips SAS's annual renewal rates.

One thing is clear, however. At the recent SAS Institute users group conference in Dallas, customers had complaints about the SAS System, but they never mentioned price.

One complaint came from James Young, a biostatistician and SAS PC user at Syntex, Inc. in Palo Alto, Calif. Young said SAS needs to provide support for expanded memory board use with its PC products.

Otherwise, Young continued, too much of the PC memory is devoted to the SAS System and too little to the data with which the user needs to work.

Another user, Wendell Refior, a research analyst with electric utility Boston Edison Co., said one way in which SAS lags behind other software companies is that it has never taken the time to publish a manual saying what the SAS System error messages mean, leaving the uninitiated frequently scratching their heads.

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EMPLOYMENT TODAY

Federal jobs offer fast growth

But low pay, internal hiring policies present steep obstacles

BY EVE OPPENHEIM
SPECIAL TO CW

Tough choices face MIS professionals who want to work for the federal government.

Although the government requires one of the largest data processing budgets, totaling about $17 billion annually, federal agencies pay substantially less than private industry for personnel, particularly for entry-level and senior MIS positions.

However, government MIS employees work with the most advanced technology — from the Department of Defense's Strategic Defense Initiative program to the Federal Bureau of Investigation's expert systems development projects. Also, because of personnel shortages within federal agencies, government employees can rapidly move through the MIS ranks.

Skills currently in demand within the government include expertise in computer-performance evaluation, statistics, data base management, quality assurance and artificial intelligence. Agencies also seek general business management skills, such as accounting and finance, when filling MIS positions. Above all, prospective employees should be able to understand government structures and work well with senior people, say mid-level DP managers.

There are drawbacks and risks in pursuing government positions. For example, the waiting time for employees for a position with a defense agency requiring security clearance can be up to nine months, without pay.

Patterns of government contract awards and hiring are changing. In the past, DP jobs were filled almost entirely by existing government employees through interagency transfers, internal promotions, reassignments and even reinstatements of former government workers. The proportion of MIS positions still filled internally is estimated at 80%. Once employed, however, government workers can take advantage of numerous job training programs and many opportunities for advancement.

For example, Ken Lively, director of communications security and material systems for the Navy, began his career eight years ago in a clerical position. He took DP courses at night and, after approaching a Navy ADP director, was hired as a computer trainee. Previously, Lively had worked for two years at a savings and loan association.

Despite internal hiring policies, shortages of qualified personnel have forced the government to look outside its ranks for job candidates. Competition from the private sector for these positions has resulted in what some government MIS managers call "grade creep."

To increase salaries beyond the specified limitations for certain levels, the government hires MIS people at inflated job grades. Mid-level MIS managers are ranked at grades of GS 9 to GS 12, with salaries ranging from $22,400 to $42,300. According to the Office of Personnel Management (OPM), many federal agencies skirt salary limitations by hiring managers at grades of GS 11 to GS 15, which increases the salary range to between $27,200 and $64,500.

Getting into government

Data processing and other professional credentials required by the government

Typical Position	Years Work Experience	Education	Job Rank	Skills Needed
Entry-level	0 to 2	BA, computer science or business, math, etc.	GS 5-7	Cobol, Fortran, C/Unix
Mid-level	3 to 10	BA and/or MS, computer science	GS 8-15	Local networks and data communications
Senior-level	11+	BA or MS, computer science	GS16+	Managerial more than technical

CWCHART

Much of the hiring done by federal agencies is on an interagency basis. The OPM fills only 20% to 25% of the vacancies from its Register of Candidates, which lists candidates outside specific agencies. The heaviest users of the OPM register are the Army, Navy and Air Force, followed by the Veterans Administration and the Department of the Treasury.

For managers, the greatest difficulty in government work may be dealing with the employees. Government employees are hard to manage because no mechanisms exist to "reward and punish people," says Robert Ross of the General Services Administration (GSA). But the opportunity to work in a larger shop might outweigh this disadvantage.

The scale of government computer installations is two to three times the size of private-sector facilities, says Reed Phillips, director of information resources management for the Department of Commerce.

Experienced MIS professionals can also work for the government as independent contractors. Government spending on third-party computer-service providers has grown at a much higher rate than the hiring of government MIS staffs during the last 10 years. Growth in the use of outside contractors is expected to remain strong relative to hiring.

The impetus for this growth has been Executive Order A76, which requires federal agencies to evaluate whether government projects can be more efficiently performed by outside contractors. Independent consultants report that after building provisions for overhead and profit into invoices, government compensation is equal to that of the private sector.

According to Ross, the GSA awarded $50 million in programming and systems study contracts in 1979. In 1987, this figure is expected to reach $170 million, representing an average annual growth of 16.5%.

Oppenheim is a free-lance writer based in New York.

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This position will be filled as either an Academic Faculty or Administrative Professional position depending on the academic background of the successful applicant. Minimum qualifications include degree or education relevant to the responsibilities, work experience with library automation, effective analytical, communication and interpersonal skills. Desirable knowledges include background with IBM systems and SAS and exposure to networking and microcomputers. Academic Faculty appointments will require an ALA-accredited master's degree.

Salary will be commensurate with experience. Benefits include paid medical, life and personal disability insurance, 24 days vacation and 15 days sick leave annually, opportunities for advanced academic work, optional deferred compensation plan and mandatory enrollment in the State of Colorado retirement plan.

Submit a letter of intent describing qualifications plus a full resume of education and experience, a transcript or photocopy of diploma, plus the names, addresses and telephone numbers of three references no later than April 24, 1987 to Nora Kahn, Libraries Personnel Officer, 106 Morgan Library, Colorado State University, Fort Collins, Colorado 80523.

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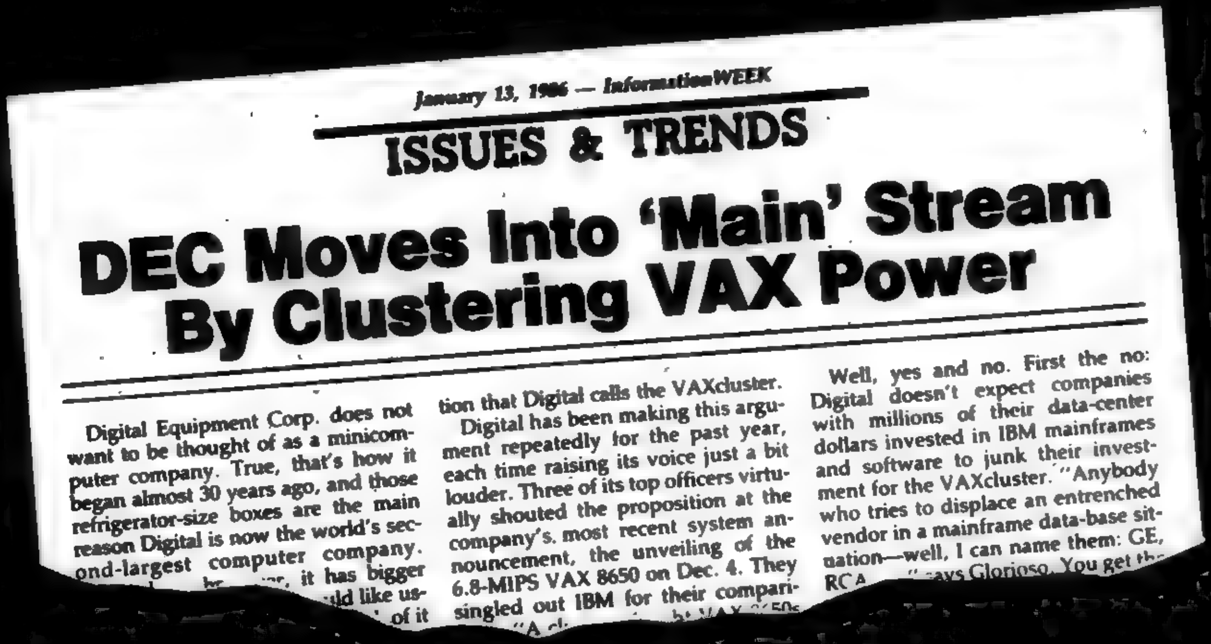

January 13, 1986 — InformationWEEK

ISSUES & TRENDS

DEC Moves Into 'Main' Stream By Clustering VAX Power

Digital Equipment Corp. does not want to be thought of as a minicomputer company. True, that's how it began almost 30 years ago, and those refrigerator-size boxes are the main reason Digital is now the world's second-largest computer company.

it has bigger

uld like us-

of it

tion that Digital calls the VAXcluster.

Digital has been making this argument repeatedly for the past year, each time raising its voice just a bit louder. Three of its top officers virtually shouted the proposition at the company's most recent system announcement, the unveiling of the 6.8-MIPS VAX 8650 on Dec. 4. They singled out IBM for their compari-

“A cl

Well, yes and no. First the no: Digital doesn't expect companies with millions of their data-center dollars invested in IBM mainframes and software to junk their investment for the VAXcluster. "Anybody who tries to displace an entrenched vendor in a mainframe data-base situation—well, I can name them: GE, RCA

says Glorioso. You get th

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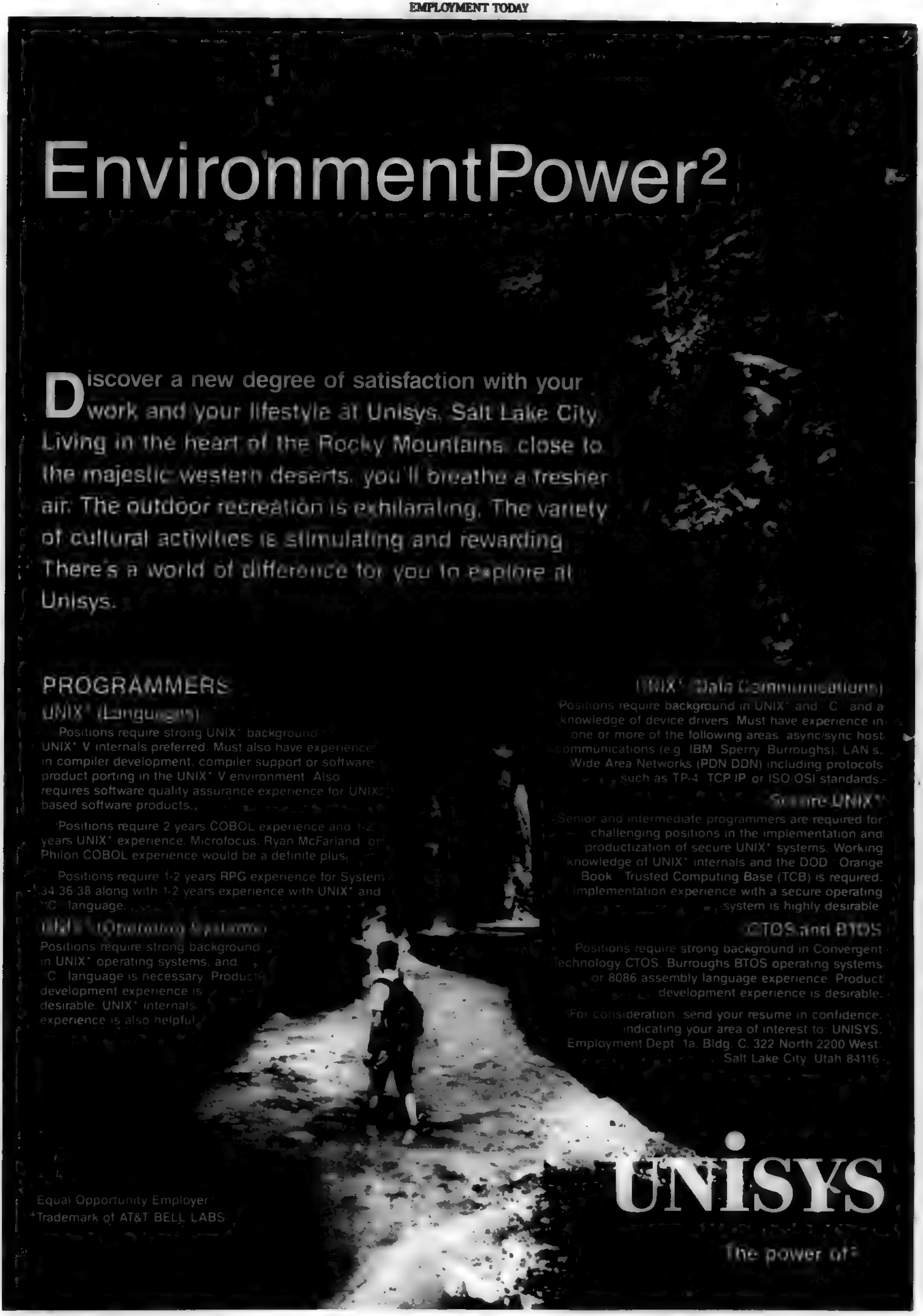

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Positions require 2 years COBOL experience and 1-2 years UNIX* experience. Microfocus, Ryan McFarland, or Philon COBOL experience would be a definite plus.

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UNIX* (Operating Systems)

Positions require strong background in UNIX* operating systems, and "C" language is necessary. Product development experience is desirable. UNIX* internals experience is also helpful.

UNIX* (Data Communications)

Positions require background in UNIX* and "C" and a knowledge of device drivers. Must have experience in one or more of the following areas: async/sync host communications (e.g. IBM, Sperry, Burroughs); LAN's, Wide Area Networks (PDN/DDN) including protocols such as TP-4, TCP/IP, or ISO/OSI standards.

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Phone: (916) 440-6893

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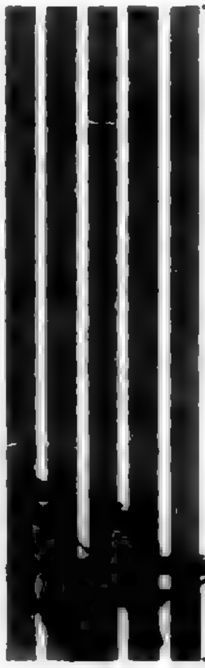

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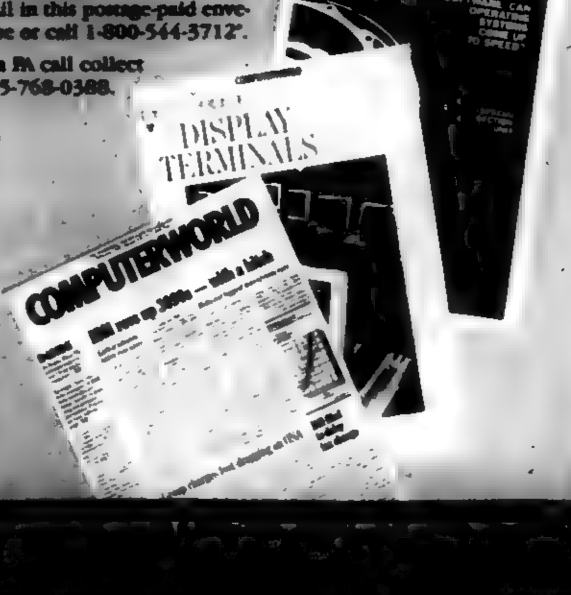

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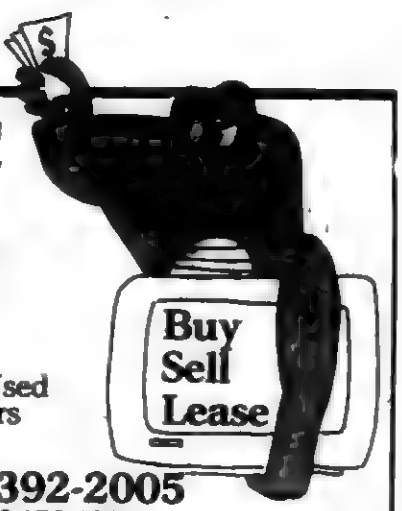

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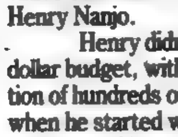

As the City and County of San Francisco has discovered, there's only one sensible way to evaluate and integrate products into one cohesive information system. And that's with a department strongly guided by an experienced, innovative information services professional like Henry Nanjo.

Henry didn't always have a multi-million dollar budget, with responsibility for the acquisition of hundreds of micros every year. In fact, when he started working with San Francisco's computers 31 years ago, Henry didn't even have a DP department. He simply worked in accounting with his state-of-the-art IBM 305.

Over the years, many of the applications Henry developed have helped keep San Francisco among the country's most innovative users of computer technology.

San Francisco made headlines recently with the first computerized fingerprint matching system. With it, prints can now be matched in less than 3 minutes—a far cry from the 4 weeks required to do the job by hand. Already, the system is credited with helping solve some 40 major unsolved crimes.

Today, Henry is in the process of evaluating both existing and potential vendors of minis and micros—and maintaining an approval list of vendors for purchases made throughout the organization. Every computer-related expenditure, whether it falls within Henry's $30 million budget or the City and County's $60 million budget, must bear the name of a vendor appearing on Henry's approval list.

What little spare time Henry finds, he spends with his sons camping, hiking and cross country skiing in areas like Tahoe, Yosemite Park and the Shasta Mountains.

If you'd really like to reach Henry, you'll find him on Monday mornings with his copy of Computerworld—he's been a subscriber since the first issue. He finds Computerworld's perspective meshes closely with the way he does business, covering everything from mainframes to micros, software and state-of-the-art technologies.

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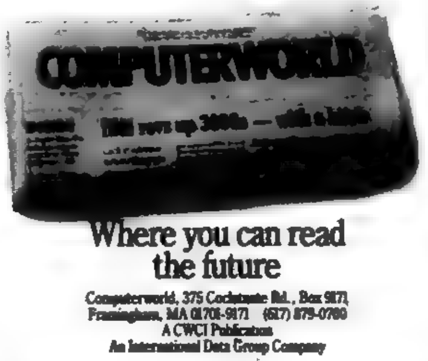

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ADVERTISERS INDEX

Action Technology 15
Applied Data Research 3
Alloy Computer 58
Aluminum Case Company 55
Amdahl 38
Ampex 12
Applied Management 30
Artificial Intelligence 23
Attachmate 70
AT&T....................63

BASF....................18
Bridge Communications 34
Business Software Technology 37

Cambex....................13
Canaan Computer 88
Chicago Soft....................64
Cincom....................55,76
Codex....................44
Compaq Computer Corp. 100-101
Computer Task Group....................13
Concurrent Computer....................65
CPT....................39
CW #1 Ad Revenue....................102
CW Circulation 82
CW May Focus 69
CW Nanjo 126
CWIMS UK 85
CXI....................46-47

Data General 32-33
Datasphere....................106
Digital Equipment Corp. 28-29
Duquesne 14,52,77,87,108

EMC Corp....................111

Federal Communications....................93
Flagstaff Engineering....................88
Fujitsu 53

Gandalf Technology 51
Genesys 24
Group Operations 92
Group Task....................107

H & M Systems Software 131
H&A Computer Systems 105
Help/38 31
Honeywell....................66-67

ICCP....................107
IDEAssociates....................74
Info Dimensions 30-31
Information Builders 97
Informix....................99
Innovation Data Processing....................7
Interlogic Trace 68
ITT Courier....................48-49

James River Corp. 104-105
JDS Microprocessing....................95

Lawson Associates 96
Levi,Ray & Shoup....................94
Local Data....................36
Lotus Development Corp. 40-41

MBCA 81
McCormack & Dodge 132
MCI Corporate....................42-43
Michaels, Ross,& Cole Ltd. 46
Micro Data Base Systems, Inc. 84
MTI Systems Corp. 62

National Advanced Systems....................15
NCR Tower....................56-57
Netec 110
Novell....................90-91

Oracle 9

Printronics 86

Questronics....................64

Rapid Systems Development....................47
Realia,Inc. 109
Relational Technology....................18
Robert Half 98

SAS Institute....................20-21,45
Search Link 80
Seiko Instruments 78-79
Sequent Computer....................25
Software AG 26
Software Technology &
Research (STAR)....................71
Spectrum Technology 106
Symbolics....................72-73
Syncsort....................5

Tangram Technology 54
Teknowledge....................11
Televideo 60-61
Tone Software 71
TRW....................93

Unitech Software, Inc. 110

Vertex Systems 98
VM Software....................13

Walker Interavtive 27
Wall Data 10
Windleaf 6
Wyse....................22

X-Tended Computing 86

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Issue Date	Topic	Ad Closing Date
April 13	Desktop Publishing Systems	March 27
April 27	T1 Equipment/Multiplexers	April 10
May 11	DEC-Compatible Software	April 24
May 25	PCs — IBM & Compatibles	May 8
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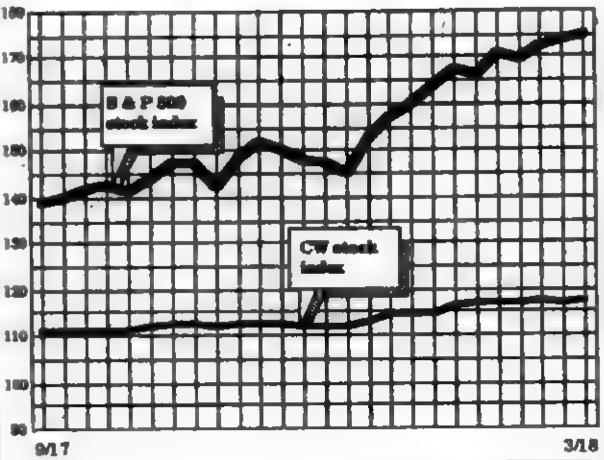
STOCK TRADING INDEX



Indexes	*Last Week*	*This Week*
Computer Systems	142.4	**142.5**
Supplies & Accessories	159.9	**159.0**
Software & DP Services	132.8	**133.5**
Semiconductors	108.2	**111.2**
Peripherals & Subsystems	132.2	**133.8**
Leasing Companies	119.6	**117.4**
Composite Index	117.2	**117.3**
S&P 500 Index	173.6	**175.1**

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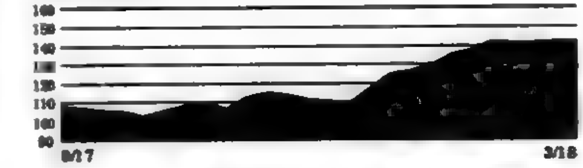

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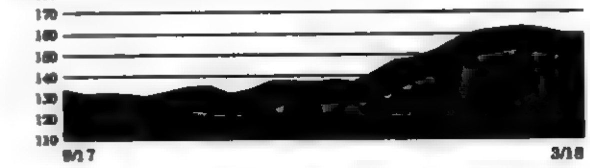

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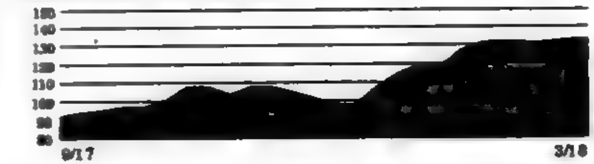

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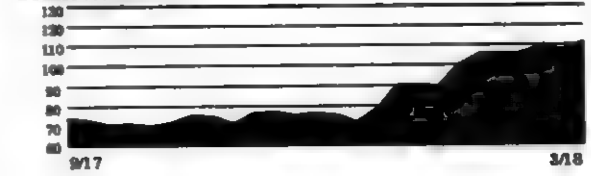

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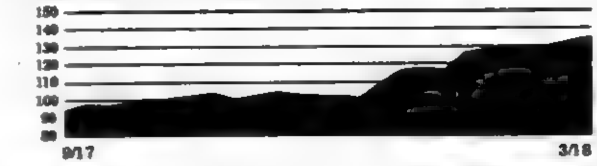

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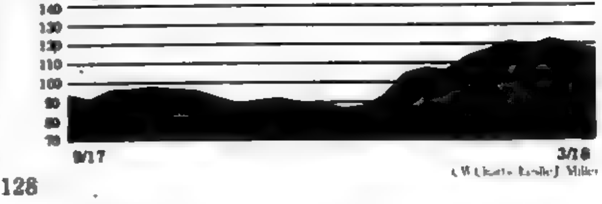

CW Charts: Leslie J. Miller

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O	ALPHA MICROSYSTEMS	8	4	4.63	+0.1	+1.4
O	ALTOS COMPUTER SYS	19	10	15.13	0.6	4.0
A	AMDAHL CORP	41	14	37.75	2.5	6.2
O	APOLLO COMPUTER INC	23	9	18.13	1.1	5.8
O	APPLE COMPUTER INC	71	26	66.00	0.3	0.4
N	AT&T	28	22	23.38	0.6	2.6
O	C P T CORP	6	3	4.50	+0.6	+16.1
N	COMPAQ COMPUTER CORP	35	12	28.25	4.8	14.4
A	COMPUTER CONSOLES INC	12	7	8.75	+0.1	+1.4
O	CONCURRENT COMP CORP	19	11	15.75	+0.0	+0.0
N	CONTROL DATA CORP	31	20	29.75	+2.8	+10.2
O	CONVERGENT TECH	12	4	10.00	0.6	5.9
N	CRAY RESH INC	133	65	122.63	8.9	6.7
O	DAISY SYS CORP	15	8	10.38	0.9	7.8
N	DATA GEN CORP	45	25	35.25	+0.3	+0.7
N	DATAPOINT CORP	9	4	5.50	+0.4	+7.3
N	DIGITAL EQUIP CORP	173	76	165.25	3.0	1.8
N	FLOATING POINT SYS INC	46	11	14.13	0.4	2.6
N	GOULD INC	28	15	17.63	0.6	3.4
N	HARRIS CORP	40	27	37.00	+0.5	1.4
N	HEWLETT PACKARD CO	60	36	58.38	+4.0	+7.4
N	HONEYWELL INC	84	58	71.13	+1.1	+1.6
N	IBM	162	116	146.25	+4.5	+3.2
O	IPL SYS INC	4	2	3.25	+0.5	18.2
N	ITT CORP	66	43	63.50	0.5	0.8
N	M/A COM INC	19	12	14.25	+0.0	+0.0
N	MATSUSHITA ELEC INDL LTD	136	72	119.75	+0.3	+0.2
O	MENTOR GRAPHICS CORP	29	11	27.00	1.3	4.4
N	NBI INC	14	8	10.50	+0.4	+3.7
N	NCR CORP	67	40	62.88	2.8	4.2
N	PRIME COMPUTER INC	26	16	21.13	+0.6	3.0
O	STRATUS COMPUTER	37	17	34.00	0.8	2.2
O	SYMBOLICS INC	15	4	4.25	0.4	8.1
O	TANDEM COMPUTERS INC	73	22	70.50	+1.0	+1.4
N	TANDY CORP	56	31	50.63	0.9	1.7
N	TEXAS INSTRS INC	171	103	169.75	+2.5	+1.5
A	ULTIMATE CORP	35	13	24.38	+0.1	+0.5
N	UNISYS CORP	117	58	105.13	+3.1	+3.1
A	WANG LABS INC B	21	11	15.88	+0.0	+0.0
A	WANG LABS INC C	21	11	16.13	+0.3	+2.0
N	XEROX CORP	75	49	73.13	0.1	0.2

Supplies & Accessories

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 18 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	28.75	0.8	2.5
N	BARRY WRIGHT CORP	24	14	17.25	0.3	1.4
A	DUPLEX PRODS INC	23	18	22.00	+0.3	+1.1
N	ENNIS BUSINESS FORMS INC	34	22	32.00	+0.0	+0.0
N	3M CO	140	97	125.75	+1.0	+0.8
N	MOORE LTD	28	20	24.00	+0.4	+1.5
O	STANDARD REGISTER CO	53	32	47.00	2.0	4.1
N	WALLACE COMPUTER SVCS	50	37	44.88	+0.0	+0.0

Software & DP Services

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 18 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	4.00	0.5	11.1
N	ADVANCED SYS INC	22	12	21.00	0.3	1.2
N	AGS COMPUTERS INC	40	17	37.25	1.0	2.6
O	AMERICAN MGMT SYS INC	33	13	30.75	0.5	1.6
O	AMERICAN SOFTWARE INC	27	10	26.00	0.3	1.0
N	ANACOMP INC	8	3	7.38	+0.3	3.5
O	ANALYSTS INTL CORP	11	4	10.25	0.1	1.2
O	ASHTON TATE	30	10	24.25	2.8	10.2
O	ASK COMPUTER SYS INC	17	9	15.63	0.0	+0.0
O	ASTRADYNE COMP IND	3	1	1.75	0.0	1.7
N	AUTOMATIC DATA PROC	47	29	45.75	+0.1	+0.3
O	BOOLE & BABBAGE INC	11	4	9.50	0.5	5.0
N	COMPUTER ASSOC INTL INC	44	17	39.75	+0.4	+1.0
O	COMPUTER HORIZONS CORP	15	10	13.75	0.5	3.5
O	COMPUTER NETWORK TECH	10	4	5.06	+0.6	+12.5
N	COMPUTER SCIENCES CORP	54	30	52.50	+0.6	+1.2
N	COMPUTER TASK GROUP INC	19	11	14.38	1.3	8.0
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	18	10	17.75	+2.8	18.3
N	CULLINET SOFTWARE INC	16	6	10.13	0.5	4.7
O	CYCARE SYS INC	17	7	8.88	+0.1	+1.4
O	DUQUESNE SYS INC	27	10	26.25	+0.5	+1.9
N	GENERAL ELEC CO	108	71	107.00	+0.0	+0.0
N	GENERAL MTRS CORP	50	24	37.88	0.5	1.3
O	HOGAN SYS INC	17	7	16.38	0.9	+5.6
O	INFORMATION SCIENCES INC	4	1	1.50	+0.2	+14.2
O	INFOTRON SYS CORP	18	7	9.25	+0.5	+5.7
O	KEANE INC	16	5	8.00	0.8	8.6
N	LOGICON INC	38	22	28.25	+2.8	+10.8
O	LOTUS DEV CORP	25	8	21.50	+0.0	+0.0
O	MANAGEMENT SCI AMER	21	11	18.63	1.0	5.1
O	MCI COMM CORP	13	5	6.75	+0.4	+5.9
O	MICOM SYS INC	18	10	15.88	+0.9	+5.8
O	MICRO PRO INTL CORP	6	2	5.31	+0.6	+11.9
N	MICROSOFT CORP	90	26	89.50	+4.0	+4.7
O	NATIONAL DATA CORP	27	16	25.63	+0.5	+2.0
O	ON LINE SOFTWARE INT	23	10	22.50	+0.3	+1.1
O	ORACLE SYS CORP	44	13	40.25	+0.8	+1.9
N	PANSOPHIC SYS INC	42	25	34.25	2.8	7.4
O	POLICY MGMT SYS CORP	30	15	26.50	0.5	1.9
O	PROGRAMMING & SYS INC	13	8	11.50	+0.3	+2.2
O	REYNOLDS & REYNOLDS CO	42	27	38.75	+2.3	+6.2
O	SCIENTIFIC COMPUTERS INC	8	4	7.88	+0.4	5.0
O	SEI CORP	26	15	25.25	0.5	1.9
O	SHARED MED SYS CORP	53	30	35.88	0.5	1.4
O	SOFTWARE AG SYSTEMS INC	22	10	11.88	0.3	2.1
O	SOFTWARE PUBG CORP	16	5	14.13	1.0	6.6
A	STERLING SOFTWARE INC	21	10	12.50	0.9	6.5
N	SUNGUARD DATA SYSTEMS	20	10	18.25	1.0	5.2
N	UCCEL CORP	34	17	32.50	+0.0	+0.0
N	URS CORP	22	14	20.50	0.6	3.0
O	VM SOFTWARE INC	39	12	39.00	+3.3	+9.1

Semiconductors

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 18 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	32	13	20.88	+0.3	+1.2
N	ANALOG DEVICES INC	25	14	19.63	1.0	4.8
O	ANALOGIC CORP	14	10	11.88	+0.0	0.0
N	APPLIED MAGNETICS CORP	29	13	28.38	+2.1	+8.1
O	AVANTEK INC	23	14	17.13	0.9	4.9
O	HADCO CORP	6	3	5.50	+0.4	+7.3
O	INTEL CORP	39	16	38.25	2.5	+7.0
O	MICRO MASK INC	7	2	5.88	0.4	6.0
N	MOTOROLA INC	55	34	54.38	+4.1	+8.2
N	NATIONAL SEMICONDUCTOR	16	8	16.13	+1.3	+8.4
N	TERADYNE INC	30	16	24.00	+1.4	+6.1

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Peripherals & Subsystems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 18 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	8.63	0.3	2.8
A	ANDERSON JACOBSON INC	4	1	3.00	+0.0	+0.0
O	AST RESH INC	23	11	19.75	1.0	4.8
O	AUTOTROL CORP	10	5	8.38	+0.9	+11.7
O	AVANT GARDE COMPUTING	7	3	4.13	+0.4	+10.0
O	BANCTEC INC	13	6	11.38	+1.0	+9.6
N	BOLT BERANEK & NEWMAN	60	37	53.88	2.4	4.2
A	CETEC CORP	9	5	5.38	0.5	8.5
A	COGNITRONICS CORP	6	2	4.00	+0.6	+18.5
N	COMPU GRAPHIC CORP	26	16	22.00	0.3	1.1
N	COMPUTERVISION CORP	23	10	20.13	+0.1	+0.6
N	CONRAC CORP	22	12	22.00	+2.4	+12.1
A	DATAPRODUCTS CORP	18	11	13.38	0.1	0.9
A	DATARAM CORP	18	7	8.63	+0.4	4.5
O	DATA SWITCH CORP	9	5	6.25	0.5	7.4
O	DATUM INC	7	4	5.75	0.1	2.1
N	DECISION INDS CORP	15	8	9.88	0.4	3.7
O	ENDATA INC	9	5	8.63	0.3	2.8
O	EMC CORP	34	11	25.50	1.8	6.4
O	EVANS & SUTHERLAND	40	20	38.50	+0.5	+1.3
N	FLOATING POINT SYS INC	46	11	14.13	0.4	2.6
O	GANDALF TECHNOLOGIES	9	5	8.63	+0.3	+3.0
N	GENERAL DATACOMM IND	15	8	12.13	+0.0	+0.0
N	HAZELTINE CORP	30	16	29.75	+0.0	+0.0
O	ICOT CORP	13	8	12.25	+0.0	+0.0
O	INFORMATION INTL INC	18	13	15.75	+0.0	+0.0
O	INTECOM INC	7	3	3.00	+0.0	+0.0
O	INTERLEAF INC	15	8	14.13	+4.5	+46.8
O	MEGADATA CORP	7	2	5.75	+0.1	+2.2
A	MSI DATA CORP	16	10	16.13	+0.4	+2.4
N	NASHUA CORP	30	20	27.88	1.0	3.5
O	NETWORK SYS CORP	19	10	15.88	0.5	3.1
N	NORTH AMERN PHILIPS CORP	48	35	40.00	0.8	1.8
N	NORTHERN TELECOM LTD	45	27	44.00	+2.3	5.4
O	NOVELL INC	45	15	39.75	4.8	10.7
N	PARADYNE CORP	11	4	7.00	0.3	3.4
A	PENRIL CORP	8	4	5.13	0.9	+20.6
N	PLESSEY PLC	40	24	38.63	+0.1	+0.3
O	PRINTRONIX INC	15	10	11.13	+0.4	+3.5
N	QMS INC	18	11	16.25	0.1	0.8
O	RAMTEK CORP	7	3	4.75	0.3	5.0
N	RECOGNITION EQUIP INC	27	10	21.75	0.9	3.9
O	SCAN TRON CORP	19	11	12.75	1.0	7.3
N	SCIENTIFIC ATLANTA INC	17	9	16.75	+1.5	+9.8
O	SEAGATE TECHNOLOGY	42	9	34.75	1.8	4.8
N	STORAGE TECHNOLOGY	5	2	4.25	0.0	+0.0
O	SUN MICROSYSTEM INC	33	11	30.50	0.9	2.8
A	T BAR INC	8	5	7.88	+0.3	+3.3
A	TAB PRODS CO	19	12	18.13	0.4	2.0
O	TANDON CORP	8	2	4.00	+0.5	+14.3
A	TEC INC	7	3	3.25	0.3	7.1
N	TEKTRONIX INC	43	27	38.25	1.0	2.5
O	TELEVIDEO SYS INC	4	2	2.75	0.3	+10.0
N	TELEX CORP	102	52	86.88	1.9	2.1
N	TIMEPLEX INC	41	14	39.75	+0.4	+1.0
N	TITAN CORP	12	6	7.38	0.4	4.8
O	VISUAL TECHNOLOGY INC	1	0	0.44	+0.0	+0.0
O	WYSE TECH	30	13	25.13	3.0	10.7

Leasing Companies

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 18 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	29	15	26.63	0.5	1.8
N	CONTINENTAL INFO SYS	14	7	13.25	+0.1	+1.0
O	FINALCO GROUP INC	5	2	2.88	+0.0	+0.0
O	PHOENIX AMERN INC	8	3	5.75	+0.0	+0.0
O	SELECTERM INC	12	5	5.25	0.4	6.7
N	U S LEASING	52	38	50.50	1.6	3.1

Microsoft on high

Diversification, forthcoming DOS release sway investors

Due, in part, to the increasing market share of its applications packages, analysts said, Microsoft Corp. was a searing issue last week.

Sales of Microsoft stock were up because the company has become less dependent on its operating systems to generate revenue and, instead, is concentrating efforts on applications packages, according to analysts. Also adding to Microsoft's gains were the company's long-standing relationship with IBM and anticipation of DOS 5 coming out in the fall, the analysts said.

After slight losses earlier in the week, Microsoft jumped 4½ points to close Wednesday at 89½. By Thursday's close, the stock had gone up another 1¾ to 91¼.

Continuing to ride the Dow Jones seesaw were manufacturers IBM, Compaq Computer Corp., Hewlett-Packard Co. and Cray Research, Inc.

IBM, which continues to be on the most active issues list, was up and down all week and closed Thursday at 147. Compaq's stock closed Thursday at 29⅛. HP surpassed its 365-day high at the week's end, closing at 60¼ on Thursday.

ALAN J. RYAN

SAA scope compared to SNA

BY DONNA RAIMONDI
CW STAFF

RYE BROOK, N.Y. — The Systems Application Architecture (SAA) strategy announced formally last week by IBM initiated a common interface project that the firm said will grow and evolve into the next decade.

"Our products today already include many of the elements in SAA," said John Friedline, manager of software marketing at IBM's Information Systems Group. Products written to SAA standards will evolve into the 1990s, he added.

SAA may be the most significant announcement from IBM since Systems Network Architecture (SNA) was unleashed in 1974, according to Paine Webber, Inc. analyst Stephen Smith. The strategy says that all software written to SAA standards could run on all IBM Personal Computers, System/36s and 38s and 370s — and even other vendors' architectures.

SAA will evolve much the same way that SNA did, Friedline said. The company started pulling the strategy together in early 1986, and it will evolve well into the 1990s, he added. "This is Step One in a long journey, but it won't take until the '90s to have products for it." IBM would not say when the first applications will appear, but they are in development.

For Travelers Insurance Co., a subsidiary of The Travelers Corp., having simple screens to access mainframe resources is one of the highest priorities, according to Richard Boyle, assistant director of Travelers' Computer Sciences Division. The company is addressing that problem by writing programs to provide a single-image system. "SAA could be a real help with that where it seems like a single mainframe environment, although you might have 20 to 30 computers."

By isolating applications from underlying communications protocols, SAA would spare MIS managers like Boyle the task of "teaching programmer communications when I want them to spend their time learning the business they're dealing with so they can write better business applications," he commented.

Unimpressed

Most software development houses and analysts contacted by *Computerworld*, while maintaining that SAA is a critical strategy, said they were unimpressed by the contents of IBM's announcement. The release included lists of protocols, conventions and interfaces that would be included in SAA development.

"We are already writing to some of the standards IBM mentions in the announcement," said Tony Percy, director of product planning at mainframe software house Applied Data Research, Inc. (ADR).

At the PC level, SAA will not have much impact for at least a couple of years, according to Robert Carr, chief scientist at Ashton-Tate. "The kinds of user interfaces and functionality that the first SAA applications will tend to have will be reminiscent of what you might find on a System/36 and 38 today for office automation, and that tends to be a very different market than what Ashton-Tate or Microsoft or Lotus is selling into," he added.

Carr would not say whether Ashton-Tate plans to write to SAA specifications. "SAA will affect PC software companies in general to the degree that they want their applications to migrate up from PCs to the minis or mainframes and to the degree that SAA ultimately embraces the best things about PCs, such as including rich graphical user interfaces."

The common communications aspects of SAA will probably be the most successful part of the program, because that is where the biggest need for standards lies, according to Carr.

But the communications areas IBM addresses in SAA held some surprises for ADR's Percy. "IBM has been promoting the Server Requester Program Interface very strongly lately, but I don't see it listed in the announcement. They also say Token-Ring is important, but they don't mention Netbios, which is supposed to be a consistent interface across PC networks and Token-Ring networks," Percy observed.

In order for items to make last week's announcement, product managers at IBM had to promise management they could produce all of the items in the lists of protocols and products within two years, according to Francis R. Gens, a vice-president at International Data Corp., a Framingham, Mass.-based market research firm. That is why there are so many interesting omissions on the list, he added.

Distributed

CONTINUED FROM PAGE 1

programming involving different application programming interfaces, most of which require Assembly language coding. We want to add high-level architectures."

With the SAA announcement, IBM proposes to solve its longstanding communications incompatibility problems by covering them with a blanket of high-level programs.

The solution addresses some important user and programmer needs but will take several years to implement, industry experts predicted and IBM admitted.

The announcement addresses IBM's vulnerable spot in the firm's war with Digital Equipment Corp. "Right now, everything IBM does is intertwined with a specific machine, so you can't port it, except through Assembly language reprogramming," observed Frank Dzubeck, president of Washington, D.C., consulting firm Communications Network Architects.

"That is what DEC has been harping on as a strategic thrust against IBM. So now IBM is reiterating, 'We don't believe the same machine architecture should exist on all product lines, but now we're offering insulation between the application developer and the machine itself,' " Dzubeck remarked.

The PC environment

In the ideal SAA world, envisioned by Richard Boyle, assistant director of the computer sciences division at Travelers Insurance Co., "When an application on an IBM Personal Computer pulls down data from a mainframe, it only deals with the PC environment — and it remains unaware whether the communications supporting that data access is Synchronous Data Link Control or Token-Ring network or whether the data came from a PC environment or CICS. And the application appears the same to the user in either case."

IBM's overall strategy is to "insulate applications from communications protocols," Dzubeck said, providing applications programmers with a consistent set of high-level programming building blocks that, once incorporated into an application, will provide transparent access to various IBM and industry-standard communications protocols that have been blessed by the vendor as part of the SAA framework.

SAA, as defined in last Tuesday's release, is composed of four elements.

Common User Access defines how the user interacts with SAA networking and applications.

Common Programming Interface includes several standard languages, including Cobol and C; a data base interface based on the IBM's or ANSI's Structured Query Language; a query interface based on IBM's Query Management Facility; and a presentation interface that is said to be based on extensions found in IBM's Graphical Data Display Manager.

Common Communications Support includes IBM communications protocols such as LU6.2, Document Interchange Architecture and Systems Network Architecture (SNA) Distributed Services, as well as the CCITT X.25 packet-switching protocol and the IBM Token-Ring network, which is based on both the IEEE 802.2 and 802.5 standards.

"When we can use national or international standards [in SAA], we will," Friedline emphasized.

Fourthly, IBM intends to develop, during a period of years, Common Applications across the SAA environment. The focus initially will be on office applications and, secondarily, on industry-specific applications. The elements that are being defined now include document creation and library, personal services and mail and decision support.

Expensive alternatives

Adding a high-level software layer for applications to go through on their way to the data could slow down response time on lower end PCs, Dzubeck indicated.

But this is infinitely preferable, as far as SNA software developers are concerned, to the expensive alternative of rewriting or replacing existing and widely installed communications protocols, he added.

Applications based on the existing versions of IBM communications programs, such as Advanced Program-to-Program Communications, will work with the future SAA versions of the products without reprogramming, Dzubeck predicted. However, as time goes on, many companies will choose to reprogram their software applications to take advantage of SAA's expanded capabilities, Dzubeck commented.

"This announcement made us very comfortable with what we're doing," said John Pickens, senior communications architect for Communications Solutions, Inc. based in San Jose, Calif., another SNA-based software vendor. "I feared that IBM would announce another, different interface."

Conflicting messages

By defining IBM's future communications architecture, SAA could be a boon to software developers who have been confused about IBM's future support of recent and apparently conflicting software announcements such as Service Requester Program Interface (SRPI), Pickens indicated. IBM has not yet decided whether or not to make SRPI part of SAA, Friedline stated.

Another matter of concern for software developers is the future impact of IBM's Common User Access Interface, whose initial publication is slated for the third quarter of 1987.

The interface, which will act as liaison between PC and terminal users and the applications and communications functions within SAA, is likely to have an immediate impact on the currently installed IBM office system products such as Distributed Office Support System, Professional Office System and Personal Services, Pickens predicted.

A commonly held opinion is that SAA will be a key component of the future Intel Corp. 80386-based machine — and vice versa. According to Dzubeck, the 286-based IBM PC AT is the lowest horsepower IBM workstation that can comfortably support the SAA user interface he envisions, which will be multitasking, with the ability to hot-key and do windowing.

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Lotus fired up, still stalks 'copycats'

BY PEGGY WATT
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. is not backing down in its legal battle against alleged copyright infringements, despite industry criticism and legal jockeying that has included amending the firm's request for damages.

Though Lotus recently dropped its initial claim for $50 million in punitive damages against Paperback Software International in Berkeley, Calif., publisher of an alleged Lotus 1-2-3 clone, Lotus still seeks trebled damages plus attorneys' fees under a Massachusetts statute cited in the original filing, Lotus attorney Henry Gutman asserted.

Lotus also claims rights to profits from the sales of Paperback Software's spreadsheet, VP-Planner, and The Twin from Mosaic Software, Inc. located here. Mosaic is the defendant in a separate suit.

Paperback Software challenged Lotus's right to additional damages in its first reply to the charges. The defendant also claimed Lotus was suing the wrong company, noting that Stephenson Software Ltd. in Vancouver, B.C., developed VP-Planner and contracted with Paperback Software to market it.

Lotus's reply was to add Stephenson Software to the suit. Gutman noted that Lotus had considered — and rejected — including the developer in the original suit, saying, "But if the defendant wants us to, we will."

Defense attorneys said they will now raise questions of jurisdiction, but Lotus attorneys said the case will remain in the Massachusetts court where it was filed.

Also, while defendants applauded when Lotus was denied a separate audio-visual copyright for the 1-2-3 interface, Lotus still retains a general copyright of the product.

Lotus spokesmen said the company will begin to reply to widespread criticism that depicts it as a Goliath seeking to squash small, innovative developers.

"We think we're on the side of David," said Greg Jarboe, director of corporate communications. "Little companies have the most to lose if Lotus loses the case." If software loses copyright protection, small firms' innovations will be copied by large companies, Jarboe explained.

"We're not trying to copyright the spreadsheet concept. We're suing the two who are keystroke-for-keystroke clones," Jarboe added.

Paperback Software president Adam Osborne contended VP-Planner goes beyond 1-2-3's capabilities and is an enhanced competitor rather than a clone.

Paperback Software attorney James Garrett said the firm will reply by the end of March to Lotus's amended complaint.

In the Mosaic case, the next action is Lotus's pending reply to Mosaic's request that charges be dropped as unfounded.

Networker

FROM PAGE 1

Lotus explained.

The delay has cost Lotus at least one contract. Last week, the Commercial Banking Group of Wells Fargo Bank NA in San Francisco decided to go with Computer Associates International, Inc.'s Supercalc4 instead of The Networker, said Kingsley Mar, the group's manager of research and development.

"We had a big local-area network project ready to roll out, but it looked like the timing of pieces and the development table [for The Networker] were too far behind schedule. They were upset we signed with Computer Associates International, Inc., but they were too far off course to be considered," Mar said.

Access counter frustrating

Beta-test users have expressed the most frustration with the access-counter method employed by The Networker in place of copy protection.

That method requires that the software be preconfigured to support a specific number of network nodes. The system must be completely reconfigured — a cumbersome procedure — to support additional stations, several users asserted.

"There was a huge outcry over this back in October," said John McCarthy, an analyst with Forrester Research, Inc. in Cambridge, Mass. "It's very inflexible, especially for large network users."

"The whole approach is silly and runs counter to what other networking software companies are offering users," said Michael Goulde, a small-systems analyst with The Yankee Group, a research firm in Boston. Some of those vendors provide unlimited-use licenses.

Users have also expressed displeasure with the screen and printer drivers for The Networker, as well as the amount of overhead required.

Lotus director of corporate communications Greg Jarboe confirmed some of the problems cited by users. "Users have said, 'If you want to ship a product that will be successful in the market, then you better fix these problems,' " he said.

"THE WHOLE approach is silly and runs counter to what other networking software companies are offering users."

MICHAEL GOULDE
THE YENKEE GROUP

Despite those difficulties, The Networker reportedly will contain features outlined in a release in August, such as The Network File Access Program. Implemented as 1-2-3 or Symphony add-ins, the program is said to allow networked users to retrieve work-sheet files in a manner that denies other users access while the file is in use. This eliminates the risk of users overwriting data in shared work sheets, Lotus explained.

"It's kind of a guessing game over at Lotus over how many users to license," The Yankee Group's Goulde said. Lotus has historically insisted on a one-user, one-copy policy, and some sources noted that Lotus's networking follows that policy.

For example, users will still have to buy one copy of Lotus per user, although they will not physically be using them. After installing The Networker Pack on the file server, users must then take the existing Lotus applications and de-install them off the regular PCs.

Each serial number, however, of each Lotus copy is stored at the file server, which recognizes authorized users. Users would reinstall copies from the file server, pointed out Raymond DiCasparro, a partner with Brown and Associates, a network reseller in Belmont, Mass.

"You wouldn't have copies of Lotus on software, you'd have five 'counts,' " added a beta-test user.

"It's not truly networking," said Wells Fargo's Mar. "They have just put patches in to protect the number of copies out there. To me, unless these applications are totally uncopy-protected, then they are too cumbersome to work with."

Another user, in the information services industry, adopted a different stance. "The interesting thing is that they are saying, 'Look, we're gonna give you credit for what you've bought.' "

Computerworld staff writer Alan Ryan contributed to this story.

INSIDE LINES

The MIS machine. According to a respected industry executive, IBM next week will announce an Intel Corp. 80386-based microcomputer that includes some operating system code in its hardware. The machine, aimed directly at MIS and DP, allows applications development for IBM's 370 family that would also run on the 80386-machine.

Shifting strategy. National Advanced Systems appears to have changed its mind about value-added systems software. Several years ago, it virtually shut down internal systems software development, but the mainframe company is expected to announce next week that it has created a systems software development center in Atlanta. NAS staffed the center by hiring former Sperry Corp. employees who were displaced when the Unisys merger closed the Atlanta operation in December and are now said to be developing scientific and engineering software that would run on NAS's AS/XL vector processors.

Expanding position. Lotus-watchers are anticipating that the firm's April 27 announcement will include an electronic-mail package, a data base and a character-based operating environment. The latter reportedly would allow users to add modules to a program such as 1-2-3. One analyst said the company might also unveil a version of 1-2-3 that operates under Microsoft Corp.'s environment,"as opposed to building Windows or another graphical interface into 1-2-3."

The big man to speak. Digital Equipment Corp.'s Ken Olsen is slated to preside this Tuesday at the announcement of a "major" computer-integrated manufacturing announcement. Analysts speculate that DEC will introduce an enhanced version of its Baseway factory-communications and data management software as well as a ruggedized version of the Microvax that would reside on the factory floor.

Unification plans. Unisys Corp. is expected to introduce several products in New York this Wednesday, including Burroughs mainframes and a Sperry workstation based on the Intel Corp. 80386 chip. In addition, Unisys is expected to announce products connecting the Burroughs and Sperry machines. All the new products will carry the Unisys Corp. label.

Still hungry. Computer Associates International, Inc. is apparently on the prowl for more acquisitions. The Garden City, N.Y., systems house is said to be looking at firms offering technology that would enable it to build better front ends to its products. Computer Associates, sitting on $100 million from a debenture offering, was recently said to have been shopping in Massachusetts for prospective candidates.

A done deal. Curt Monash, the brash young software industry analyst at Paine Webber, is reported to be cleaning out his desk after a falling out with Paine Webber management because of some recent bad calls. The research task now falls to Robert M. Therrien, Monash's co-analyst in the New York office.

Say it ain't so! Originally scheduled for March 30, the official debut of ETA Systems, Inc.'s ETA-10 supercomputer has been postponed for at least a few weeks. The announcement is still slated to occur at Florida State University in Tallahassee, Fla., but has been delayed by scheduling conflicts, according to officials at the company and the school, which has been a beta-test site for the system for three months. Meanwhile, rumors continue regarding a possible restructuring of ETA Systems, with reports centering on ETA being reabsorbed by former parent company Control Data Corp.

Seeing is believing. Apple Computer, Inc. can offer a multitasking Macintosh by using its system tool Finder "any time we want," according to Jean-Louis Gassee, Apple's vice-president of research and development. But the feature won't be standard soon, because he wants it perfect, Gassee added. Another Apple official, Vice-President of Advanced Technology Larry Tesler, clarified the issue when he said Finder's immediate multitasking is limited to application swapping with the Switcher utility built into Finder.

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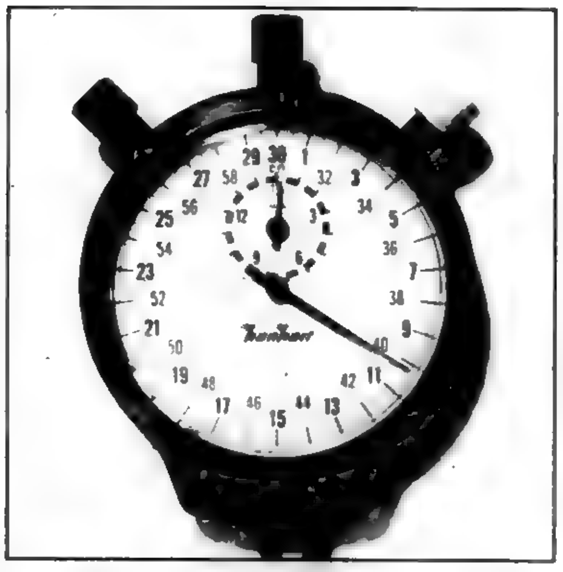

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COMPUTERWORLD

INSIDE

Spotlight — Modems acquire new names and functions to keep pace with changes in data communications. Center pullout section.

In Depth — Brad Cox on object-oriented programming: Write new code, but keep the old. **Page 59**

Beta-test users rate the second release of Software AG's fourth-generation language, which is expected to be released today. Page 4.

As part of last week's rollouts, AT&T officials hint at a more powerful host system for the firm's 3B2 line. Page 6.

Unisys connects Sperry micros to the Burroughs micro network, rolls out two small mainframes and throws its hat into the 80386 ring. Page 9.

Customized integration services lead DEC's latest assault on the factory automation market. Page 12.

Gould inaugurates a new line of superminicomputers, clustering CPUs to achieve a 96 MIPS rating. Page 15.

Putting the finishing touches on Computer Inquiry III, the FCC decides to treat protocol conversion as an unregulated, enhanced service. Page 2.

Early LU6.2 application spans multivendor gap

BY ELISABETH HORWITT
CW STAFF

NEW YORK — Spectrum Concepts, Inc. is expected to announce this week XCOM6.2, the first multivendor commercial turnkey software application that runs on IBM's LU6.2 peer-to-peer communications protocol.

Targeting companies that currently use IBM's Remote Job Entry and Network Job Entry protocols to handle intersystem file transfer, XCOM6.2 will reportedly provide users with the first off-the-shelf application for LU6.2, according to Keith Eisenstark, Spectrum Concepts' director of marketing. Many analysts were not expecting this for at least two years.

XCOM6.2 performs the same basic file-transfer functions as RJE but adds LU6.2's device independence, a greater range of communications protocol support and consistent programming interfaces, Spectrum claims. As a result, the firm says, users will have more flexibility in transferring files among a wide range of computers using whatever communications methods they choose.

The XCOM6.2 product family will run on top of existing LU6.2 hardware and software developed either by host or third-party vendors.

The initial introduction is set to include XCOM6.2 programs for Digital Equipment Corp. VAX/VMS systems as well as IBM System/38s, Personal Computers and mainframes running MVS. A programmer who has worked extensively on the project says Spectrum hopes to announce implementations of XCOM6.2 on the following systems by year's end or early in 1988: IBM DOS VSE, native VM and the System/36 in addi-

Continued on page 8

IBM readies 200-product PC tidal wave

BY ED SCANNELL
CW STAFF

MIAMI — "Here it comes."

Those are the words on the invitations sent to corporate users, software developers and dealers for what promises to be a tidal wave of systems, communications and software-related announcements from IBM here this week.

The products, which sources say number approximately 200, constitute an entire second generation of systems that will be the foundation of the company's corporate microcomputer strategy for the next several years.

Many major corporate accounts have been invited to the introduction along with 200 software developers, 20 of whom will demonstrate products that

Continued on page 101

Honeywell Bull born

French, Japanese firms formalize ownership

NEW YORK — Heralding "a unique combination," executives of the new computer systems group formed by Honeywell, Inc., Compagnie des Machines Bull and Japan's NEC Corp. last week unveiled plans for building on the flagging operations of Honeywell Information Systems in the U.S.

Named Honeywell Bull, Inc., the privately held company will be headquartered in Minneapolis; its executive management will be dominated by officials from France's Bull, which was once called Honeywell Bull and which will have five seats on the nine-man board of directors, including the chairman's position.

Jacques Stern, chairman and chief executive officer of Bull, was named chairman of Honeywell Bull, while former Honeywell Information Systems Executive Vice-President Jerome J. Meyer was named president and CEO and will fill one of Honeywell's two seats on the board of the venture; NEC will have one seat on the board.

Honeywell retained 42.5% ownership in the venture, which was first announced in December 1986, following negotiations first made public in September 1986. It sold 42.5% of its former holdings to Bull — although it has an option to sell more than half of its remaining stake to Bull at year-end 1988 — and an additional 15% to NEC, netting $527 million in cash, more than double the expected price Honeywell announced in December.

'Stronger supplier'

Honeywell Chairman Edson Spencer said the venture will provide information systems customers "with a stronger competitive supplier along with continuity and protection of their investment in computer systems."

"Honeywell Bull is a separate company and an American company with American management," Stern said. "But if you were to add together the sales of Honeywell Bull and NEC's computer businesses, they would amount to about $9 billion; that would rank No. 2 worldwide."

One user with a dozen Honeywell DPS6 mid-range systems said he was happy to see the restructuring completed. "Our first response is that we

Continued on page 102

CASHING IN

NCR marches to its own beat

BY CLINTON WILDER
CW STAFF

Like the ornate brass cash registers alongside the computers in its product display hall, NCR Corp. in many ways is a study in contrasts.

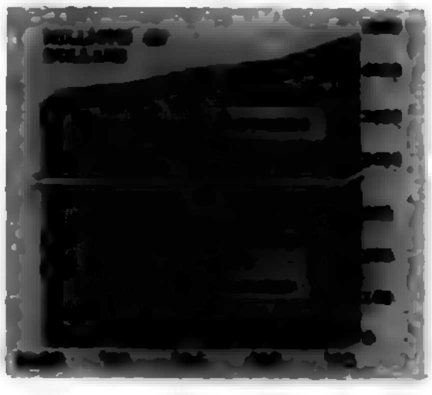
Headquartered in the unlikely high-tech enclave of Dayton, Ohio, it is one of the industry's most financially conservative companies — but has exciting technological developments in fields such as transaction processing and incremental computing. It is the industry's oldest company but also one of the few major systems suppliers with a highly successful merchant semiconductor business.

And at a time when every vendor from IBM on down is reorienting itself toward vertical markets and the "solution sell," NCR still believes that superior products, sold on their technological advantages, will win in the marketplace.

Continued on page 81

NCR growth: Modest but steady

13% growth in 1986 marked NCR's first double-digit revenue increase since 1980



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IN THIS ISSUE

Up with power. AT&T adds high-end Model 600 to 3B2 line and hints of future host machine, while the Unisys label will tag the V 510 and V 530 small mainframes, said to double and quadruple the power of former Burroughs machines. Pages 6, 9.

NEWS

4 IBM moves up 9370 Information System ship date by two months.

4 Beta-test users say performance improvements of Software AG's Natural 2 are [illegible]

8 Palladian ports Management Advisor package to Apollo workstations.

10 Varityper claims VT-600 is highest resolution laser printer available.

10 NCGA conference attendees want vendors to meet their needs.

10 Computervision rolls out the next generation of its CAD/CAM system.

12 DEC forges into factory systems market with integrations service, software, service offerings.

13 CDC breaks out of niche with first departmental system.

14 Plexus designs high-end processor to integrate diverse data, documents.

14 ADR seeks buyer for computer-based training system.

15 Gould claims speeds of 96 MIPS, 300 MFLOPS for high-end machines.

18 Gateways, satellites add spice to Interface '87 product parade.

19 Micom releases direct Unix, Ethernet connection for 80386.

101 3Com premiers first line of diskless workstations featuring built-in adapters, advanced graphics.

101 IBM strategy for control of PC market includes rash of product announcements.

102 Reagan's Cabinet seeks retaliation against Japan's chip dumping.

SOFTWARE & SERVICES

25 Success of All-In-1 helps DEC sell computers.

25 ADR/Vollie allows shared program development across IBM VM, VSE systems.

25 Multisoft development tool builds IBM peer-to-peer applications.

Easing transition trauma. Page 69.

MICROCOMPUTING

35 Borland develops Linguistic Technology for use on CD-ROM.

35 Inexpensive PC project-management package developed in India.

35 Hand-held text scanner provides alternative to rekeying data.

35 Summit Software's BetterBASIC judged best for compatibility.

NETWORKING

47 Interlink emulators support full-screen terminal access to IBM, DEC hosts.

47 Avatar's Alliance ZSL links PCs for around $100 each.

47 Token-Ring support, VME interface among expected Interface '87 announcements.

SYSTEMS & PERIPHERALS

53 Bank of Chicago aims toward centralization of its 10 operating environments.

53 Tape subsystem for use with DEC minis allows faster buffering.

Quotable

"The merger itself was a launching, not an arrival, and we operate under no illusions that safe passage is guaranteed."

W. MICHAEL BLUMENTHAL
"UNISYS CORP. ANNUAL REPORT"

MANAGEMENT

69 Colonial Penn pegs information systems as strategic asset.

69 MIS research center leader questions use of leading-edge technology.

69 MIS managers find kid-glove techniques ease employee transition.

COMPUTER INDUSTRY

75 ADR struggles with weak market, IBM to remain No. 1 software alternative.

75 Rodime files yet another infringement suit.

75 Wang pens development agreements with Diebold and Sterling.

EMPLOYMENT TODAY

87 Organizations, agencies help employees bounce back from layoffs.

SPOTLIGHT

Modems demonstrate remarkable adaptability as telecommunications networks evolve. Follows page 52.

IN DEPTH

59 The malleable system: Object-oriented programming places change at the center of software development. By Brad Cox.

OPINION & ANALYSIS

21 Grayson suggests solutions to the expert system dilemma.

25 Fosdick unlocks convergence strategy with ISPF key.

35 Zachmann calls 10-Base hot property in relational DBMS market.

47 Carosella bills 9370 as IBM's anchor to LAN environment.

53 Connolly waves goodbye to the paper chase.

69 Synnott comments on the evolution of three types of systems.

75 Szuprowicz sees IBM moving rapidly toward AI.

DEPARTMENTS

20 Editorial

95 Buy Sell Swap

FCC keeps hands off protocol conversion

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Putting the finishing touches on its Computer Inquiry III proceeding, the Federal Communications Commission last week reached the difficult decision to continue treating protocol conversion as an unregulated, enhanced service.

That decision, supported by users groups, means that AT&T and the regional holding companies can offer protocol conversion services only if they meet the FCC's accounting and interconnection rules intended to prevent discrimination against competitors.

After disposing of the protocol processing issue and clarifying the FCC's rules for Comparably Efficient Interconnection and Open Network Architecture, FCC Chairman Mark S. Fowler declared that the commission's "road map" for a competitive telecommunications industry is in place.

"Provided we use our road map wisely, competitors of all stripes will soon be providing a range of communications-related services never before possible due to artificial constraints on our nation's largest telephone companies," Fowler said. Under previous rules, the dominant carriers were required to use separate subsidiaries to offer unregulated services.

Under the Computer Inquiry III regulatory scheme, basic network services are regulated, while enhanced services are exempt from traditional utility regulation. AT&T and the divested Bell companies can offer enhanced services without using a separate subsidiary if they meet the FCC's cost-allocation rules and provide other enhanced-service providers with equal access to their networks.

'Difficult to decide'

Fowler said the commission found it very difficult to decide whether to define protocol processing as a basic or enhanced service. AT&T and the divested Bell companies argued that it would be more efficient to embed protocol conversion in their basic network services.

"I can easily understand why many sincere industry representatives have found it desirable to end any federal rules limiting the role of protocol conversion in network design," Fowler said.

"However, by reaffirming the unregulated status of protocol processing, we are also keeping the faith with the large and competitive data communications industry. Regulation, federal or state, has no place in that competitive business," Fowler said.

The International Communications Association and the Ad Hoc Telecommunications Users Committee, two major users groups, had urged the FCC to define protocol processing as an unregulated, enhanced service.

Spectrum set to go

HP ships beta, sees on-time delivery of system

BY JEFFRY BEELER
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. last week announced shipment of beta-test versions of its initial general-purpose Spectrum system and expressed confidence that the company will meet the rapidly approaching revised target date for commercial delivery.

During the coming weeks, HP said it plans to install 12 of its Series 930s for testing purposes in both U.S. and international accounts. Three of the shipments reportedly took place during the week of March 16 and went to domestic customer locations.

The timing of the Series 930 deliveries keeps HP basically on target with the beta-test timetable to which the firm publicly committed itself during a securities analysts' meeting in January. Last September, HP said deliveries would fall six months behind schedule.

Not everyone, though, finds the timing of the first Series 930 beta-test shipments altogether comforting. One user of HP's existing 3000-series systems last week voiced doubts about the apparent brevity of the vendor's beta-test period.

In an ideal situation, HP should begin beta tests of a major new product six months before the company officially releases it, according to the user, who asked to remain anonymous.

An HP spokesman characterized the length of the company's current testing schedule as adequate.

"We see no problems today in beginning limited-quantity shipments of the 930 sometime between May and August and deliveries of the Series 950 during the second half of 1987," the spokesman said.

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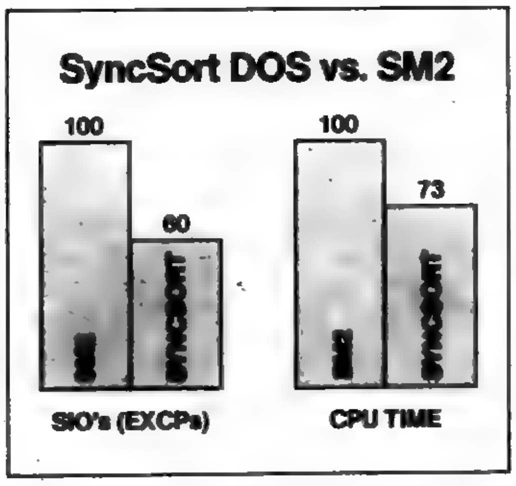

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IBM hastens 9370's arrival

High importance and large demand push delivery date up to July

BY ROSEMARY HAMILTON
CW STAFF

RYE BROOK, N.Y. — IBM last week moved up the delivery date of its 9370 Information System by two months, a step analysts said was expected because the system is both in great demand and critical to IBM's success in the mid-range market.

Fixed configuration versions of the 9370 Model 20 and Model 60 will be shipped in July instead of October, the vendor said. Customers participating in the IBM Early Support Program were scheduled to receive systems this month, while shipments of 9370 development systems to be used by authorized value-added resellers are slated to begin next month.

"The reason for this is obvious," said Marty Gruhn, vice-president of the Sierra Group, a market research firm. "They need revenue in 1987, and they need product on the street that can compete with Digital Equipment Corp. in a real sense. And it's a product in demand."

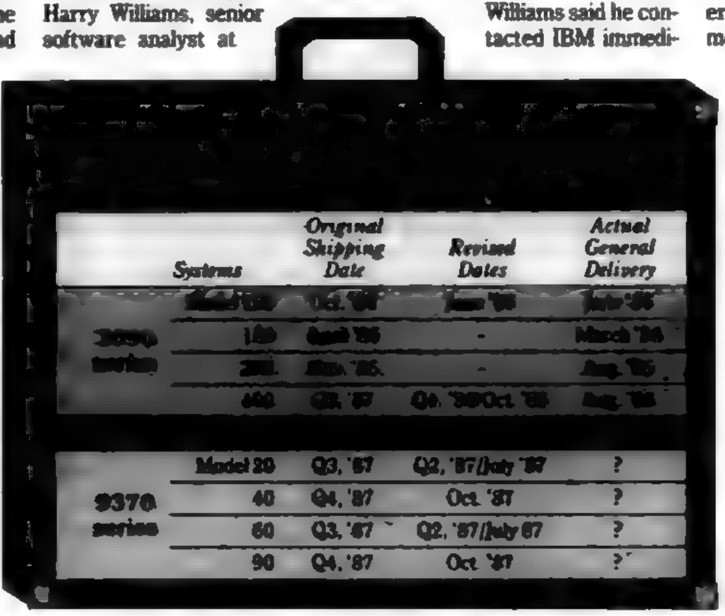
But apparently not every potential 9370 user will benefit from the new shipment date. Harry Williams, senior software analyst at Marist College in Poughkeepsie, N.Y., commented that he was thrilled when he heard about the early shipment dates last week, because he has been anxiously awaiting a 9370 he ordered last fall.

Williams said he contacted IBM immediately following last week's announcement, but a few days later, he was told to expect a delivery date of January 1988. "We're going to see what we can work with them," he said. The system is slated to serve as the host computer at the college's new science and communications center.

An IBM spokeswoman explained that the reason for offering fixed configuration systems initially is to help speed up delivery. "Obviously, if you have a more limited number, you can build them faster," she said. There will be 20 versions of the Model 20 and Model 60 available this summer, she added.

The earlier shipment dates "were expected by outsiders and IBM itself," said David Moschella, an International Data Corp. analyst. "The original dates were very conservative, and they certainly need to get out there and compete in that market."

According to the IBM spokeswoman, 9370 orders number in the "tens of thousands," and large accounts with multiple systems ordered make up two-thirds of that amount.



	Systems	Original Shipping Date	Revised Dates	Actual General Delivery
3090 series	[illegible]	[illegible]	[illegible]	[illegible]
	180	[illegible] '85	-	March '86
	200	[illegible] '85.	-	Aug. '85
	400	Q3, '87	Q4, '86/Oct. '86	Aug. '86
9370 series	Model 20	Q3, '87	Q2, '87/July '87	?
	40	Q4, '87	Oct. '87	?
	60	Q3, '87	Q2, '87/July 87	?
	90	Q4, '87	Oct. '87	?

Natural 2 does CPU windows

BY CHARLES BABCOCK
CW STAFF

RESTON, Va. — Beta-test users of Natural 2, the second version of Software AG of North America, Inc.'s fourth-generation language, which is due to be announced today, say it borrows the concept of windowing from personal computers and makes it available for mainframe applications.

In addition, other improvements to Natural 2, which now includes automatic array processing, are yielding large performance gains.

At one site, Inland Container Corp. in Indianapolis, Larry Lammers, the development language administrator, says he has been seeing performance gains of 70% to 80%.

'Comparable to Cobol'

"The speeds we have seen are not as fast as assembler but comparable to Cobol," Lammers says. The gain in speed and functionality in the new version is prompting Inland users to view Natural 2 as a new language rather than an enhanced version of the original, he adds.

The revamped language is slated to interface to IBM's DB2 by the end of this year, Software AG President Stuart Miller says. This move represents Software AG's recognition that its fourth-generation language will coexist with IBM's relational data base product as well as support Software AG's competing product, Adabas.

Natural was first introduced in 1978 and has an installed base of 2,400 licenses.

In addition to windowing, the four-year Natural redevelopment effort has yielded the following:

- Intelligent editors for data definition and follow-up stages of applications development.
- An ability to call subprograms in either Natural or third-generation languages that are external to the running program module and therefore usable by a variety of applications. Natural could previously only call subroutines within an application.
- A split-screen mapping facility that allows the display of data layouts from the Software AG Predict data dictionary. Selection of fields can be performed in check-off fashion for inclusion on a map without incurring the possibility of error when names must be typed onto screens.
- A structured mode of programming that enforces certain syntax constructs for production applications and allows for easier maintenance.

"You can create more PC-like applications. That's what the user community wants," Lammers says.

Another beta-test site, Washington State University in Pullman, Wash., is in the process of converting 6,000 Cobol programs into Natural 2. Its new functions will encourage the use of on-line systems for users, complete with Help screens that can be opened in the middle of an application, maintains Steve Watson, director of administrative computing services.

"It will change the way we do applications. There's more to the product than we thought there would be," he says.

> "WITH Natural 2, you can create more PC-like applications. That's what the user community wants."
>
> LARRY LAMMERS
> INLAND CONTAINER CORP.

Watson said Natural 2 will also change the type of programmer he seeks to hire. In the past, he has looked for people with four to five years of experience in Cobol. Now, he will look for "business application experience" on the grounds that applications are easier to build with Natural 2's editors and intelligent screen design facilities.

Natural 2 programs are showing a 60% performance improvement over their predecessor Natural 1.2 programs, Watson asserts.

One performance improvement was to send only the modified parts of screens to the mainframe from a terminal, reducing from 960 to a handful the number of characters sent down-line, Miller explains.

Natural 2 is scheduled to be available in May at a price of $25,000 to $150,000. It runs in IBM's CICS, IMS/DC and TSO teleprocessing environments as well as VM/CMS. The fourth-generation language works with Adabas or IBM VSAM and DL/1 files, with a DB2 interface scheduled for delivery by the end of this year.

Focus shifts to 4GL

Miller explains that Software AG has concentrated on developing its fourth-generation language because it wants Natural to be viewed as a strategic product on a par with a data base management system. Since Software AG also markets the aging Adabas system, the move reflects a shift of emphasis, if not resources, at the company toward Natural.

Adabas and other established hierarchical and networked data base management system sales are believed to be losing ground as IBM's DB2 and other relational products gain customers. D & B Computing Services, Inc. previously announced a windowing capability to its fourth-generation language but will not deliver it until next January.

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CW Communications International News Service
Susan Blakeney, Director

Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
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CW

New Dimensions in Software Productivity.

AT&T strengthens 3B2 minis, ties units to IBM, DEC, Wang

BY JEAN S. BOZMAN
CW STAFF

NEW YORK — AT&T strengthened its 3-year-old line of 3B2 minicomputers last week by adding a high-end Model 600 and connecting the minis to the well-established office environments of IBM, Digital Equipment Corp. and Wang Laboratories, Inc. through systems software.

The connectivity of the 3B2s was promoted by the acquisition of protocol-translation modules from Soft-Switch, Inc., AT&T executives acknowledged. Incorporated within the product name, AT&T Document Exchange, the Soft-Switch translators link AT&T applications to IBM's Professional Office System (Profs) and Distributed Office Support System (Disoss), DEC's Decnet, Ethernet and Wang's VS systems.

The links were designed to promote AT&T sales in non-Unix accounts. "We need to offer systems that can work with whatever profile the customer implements," explained Vittorio Cassoni, senior vice-president of AT&T's Data Systems Division.

Cassoni, along with Jack Scanlon, group vice-president of product development, hinted at a host machine for the AT&T line. The as-yet-unannounced minicomputer, expected out later this year, will be based on multiple microprocessors and will be expandable through the addition of printed-circuit boards, Scanlon said.

AT&T's wide range of announcements failed to address MIS concerns such as the current lack of an AT&T host, observers said. But the observers did emphasize AT&T's recognition that there are standards that will dictate many features of future AT&T systems. Among them are Microsoft Corp.'s MS-DOS, IBM's Systems Network Architecture and Netbios, the International Standards Organization's Open Systems Interconnect and IBM 3270 protocols.

At the heart of the AT&T office strategy is the 3B2 Model 600 machine, based on an 18-MHz version of the WE32100 chip that powers the 3B2 Models 300 and 400. The 18-MHz chip allows the Model 600 to run at 2.6 million instructions per second, which is about 2½ times as fast as the 3B2 Model 400.

The Model 600 can support 64 concurrent users and is set to be available for delivery in May at a price of $46,500. An industry-standard SCSI interface card will allow the attachment of up to 6.5G bytes of external storage, AT&T said.

AT&T also announced the following:

Double the ante

AT&T tops off 3B2 line with the Model 600

	MIPS*	[illegible] (M bytes)	I/O Bandwidth (M byte/sec.)	[illegible] of Users	Typical Number of Users	[illegible]
3B2/300	[illegible]	1 to 4	2	[illegible]	six to 10	$12,845 [illegible]
3B2/310	1.1	1 to 4	2	18	[illegible] to 14	$14,845 [illegible]
3B2/400	1.1	1 to 4	2	46	[illegible]	$20,845 [illegible]
[illegible]	2.6 to 4	4 to 16	4	90	25 to 64	$46,500

* Millions of instructions per second, according to AT&T claims.

CW CHART

- The $3,595 AT&T 495 laser printer for AT&T personal computers. The printer, which was built by Genicom Corp., features 300-dot resolution and 10 page/min. performance.
- A version of Unix System V, called Release 3.1, which has been optimized for international communications protocols. Enhancements include improved remote file-sharing performance and decreased response time for remote file access. The release should be available next month for $300 as an upgrade from Release 3.
- A $5,000 version of the Information Systems Network (ISN) software, Release 4.0, that supports extensive DEC connectivity through a high-level interface; a $7,500 remote concentrator for the data-switching system; and a $12,000 network management system called Starkeeper that runs on the AT&T 3B1.
- A Dataphone II 740 Acculink Multiplexer. The system multiplexes data and voice and supports Accunet T1 services. It combines up to 128 voice or data channels and should be available in June at prices ranging from $15,000 to $52,000.
- Starlan PC Servers, Models 310 and 400, priced at $16,600 and $29,500, respectively. The 3B2-based servers use 10-MHz WE32100 chips and offer PC access to Unix applications as well as shared printing and file services.
- A 3B2 Remote Management Package. Priced at $900, the software is said to allow a single 3B2 to manage a network of remote 3B2s.

Last week's wide-ranging announcement is only the first in a series of AT&T product introductions to be made this year, Cassoni said. By December, AT&T's product line is scheduled to include an Intel Corp. 80386-based workstation that will run both MS-DOS and Unix System V, as well as a modular minicomputer that will run a modified version of Unix. Meanwhile, AT&T said it plans to reduce the prominence of the older 3B2 and 3B15 systems. It started by cutting prices for those systems by 12% to 25%.

Cassoni claimed that AT&T's cause is furthered by the mounting number of Unix systems. He noted that 75% more System V licenses were sold in 1986 than in 1985. However, he admitted, AT&T had a market share of just 14% of all installed Unix machines.

"It is not true that people are not using the 3B computer line," Cassoni told those who questioned the market share at the press conference. To that end, he announced the appointment of a 500-person dedicated sales force as a "point of transfer" for new AT&T technology.

Gaps seen in AT&T's approach to MIS

New President Vittorio Cassoni emphasizes adherence to operating standards, connectivity

BY ALAN ALPER
CW STAFF

ANALYSIS

NEW YORK — AT&T's data networking strategy, as articulated by new Data Systems Division President Vittorio Cassoni, represents little that is conceptually different from past approaches taken by the communications giant, analysts and observers said last week.

Cassoni, who presided over AT&T's first major product rollout in a year, stressed AT&T's adherence to operating environment standards, multivendor connectivity and increased focus on sales support. The myriad of products introduced included a high-end addition to its Unix-based 3B2 minicomputer family, bridges to exchange documents with IBM and Wang Laboratories, Inc. systems and increased connectivity with Digital Equipment Corp. computers (see story above).

Under its new strategy, AT&T is addressing computer users in specific work groups and the ability to tie systems together with networking technology, Cassoni said. But analysts said AT&T still seems to lack the understanding required to sell MIS executives on the virtues of their strategy and technology. Cassoni's reference to MIS as the "production work group" bears this out, some analysts said.

Plagues and gaffes

AT&T's three-year attempt to gain entry to the computer business has been plagued by confusion over whether it is selling stand-alone computers or data networking solutions. Such positioning problems, in conjunction with marketing gaffes and a burdensome overhead, caused AT&T to lose $1 billion in the computer business last year alone, analysts estimated.

Cassoni, who said business exceeded budget during the first two months of the year, still has his work cut out for him, they noted.

Other analysts said the firm's data networking strategy represents little more than a rehash of earlier statements of direction. "Their strategy assumes that people want to buy AT&T computers and the only thing that was preventing them from buying AT&T computers was a lack of connectivity," said David Taylor, program director of office systems at the Gartner Group, Inc. in Stamford, Conn.

"What's going on better work over the next 18 months or the corporation is going to pull the plug anyway," one analyst who requested anonymity said. "AT&T has given Cassoni two years to move the Data Systems Division to profitability."

'Tough row to hoe'

AT&T strategy revolves around the belief that MIS can be sold on the virtues of Unix. While acceptance of Unix is growing, AT&T is only one of a number of major firms pushing the operating environment, many of whom have already made deeper inroads into the market.

"It's a tough row to hoe, noted Lee Doyle, an analyst with International Data Corp. (IDC), a market research and consulting firm in Framingham, Mass. "There's a lot of demand for Unix in the government and educational markets, but it's a lot less defined in the commercial market."

William Rich, an analyst with Northern Business Information in New York, said that although AT&T has failed miserably in attempting to sell stand-alone Unix systems, the firm's data communications strategy strikes right at the heart of IBM's weakness — networking — and sets the firm up as an alternative to DEC.

"DEC's proven that networking is the way to go. AT&T will have to try hard to emulate that," Rich concluded.

Yet to compete with DEC, AT&T will have to vastly improve the performance of its 3B2 processor line.

The new 3B3/600 is the first step in getting AT&T in sync with market requirements.

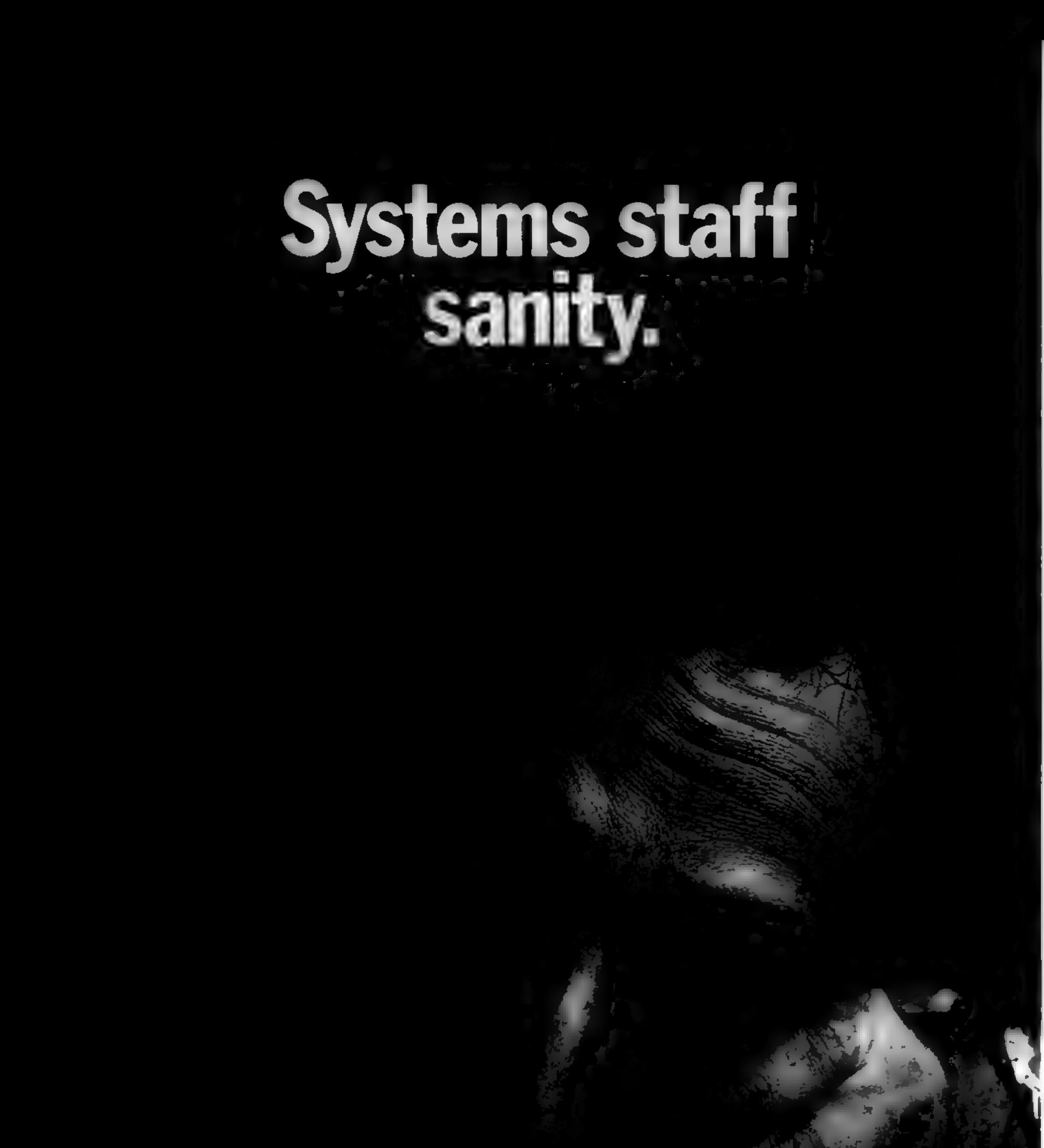
Playing by the rules

"They're in a tough position; they've been playing catch up since divestiture," IDC's Doyle said. "They never seem to catch up because the market requirements keep changing."

Beyond the substance of last week's press conference, AT&T seemed to have a more pressing agenda. Cassoni, who succeeded James Edwards as the chief architect of AT&T's computer strategy in October 1986, needed to increase AT&T credibility in the marketplace after years of tumult.

"Not much of what was announced was revolutionary," said Suzanne Purnell, an analyst at Dataquest, Inc. in San Jose, Calif. "It does appear that there was some image building there and something to do with Vittorio Cassoni and his presence at AT&T."

Computerworld *Midwest correspondent Jean Bozman contributed to this story.*



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XCOM6.2's role: the RJE giant killer

The XCOM6.2 applications suite boasts several advantages over IBM's Remote Job Entry (RJE), which up until now has been the main way to transfer bulk data from IBM and other systems, according to Mark Favelson, marketing manager for XCOM6.2 at Spectrum Concepts, Inc.

First, under RJE, the system requesting data must emulate a dumb terminal such as an IBM 2780, which limits the type of file formatting and requires that only the IBM mainframe host initiate file transfers. XCOM6.2 supports peer-to-peer communications, allowing either system to initiate the transfer.

Second, an RJE-based transfer program must include embedded commands that are specific to the device initiating the request, the host operating environment and the type of communications link. This adds both to the system overhead and to the programmer's job, according to Favelson. In contrast, XCOM6.2 makes use of the fact that LU6.2 is device-independent, able to use the same commands across a variety of communications links and computer hardware.

Third, where RJE emulators work only over remote, low-speed, analog lines, XCOM6.2 supports a wide range of connections including IBM's Synchronous Data Link Control, High-Level Data Link Control and Token-Ring network in addition to CCITT's X.25 and high-speed channel-to-channel interfaces — given that the device running XCOM6.2 supports any given connection.

Fourth, while RJE requires that an IBM mainframe be used as a go-between for all data transfers between non-IBM systems, XCOM6.2 allows direct data transfer among all of the systems it supports.

One current exception is the Digital Equipment Corp. VAX. Because DEC's current implementation of LU6.2 does not include PU2.1 support, VAX/VMS systems currently can only communicate with IBM mainframes via LU6.2.

While several vendors provide interface boards and software that implements LU6.2, such products are programmers' tool kits for developing LU6.2 applications, compared with XCOM6.2, which "you can install, turn on, and away it goes," Favelson said.

John R. Pickens, senior communications architect for Communications Solutions, Inc., said that while several companies have developed applications for LU6.2 internally, "I know of no commercial application that runs on LU6.2." If Spectrum Concepts has come out with one, "I'd be glad to give them the credit for being first," he added.

ELISABETH HORWITT

Early LU6.2

FROM PAGE 1

tion to computers from Wang Laboratories, Inc., Data General Corp., Stratus Computer, Inc. and Tandem Computers, Inc. A Spectrum spokesman refused to comment.

The XCOM6.2 products achieve two more firsts, the vendor claimed: LU6.2 communications applications that can interface with an IBM cluster controller and with IBM's VTAM mainframe network operating system.

IBM's existing LU6.2-based mainframe products reportedly interface with the CICS environment but not directly with VTAM.

This makes XCOM6.2 potentially useful to Travelers Insurance Co. in Hartford, Conn. Travelers is already using IBM's LU6.2 programs as the basis for applications that will provide IBM Personal Computer users with data base access within the CICS environment.

However, the insurance giant would like to be able to provide VTAM-based data access as well, according to Richard Boyle, assistant director of Travelers' computer sciences division.

There is an "obvious overhead" involved in retrieving records using "data base-style languages" associated with CICS, Boyle explained.

Besides improving response time, XCOM6.2's VTAM-based applications would permit Travelers to "store information and have it transferred exactly as I store it," Boyle said.

XCOM 6.2 applications can be invoked via a menu-based user interface or by other batch or interactive programs.

An XCOM6.2 program can be used to redirect a host spool file to any other computer with a destination address on the XCOM6.2 network, effectively replacing IBM's NJE product, according to Spectrum.

The XCOM6.2 PC program includes background processing software that takes care of communications functions in the background while an application runs in the foreground. The software will run on any PC-DOS system.

First-copy prices for XCOM6.2 are $9,500 for the IBM System/38 and DEC VAX 8000, $8,000 for the VAX 7000 series, $3,000 for the Microvax and $475 for the IBM PC. Commercial release is scheduled for June, with the exception of XCOM6.2 MVS, priced at $26,000, which will be released in May.

Batch file transfer alternatives

Remote job entry	XCOM6.2
Complex device-dependent commands	Simple device-independent commands
Remote, low-speed analog communications	Supports multiple network connections, including high-speed, channel- [illegible]
Dumb terminal emulation	Peer-to-peer
IBM host-initiated file transfer	File transfer initiated by any system
Must interface with VTAM through job entry system	Direct VTAM link

CW CHART

Expert system ported to Apollo

BY NINAMARY BUBA MAGINNIS
CW STAFF

CAMBRIDGE, Mass. — Palladian Software, Inc. announced last week that its Management Advisor package, an expert-system business application, has been ported to Apollo Computer, Inc. workstations, marking a first for both companies.

The announcement opens up Palladian's potential market by making the software package available on a general-purpose machine as opposed to the costly LISP engine. Apollo, traditionally a workstation vendor for engineers, scientists and other technical professionals, is branching out into the business, financial and commercial arena.

Palladian would have been handicapped if it continued offering its artificial intelligence application exclusively on LISP machines, according to Harvey P. Newquist III, editor of "AI Trends," a newsletter published in Scottsdale, Ariz., for the AI industry.

"There are probably only 6,000 LISP machines in the world, and the LISP market slowed down in 1986," Newquist explained.

Difference in price

The move to a nonspecialized workstation may make a big difference in price, noted John Sviokla, an assistant professor at Harvard Business School who monitors the AI market for useful business applications. But price is only part of the issue. "Their challenge is to get people to both understand and adopt the perspective of the Advisor. That's the challenge when you use any new tool," Sviokla said.

Competitive workstation vendor Sun Microsystems, Inc. is also seeking customers outside the traditional technical market. Sun recently announced that Morgan Stanley & Co., a New York-based brokerage firm, will purchase Sun systems for automated securities trading.

"Both Apollo and Sun have to look outside their traditional installed base to try to get new customers," observed Vicki Brown, program manager of technical computing for International Data Corp., a Framingham Mass.-based research firm. Management Advisor is the software supplier's new name for its Financial Advisor package, which was announced in March 1986, the vendor said. Advisor software costs $66,000 for a single copy; the cost plummets to about $10,000 for 30 copies and drops further to $5,000 for orders of 50 or more, the vendor explained. The package includes one year of free maintenance with paid support ranging from $5,000 for one copy to $1,000 per copy for 31 or more copies.

The base configuration required to run the AI package includes an 8M-byte memory, a 348M-byte disk and a runtime license for Common LISP, all of which costs $31,500.

Both vendors are hammering out details for jointly offered package deals, which may start in the $75,000 price range. These packages are to be announced later this year.

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New CPUs, micro spill from Unisys bag

BY STANLEY GIBSON
CW STAFF

NEW YORK — Opening up a grab bag of products, Unisys Corp. last week announced two V series small mainframes, a multiuser microcomputer based on the Intel Corp. 80386 microprocessor and links between former Burroughs Corp. and Sperry Corp. machines.

Unisys announced the connection of the former Sperry's IBM-compatible personal computers to the former Burroughs' microcomputer network and micro-to-mainframe connectivity across both Burroughs and Sperry product lines.

In addition, Unisys announced a so-called "semantic" relational data base offering and enhancements to a fourth-generation language.

The new offerings are "the first true Unisys products" and the first to bear the Unisys label, according to Unisys Vice-Chairman Joseph J. Kroger.

Kroger, who before the merger of Burroughs and Sperry was president and chief operating officer of Sperry, professed that the combined firm is stronger than either company was on its own. He said that all corporate consolidations are now in place and that no more are planned. However, he added, former Burroughs and Sperry sales agents will be increasingly trained in cross-selling the equipment of each former vendor.

The new V series models, the V 510 and V 530, double and quadruple, respectively, the performance of former Burroughs V 340 and V 380 general-purpose mainframes. Although the V 340 and V 380 hardware cannot be upgraded to the new processors, software written for the previous machines can be used on the new [illegible]

The V 510 includes a CPU with 20M bytes of memory, a data transfer module and an I/O cabinet. The memory can be expanded to 80M bytes. The V 530 includes 40M bytes of memory, a 40K-byte cache and two data transfer modules. The memory is expandable to 160M bytes.

The base price of the V 510 system is $950,000, and the base price of the V 530 is $1.77 million. The V 530 is set to be delivered in the fourth quarter of this year, while V 510 delivery is set for the first quarter of 1988. The V 510 can be field-upgraded to the V 530 system.

Infoexec, the semantic data management system, runs on Unisys A series and B5900, B6900 and B7900 mainframes.

"Relational technology captures items of information and joins them together through external means. In contrast, semantic data management captures data relationships as part of the data base," said William Maclean, program manager for systems software.

The data base management system will reportedly be available in September. Priced according to a tiered structure, license fees range from $570 per month on an A 2 model to $3,100 per month on an A 15 model. A five-year purchase plan is priced from $19,266 to $151,900.

Unisys also announced Release 13.0 of its Logic and Information Network Compiler II (LINC II), the former Burroughs fourth-generation language. The new version will feature the ability to download some application functions and data from a host system to workstations based on the former Burroughs' BTOS and Microsoft Corp.'s MS-DOS. LINC II Release 13.0 is priced from $14,000 to $250,000 and is slated to be available in the third quarter of this year.

Sets early stake in 386 game

NEW YORK — Unisys Corp. added to its B25 multiuser workstation line by unveiling last week the B38, based on the Intel Corp. 80386 microprocessor.

The B38 runs BTOS, the Burroughs multiuser, multitasking operating system, and as an add-on feature, the B38 can run Microsoft Corp.'s MS-DOS. Unisys Vice-President Fred R. Meier said a future version will run BTOS and MS-DOS and that steps will be taken to remain compatible with whatever 80386 standard IBM sets.

The B38, manufactured by Convergent Technologies, Inc., is available in two versions, one with a 10-MHz Intel 80287 math coprocessor. Both can expand memory to 4M bytes. The B38 supports up to 11 cluster workstations and runs twice as fast as the B28.

A base configuration of a B38 processor, display and keyboard, 1M byte of memory and 20M bytes of disk storage costs $8,375.

Unisys also announced Clustershare, which allows personal computers running MS-DOS to operate in a BTOS cluster with any member of the B25 workstation family.

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Printer hits 600-dot resolution

BY PEGGY WATT
CW STAFF

EAST HANOVER, N.J. — Varityper is set to announce next week what it claims is the highest resolution laser printer available commercially.

The printer supports Adobe Systems, Inc.'s Postscript page description language and is said to produce 600 dot/in. resolution, double that of most laser printers now available, according to Varityper and sources who have seen the system.

The VT-600 will be priced at $18,760 and is scheduled to be available in June. It will be sold by Varityper and through OEMs, according to Mike Turetsky, national sales support specialist.

The printer produces 10 page/min. and uses the Adobe Postscript raster-image processor, according to technical specifications from Varityper.

A Varityper spokeswoman said the VT-600 is based on a Motorola, Inc. 68020 microprocessor but declined to say what engine it uses, "at the manufacturers' request."

While the VT-600's crisper resolution may be of interest to businesses that use laser printers for office documents, the near-typeset quality is also aimed at internal corporate and professional publishers.

The VT-600 uses the Postscript protocol and accommodates Postscript and Varityper font libraries. Eight fonts in the Courier and Varitimes type families, as well as the Adobe symbol set, are available in read-only memory, according to Varityper's specifications. Varityper will redesign its entire library of 1,200 typefaces and release them 30 to 50 at a time during the next year, the vendor said.

Products bombard NCGA

But training, service issues draw lively talk at expo

BY ALAN J. RYAN
CW STAFF

PHILADELPHIA — The rollout of some 300 products marked the NCGA Computer Graphics '87 conference and exposition here last week, but longstanding issues were foremost in the minds of many attendees.

Computer graphics users converged upon 200 booths to see the products, including a three-dimensional display terminal from Prime Computer, Inc., which was developed with Silicon Graphics, Inc. and MIPS Computer Systems, Inc.

Targeting the vibrant market for Digital Equipment Corp. systems, Autodesk, Inc. announced the addition of DEC's Vaxstation 2000 and Vaxstation GPX workstations to its list of supported 32-bit platforms.

Both DEC and a limited number of Autocad dealers will distribute the VAX version of Autocad 2.6 for the workstations under the VMS operating environment. Shipments are slated to begin in the second quarter, and suggested price is $2,850.

Noticeably lacking were major announcements at the show from IBM, which recently announced an interface to the Graphical Kernel System (GKS) for users of its Graphical Data Display Management mainframe graphics system. The interface was developed by Uniras, Inc.

While many users attended the show to see the new products, those polled said they had other reasons for attending as well.

The users explained that their needs and wants have basically remained the same in an industry that is growing rapidly and that they want the vendors to meet those needs.

They said they still want faster equipment; better training, support and documentation; more input into what vendors add or change in upgrades and enhancements; more memory; increased system integration; smaller unit footprints; and, of course, lower prices.

"Users want good training," Gary Whittaker of Ford Motor Co. said during a technical session on what users want from vendors. He asserted that while training is often provided, users find it difficult to apply that training to real projects.

One area many users agreed they would like to see addressed by vendors is allowing users to help direct product enhancements, especially in graphics software. "User groups should be there at the design specification stage and should actually have to sign off before the code is written," Whittaker said.

Graphics standards and what they mean for users was listed by many as a top priority.

Members of the Technical Office Protocol (TOP) and the Manufacturing Automation Protocol (MAP) committees maintained that users want to know what type of graphics hardware and software they should buy and whether users will fare well if they follow standards.

Debbie Cahn of Boeing Computer Services pointed out that the base standards developed by the International Standards Organization, the American National Standards Institute and the Consultative Committee on International Telephone and Telegraph leave some loose ends.

"The user needs functional standards built on top of base standards to tie up the loose ends," she said.

The TOP and MAP committees support the GKS, and it will be included in TOP Version 3.0, she said. The application program interface includes GKS and will soon include GKS-3-D and Programmers Hierarchical Interactive Graphics Standard. Additionally, Cahn noted, the device interface, the computer graphics metafile, the computer graphics interface and the computer graphics extended metafile will all be considered for future versions of TOP.

Cadds line pumped up

BY ROSEMARY HAMILTON
CW STAFF

Computervision Corp. introduced the next generation of its computer-aided design and manufacturing (CAD/CAM) system last week and announced software enhancements for this workstation-based product line.

In announcements made at the NCGA Computer Graphics '87 conference in Philadelphia, the vendor said its personal computer-based design package, Personal Designer, is now available for the Compaq Computer Corp. Deskpro 386.

The Caddserver 34 is based on the Sun Microsystems, Inc. processor, which is based on the Motorola, Inc. 68020 chip with a 25-MHz clock speed. The Caddserver 34 will be available in the third quarter, Computervision said. Like the Sun system, it reportedly processes data at a rate of 4 million instructions per second (MIPS). Upgrade packages will be offered for users of the older system, the vendor said. Computervision will offer the new system initially as a network server. A stand-alone version is expected sometime in the fourth quarter.

A typical Caddserver 34 starts at $90,400. In addition to Release 3.2 of the Sun operating system, the system includes 16M bytes of main memory, a 515M-byte hard disk, a ½-in. tape drive, an Ethernet interface and a color monitor. The upgrade package will cost $35,000.

The vendor also introduced Tech Pubs II, a technical publishing software package consisting of two modules. The $7,000 Technical Documentor allows users to integrate Cadds 4X, Computervision's CAD/CAM graphics software, with text. It includes multitasking windowing capabilities and can be used for design and layout.

The $2,500 Engineering Notebook module allows users to maintain notes in a separate window. Comptervision said both will be available in the third quarter. The software is a joint effort between Computervision and Omnipage Corp.

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DEC factory push on overtime

BY ROSEMARY HAMILTON
CW STAFF

BOSTON — Digital Equipment Corp. continued its push for the factory systems market last week with an announcement that included an integration service along with a host of hardware and software offerings.

"This is a reinforcement of what's been going on — DEC's big push for the factory market," said Tony Friscia, president of Advanced Manufacturing Research Co. "It strengthens their overall position, which is already strong."

Services customized

Key to the announcement is DEC's plan to provide customization services. Integration of the various factory-floor devices is the most difficult challenge facing manufacturers.

By adding Manufacturing Systems Integration Services to its lineup of factory hardware and software, DEC is now providing a well-balanced solution, analysts said.

Last week's introductions numbered 18, one-third of which are versions of Microvax II and PDP-11 hardware that have been ruggedized for factory-floor environments.

The Industrial VAX (IVAX) 630, based on the Microvax II, starts at $32,615. It will also be offered as a complete system with DEC's Baseway software for $63,050.

The IVAX 630 is intended to collect data and control manufacturing operations.

With Baseway, which includes communications capabilities to link factory-floor devices to a computer, the IVAX 630 can serve as a cell host.

The Industrial VAX 620 is based on an RTVAX processor and was designed specifically for real-time applications, according to the vendor.

It is set to be offered in a diskless configuration for $11,330. In a disk-based system, it will sell for $23,930.

Offers Industrial PDP-11

DEC said it also plans to offer the Industrial PDP-11 for those installations that have been using PDP-11s for factory operations.

The industrial version will enable users to move their RSX-11-M-Plus software to the factory floor, DEC said.

Based on the MicroPDP-11/83, this product starts at $29,315.

All three industrial systems are scheduled for July availability.

Sealed versions of each system, intended for particularly harsh factory environments, are scheduled to be available in the fourth quarter this year, according to the vendor.

Pricing is not yet available on the sealed systems, the vendor said.

Also announced last week was Decscan, a controller with supporting software that will enable users to link certain factory-floor devices to Industrial VAXs, including all devices that support the Intel Corp. Bitbus open-architecture interconnect, the vendor said.

Decscan and Baseway software serve similar purposes, however, Baseway is specific to programmable-logic controllers. Decscan costs $3,000.

A Decscan software tool kit that allows users to write data acquisition and control applications was also announced and will sell for $2,600. Both Decscan and the software tool kit are expected to be available in July, the vendor said.

Enhancements to Baseway that will expand the number of devices it supports were also introduced.

Baseway currently supports programmable-logic controllers from Texas Instruments, Inc. and Siemens AG, in addition to those from Allen-Bradley Co. and Gould-Modicon.

Baseway has a starting price of $25,000, and the enhanced version should be available in July.

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This connection allows DEC users to access IBM mainframe power to run complex CAD pro-

CDC system crosses multivendor threshold

BY JAMES CONNOLLY
CW STAFF

NEW YORK — Control Data Corp., a company that clung to its niche markets during several years of financial trouble, last week acknowledged the need to deal with other vendors in a drive into new areas with its first departmental system.

The two models of the Cyber 930, announced at a press conference here, are aimed primarily at CDC's installed base of 900 organizations, two-thirds of which are concentrated in technical computing markets such as education and the petroleum and electrical power industries.

However, CDC officials said the 930, with a base CPU price of $59,900, will also key a drive for new users as the company targets 1,500 potential customers during the next few months. CDC emphasized price/performance benefits in the 930 and the ability of the Cyber 180 product line, including the 930, to coexist with other vendors' equipment or to support migrations from non-CDC equipment.

In addition, the announcements included enhancements of CDC's NOS/VE operating system with shells designed to allow users familiar with Unix and Digital Equipment Corp.'s VMS to continue programming in their own languages with NOS/VE coordinating the commands in the background. A new software product, Desktop/VE, allows use of an Apple Computer, Inc. Macintosh with a 930.

CDC introduced CDCNet Release 1.2, an enhanced version of its communications network with the ability to transfer files between CDC hosts and IBM mainframes running IBM's Network Job Entry. The company also announced plans to add to its Cyber 910-300 line of workstations, which are based on Silicon Graphics, Inc. machines, with the resale of a reduced instruction set computer introduced last week by Silicon Graphics, Prime Computer, Inc. and MIPS Computer Systems.

'Earned our stripes'

"We are not arrogant enough to believe that CDC will be a total systems solution in customer environments today, except in certain privileged circumstances where we've earned our stripes over the years," said Gil Williams, CDC vice-president of computer systems.

"There is a lot of equipment from different manufacturers out there. While we certainly have prestigious customers, we don't enjoy the huge customer base that some of our larger competitors do, and it is not our style to demand a single-source solution. Our aim is to help all these multivendor machines work better together in the customer's environment," he said.

The entry-level 930-11 is available now and, according to CDC, is rated at 1.8 million instructions per second (MIPS). That system can be upgraded through a microcode change to a 930-31, the company said. CDC rated the 930-31, set to be available in August, at 3 MIPS.

A 930-11 CPU with 8M bytes of memory and a one-year warranty costs $59,900. A 930-11 entry-level system with five peripheral processors, printer, tape drive, 828M bytes of disk storage, 16 communication lines and annualized basic software costs $156,016. The 930-31 CPU starts at $125,900.

The pricing is more aggressive than one financial analyst expected. Jonathan Fram, of New York brokerage house Bear, Stearns & Co., said CDC's customer base should be interested in the 930 but that in pursuing new users, CDC — like other companies — faces "quite a bit of entrenchment" with other vendors. "They have done well to cast the latest materials technology into their machine architecture," he added.

TWO GOT ALONG

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CPU, system target forms integration

BY JAMES CONNOLLY
CW STAFF

SAN JOSE, Calif. — Plexus Computers, Inc., a multiprocessing vendor that has focused on the commercial MIS market rather than the scientific computing arena, is expected to introduce today a high-end CPU and a series of products designed to integrate diverse forms of data and business documents.

The Plexus Extended Data Processing (XDP) system reportedly merges its Unix-based processors with IBM Personal Computer AT-compatible microcomputers, optical and magnetic storage systems, an Ethernet local-area network, document scanners, optical character readers, facsimile machines and data base software.

XDP was designed to capture, store, catalog, manipulate and retrieve information in various forms, including text, alphanumeric data and images.

"The Plexus XDP system is a breakthrough in commercial data processing, providing a solution to complex data processing problems that could never be managed by traditional computer systems," said Paul Klein, Plexus president and chief executive officer.

"No other commercial computer integrates so many previously incompatible hardware and software components or integrates so many various types of data," he added.

XDP is built around the new Plexus P/95 or the previous high-end P/75 CPU in a production environment or a P/55 CPU in a development system. It also features a Cygnet Systems, Inc. jukebox-style optical storage facility.

Software includes the XDP Dataserver package, which is based on AT&T Unix System V and application development modules. The XDP Workstation software operates under Microsoft Corp. Windows and Microsoft MS-DOS 3.1 and features a library of mixed-mode data manipulation routines and an extended SQL processor.

The P/95 is based on 25-MHz Motorola, Inc. 68020 microprocessors, rather than the 12.5-MHz 68020 used in the P/75. In addition to its use in XDP, the P/95 is offered for departmental applications. It provides up to 48M bytes of memory and 6.7G bytes of magnetic disk storage and supports up to 128 users.

The P/95 costs $57,200 with 4M bytes of memory, 16 ports, 142M bytes of disk storage and a cartridge tape drive. Prices for XDP range from $75,000 for a P/55-based developmental system to more than $1 million. A typical production system based on a P/75 or P/95 costs $150,000 to $200,000 with four workstations, a scanner, software and a laser printer.

ADR training tool on block

BY ALAN ALPER
CW STAFF

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) is seeking a buyer for its computer-based training system, ADR/PC Adroit, *Computerworld* has learned.

Adroit, which has been on the market for three years, enables organizations to develop and conduct courses on a broad range of software using a personal computer. The system also supports the integration of videotape and disk programs.

ADR President Dennis Strigl said the Ameritech subsidiary is interested in selling Adroit because it no longer fits with ADR's product strategy, which includes programming languages, relational data base management systems and programmer productivity tools. "[Adroit] requires a different kind of buyer and marketing plan," he noted.

ADR said a number of organizations, which it declined to identify, had expressed an interest in acquiring Adroit. During the course of these discussions, ADR said, it will continue to enhance Adroit. "We remain firmly committed to educational programs for our own clients," ADR said in a prepared statement.

Potential buyers

ADR declined to say whether any offers have been made for Adroit. One source said the product was shopped around the industry but no offers were made. In addition, the source said a group of former employees is interested in purchasing the system, although a formal offer has not yet been made.

"We're not willy-nilly holding the product out to the market and saying, 'Come take it off our hands,' " Strigl said. "We're being very methodical about finding a buyer and will talk to those who will continue to support and enhance the system."

ADR said about 110 customers are using Adroit and that the decision to sell Adroit is an isolated incident. The firm added that it does not expect any other major changes in its product line or overall strategic direction.

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Gould claims minisuper hits 96 MIPS, draws bead on VAX

BY NINAMARY BUBA MAGINNIS
CW STAFF

FORT LAUDERDALE, Fla. — Gould, Inc. last week introduced two entry-level members of its new NP1 family of minisupercomputers, claiming that the high-end machines, slated to be delivered next year, will operate at up to 96 million instructions per second (MIPS) and 300 million floating-point operations per second (MFLOPS).

The 40 possible configurations of the NP1 represent Gould's initial offering in a planned family of N-Processor Line (NPL)-compatible systems targeted at the computer-intensive real-time scientific and engineering markets, the vendor said. Because the machines can house large amounts of memory — up to nearly 4G bytes on the high end — Gould will also sell the NP1 in data-acquisition and data base systems and large multiuser environments, the company said.

The entry-level single-processor NP1, the Model 110, reportedly can be configured with up to 512M bytes of memory. The dual-processor Model 120 contains two CPUs and 256M bytes of memory and can be expanded to 512M bytes using 1M-byte chips. Both systems are scheduled for delivery by September.

Gould said that two, three or four system buses can be linked together to configure systems including four, six or eight CPUs, respectively. The eight-CPU Model 480 will allow for 1G byte of memory using 4M-byte chips, the vendor said. The high-end NP1 is slated for delivery by early next year.

The NPL processors can link to Gould's superminicomputers, the real-time Concept/32 and Selconnection and the Unix-based Powernode systems, according to the vendor.

One-on-one with VAX

Gould is pitting the minisuper against the Digital Equipment Corp. VAX 8800, a 10-MIPS processor. "They want to say to all those people thinking of buying an 8800, 'Here's an alternative product that's more powerful and comparably priced,' " said Sandy Gant, vice-president of small systems research for Infocorp, a Cupertino, Calif.-based market research firm.

"It is approaching Cray performance at half the price at the top end," Gant added, referring to supercomputers from Cray Research, Inc. "If a start-up comes out with a hot new box, they would have to align themselves with a systems supplier. Gould already has distribution channels in place, an installed base and customers."

There are no NP1-installed beta-test sites, but Purdue University's Electrical Engineering Department is slated to receive the first minisuper, a Gould spokesman said.

"The first thing we'll do is make it work. We have a reputation for breaking machines," observed George Goble, a Purdue senior computer systems engineer. "Gould has sent us machines in the past. We found bugs and worked Gould hard [to rectify them]."

Goble said he has high expectations for the 100-MIPS machine, explaining that the university will first work with a two-processor system that offers about twice the performance of the Gould 9080 supermini. "We've noticed that once we have over 100 users with a 16M-byte computer, we start paging and probably run two to three times slower when paging is in process," he added. With increased memory on the NP1 system, Goble said, he expects paging will not be necessary, which will boost performance two to three times.

"I think it's a major, positive announcement for the company as a whole," reported Julian Menear, an investment analyst for the Pershing Division of Donaldson, Lufkin & Jenrette, Inc., a New York-based brokerage investment banking firm. "This system is offering supercomputer power and reliability at a minicomputer price. It's a significant achievement."

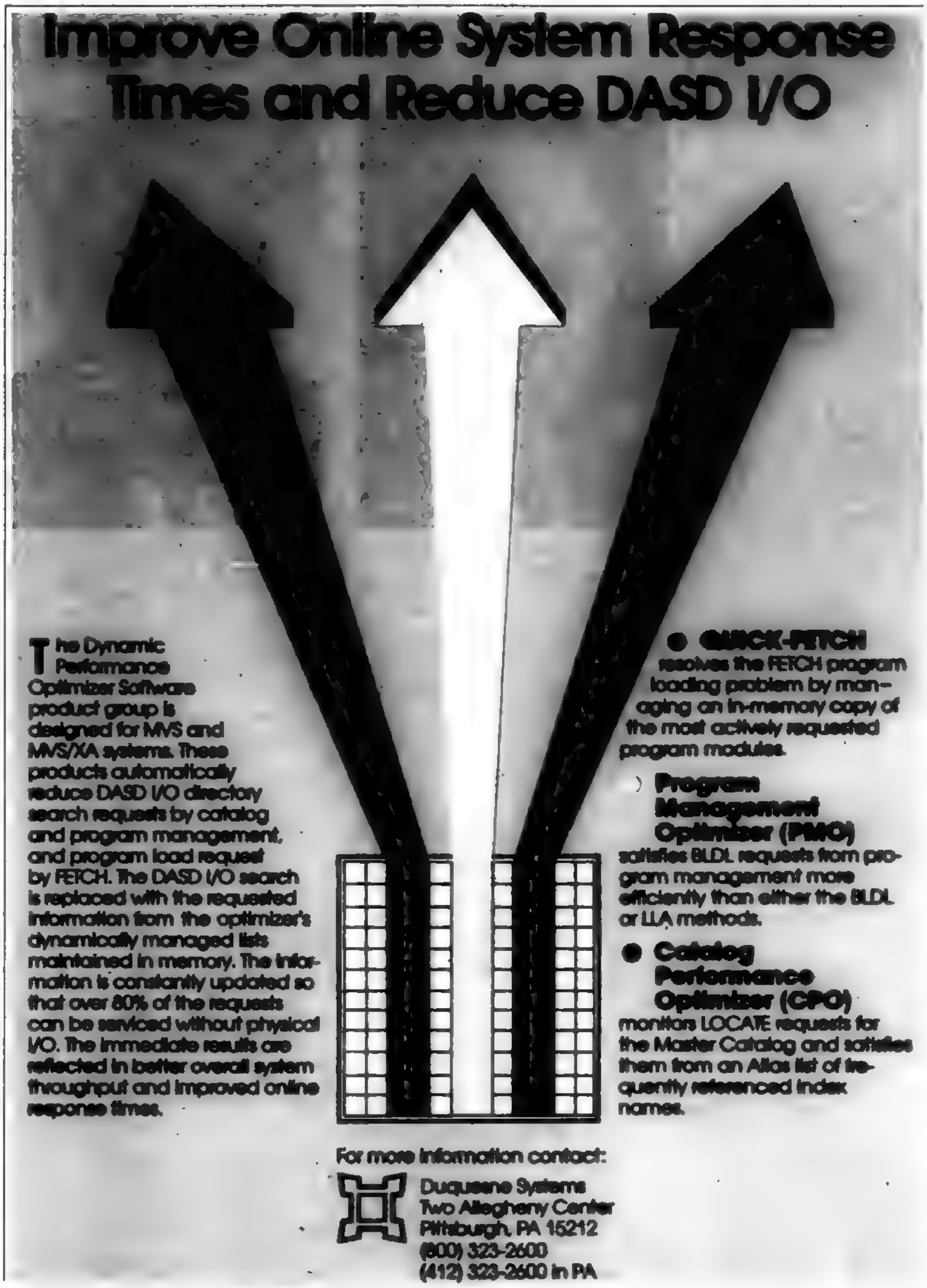
Sizable sales eyed

Menear predicted NP1 sales will reach $75 million next year and account for approximately one-tenth of Gould's total sales, or about 20% to 25% of computer revenue.

The NPL computers will run on Gould's UTX/32, a compatible multiprocessor extension of the Unix operating system used on the firm's Powernode machines.

The NP1 Model 110 with 64M bytes of memory will reportedly list at $395,000. The dual-processor Model 120, with 256M bytes of memory, is slated to cost $595,000. The high-end 96-MIPS 320-MFLOPS NP1/Model-SP 480, which can service more than 1,000 users simultaneously, is scheduled to cost $2.9 million, Gould said.

The configuration will include eight CPUs, 1G byte of memory with an arithmetic-accelerator scientific processing option and the UTX/32 operating system. Additional memory is set to be priced at $64,000 per 64M-byte module and $32,000 per 16M-byte module.



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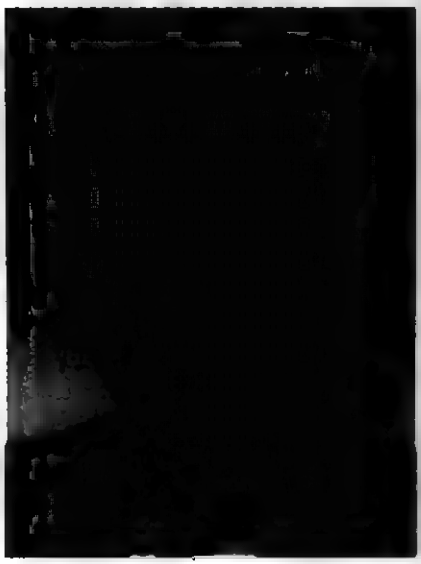

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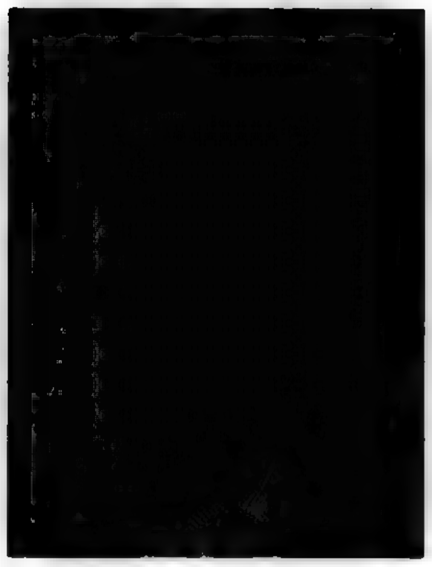

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Product parade to spice show

Everything from gateways to satellites will be unveiled at Interface '87

BY DONNA RAIMONDI
CW STAFF

LAS VEGAS — Interface '87, opening today, will be the setting for a number of product announcements ranging from modems to satellite systems.

Among those expected announcements are the following:

- Teltone Corp. is scheduled to show two additions to its data-over-voice products. Tellan is a 1M bit/sec. local-area network that transfers data simultaneously with voice on the existing telephone wiring. Tellan costs $324 per port, or $13,960 for a typical 43-port system.

Teltone will also release its DCS-3B data-over-voice multiplexer, an extended speed and range version of its data-carrier system for transmission of asynchronous data at 19.2 bit/sec. DCS-3B has two circuit cards that multiplex and demultiplex the data carried above the voice band. It costs $17,734 for a typical configuration of 48 channels, or $369 per channel.

- Microtel, Inc. is expected to release its VSAT satellite system, Spacetel DS2100, for communication of large, dispersed data networks.

Spacetel is said to transmit and receive voice and data communication. Distantly located Spacetel terminals provide communication links to one another via leased satellite circuits. The terminals interface with voice and data equipment or public and private networks.

- Emulex Corp. plans to introduce its synchronous serial dial-line modem. The HF144, with a maximum data rate of up to 14.4 bit/sec., and the HF96, with a maximum rate of 9.6 bit/sec., cost $355 and $255, respectively.

The half-duplex modems are said to be acceptable in any dial-network application in which fast one-way transmission with occasional line turnaround is needed.

- General Data Comm Industries, Inc. is expected to show a line of desktop modems — the Desktop 201, 202, 208 and 9600. The modems make extensive use of custom very large-scale integration devices and have switchable options and built-in diagnostics, according to the vendor. They range in price from $400 to $2,000.
- Paradyne Corp. plans to announce its Analysis 6510, a network management system that offers network diagnostics, control for Paradyne modems, multiplexers and digital transport products, reporting functions and network administration. The system is reported to support up to three operator consoles, two system printers, 150 diagnostic ports and 2,000 devices. Entry-level price is $21,250, which includes a controller, console and printer.

Paradyne is also scheduled to release its 3400 series of network diagnostic modems. The $8,900 Model 3450, with 14.4K bit/sec., and the $11,500 3470, with 19.2K bit/sec., have two-channel buffered time-division multiplexers, analysis network management diagnostics and automatic call-and-answer dial restoral. The modems support point-to-point and multipoint tail circuit applications.

- Canoga-Perkins is slated to introduce its Model 3124 T1 voice and data multiplexer for both short- and long-haul applications. The unit is Canoga-Perkins' first entry into the twisted-pair four-wire T1 marketplace. It costs between $7,000 and $15,000, depending upon configuration.
- Okidata is set to release its 9600 bit/sec. syncronous modem for use on dial-up or dedicated telephone lines. The $1,495 CLX96DP complies with CCITT V.29 requirements for 9600 bit/sec. transmission and meets Federal Standard 1007 for government applications.
- Telematics International, Inc. plans to debut its Series 200 Programmable Communications Processor (PCP) for 10 to 34 communications ports. The $15,000 PCP provides access to Telematics' Net 25 packet-switching networks.
- Adacom Corp. is expected to show Adaprint/PC, a personal computer interface board that allows IBM 3287 emulation on a variety of ASCII printers. The board costs $790.

Adacom also plans to announce its LG-708 local-coaxial gateway that provides remote micro-to-mainframe access and IBM 3270 connectivity into existing local and wide-area networks and private branch exchanges. The LG-708 costs $468 per port and can connect up to 16 devices.

- Performix Software Corp. is scheduled to release the Network Performance Expert (Net/PX) software for performance analysis, capacity planning and mapping of synchronous and asynchronous data communications networks. The package runs on an IBM Personal Computer or compatible system running IBM's PC-DOS 2.0 or higher with a minimum of 256K bytes of memory and a hard disk. Net/PX requires two classes of data — a description of the network topology and a description of the message traffic. The single-copy license costs $3,800.
- ISC Datacom plans to announce two radio frequency modems: The 19.2K bit/sec. Model 1019 and the 56K bit/sec. Model 1056, both of which include menu-driven interfaces for control and monitoring as well as local and addressable remote control of frequency, power, format and diagnostics. The 1019 costs from $1,695 to $1,870, depending on frequency. The 1056 costs from $2,190 to $2,365.

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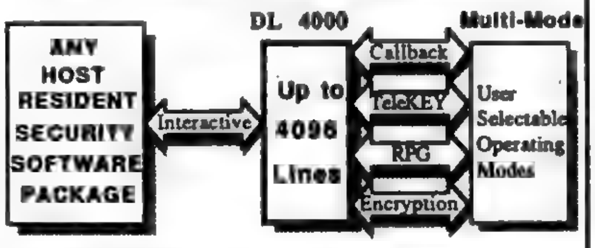
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Tool spans Unix-Ethernet gap

BY DONNA RAIMONDI
CW STAFF

SIMI VALLEY, Calif. — Micom Systems, Inc. last week announced a networking hardware and software package that reportedly allows Unix System V Release 3 users on Intel Corp. 80386-based personal computers to directly connect to Ethernet.

With the 80386 system and Unix, users of the $1,390 Micom NP622 networking package will have the basic tools to do development for applications that are immediately networkable, according to Gabe d'Annunzio, who is vice- president of marketing at Micom-Interlan, Inc., the Boxborough, Mass., Micom subsidiary that developed the product.

The product consists of the NP600 protocol processor board, Excelan Corp.'s Transmission Control Protocol/Internet Protocol (TCP/IP) software, a software license, documentation and an array of hardware for installation.

Team effort

Micom worked in collaboration with Interactive Systems Corp. in Santa Monica, Calif., the company selected by Intel to adapt AT&T's newest Unix version for 80386-based systems. "Our collaboration ensures that Interactive Systems' port of Unix is automatically able to talk on Ethernet, because the Streams driver to our network controller is built into the port," d'Annunzio said.

The Streams feature of Unix allows users to write customized networking or other code into the standard Unix software, according to Micom's Joseph Mannas, senior product manager for Unix System V products.

"You plug our NP600 protocol processor board into the 80386, load the TCP/IP protocols on and then you are on the Ethernet. Unix automatically knows how to talk to the board," d'Annunzio said.

Connection a first

Direct Unix connection to Ethernet was not possible before this time, said Bruce Kin Huie, industry analyst at International Data Corp. (IDC), a Framingham, Mass.-based market research firm.

"This further integrates Unix processors into an Ethernet environment," he said. "They are giving the capability for direct connection, and the OEMs they sell to will bundle the product with existing processors, thereby making it readily accessible for end users to tie into Ethernet."

This will be transparent to the end user, who will not have to write customized code to connect to Ethernet as he would have had to before, Huie added.

Release 3 of Unix is the first truly networkable operating system because of the Streams capability, d'Annunzio noted.

Because the Micom controller supports the TCP/IP protocol, the Unix systems on the network can talk to other Unix systems and to non-Unix systems as well.

"For example, if there was a Digital Equipment Corp. VAX on the network running VMS and it supported the TCP/IP protocols, it would be possible for files to be transferred between the 80386 and the VMS system, because they both share the same protocols," d'Annunzio said.

"There are different ways of supporting TCP/IP," IDC's Huie said. Users will have to know which versions the company uses of TCP/IP, as all versions do not tie in together, he concluded.

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EDITORIAL

Data laissez-faire

The fact that the dirty politics of Irangate have played a role in the Reagan administration's backing off its data security policy is proof positive of the capriciousness and ill-conceived nature of that policy.

Moreover, this politically inspired flip-flopping is a scathing indictment of any administration's ability to set such national mandates without having to first consult with Congress or the private sector, despite the potentially profound effect of such policies.

To be fair, it should be noted that pressure from Congress and the private sector did have something to do with the administration's change of direction regarding the computer security policy.

But clearly it was the refusal of former National Security Advisor John ('Thou Shalt Take the Fifth') Poindexter to answer a congressional committee's questions about the computer policy that provoked the reversal. His lawyer said such answers might relate to Poindexter's role in the Iran arms-sale fiasco.

All this being said — or not said, in Poindexter's case — the question must be addressed as to just what role the federal government should play in setting such policies as access to U.S. data bases.

To be certain, the unilateral action attempted by the executive branch of the government under the guise of national security was terribly flawed. Categories of what the government considered highly sensitive data were far too broad.

It was reminiscent of the Reagan administration's attempt a few years ago to include the Apple II on the list of hardware banned for sale to the Soviet Union.

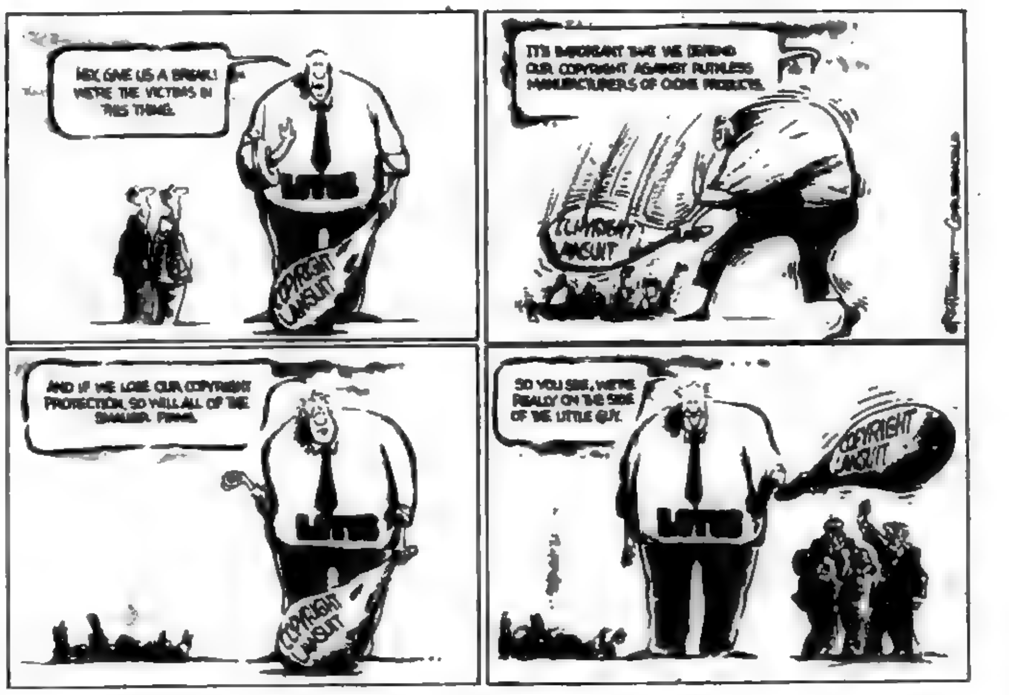
In both cases, input from the private sector could have shed much light on what should be rational exclusionary policies. But the only group the administration listened to was the military.

For this reason, it is encouraging to see the reduction of the role of the military in such policy setting, vis-a-vis the diminished role of the National Security Agency in shaping such policy.

FAR AND AWAY, we favor the approach to data security policies proposed by Rep. Jack Brooks (D-Texas). His proposed Computer Security Act would place considerable authority for developing and maintaining security standards in the nonmilitary sphere in the hands of the National Bureau of Standards.

The bill would also leave a considerable chunk of control in the hands of the military and the NSA — but control only of the computer and communications systems operated by the military and the intelligence agencies.

In other words, the administration that promised to keep government off the backs of the people should do exactly that and stop meddling in private-sector affairs, the sanctity of which the military can have such reckless disregard.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LETTERS TO THE EDITOR

CICS response time

In response to your "Netspy vs. Mazdamon" product face-off [CW, Feb. 2], there are several technical reasons CICS system programmers do not want to implement definite response in CICS (IBM recommends against it for large network shops). When definite response is turned on in CICS, it means that CICS will hold overhead resource until it receives a reply (from VTAM) that the control unit has actually received the outbound message.

Another issue involves the way CICS handles outputs for transactions. It is common for CICS to issue more than one output to a terminal per transaction; the second output is a null buffer used to change the flow of direction.

In this case, definite response in CICS means that the Change of Direction indicator or End of Bracket, which actually restores the keyboard, will not be sent until a response to the previous output is received back at CICS, which obviously means that the user's response time will suffer. Netspy's FORCEDR feature for CICS allows users to measure network response time without incurring any CICS overhead.

Two major network performance issues that are not discussed but which have been addressed by Netspy are the following:

First, since multiple session management products allow a user to interact with up to 16 different sessions at the same time, the ability to measure true end-to-end response time is destroyed. In early 1986, we started working with several of the major vendors of these products. As of October 1986, we have actually had a Netspy/Tele interface in production.

The second issue applies only to Netspy. Netspy's objective has been to bridge the void between raw data collection and an "expert" system.

As of September 1986, Netspy evaluates and reports on how applications design can adversely affect network performance. This adds a new dimension to the quality of information available to network personnel.

Peter J. McLaughlin
President
Chicago-Soft Ltd.
Chicago

This week in history

March 28, 1977
Judge David N. Edelstein upholds Itel Corp.'s charges that IBM attorneys harassed and intimidated the company to obtain documents for the *U.S.* v. *IBM* antitrust trial and denies an IBM motion requesting additional Itel documents "in light of the conduct of counsel for IBM." The Department of Justice eventually dropped the suit in 1982.

March 29, 1982
As nearly a million people watch and cheer, the space shuttle *Columbia* roars into orbit. Its third and longest space mission involves the heaviest use of computers and data processing to date. During the landing, the shuttle's astronauts will for the first time turn over command of the ship to the on-board computers.

No thanks to SQL

I agree with Barry Randall's letter to the editor, "Language factions" [CW, Feb. 9]. I have used Relational Technology, Inc.'s QUEL for three years and recently reviewed IBM's Structured Query Language because it is "the standard."

There are areas where QUEL is superior to SQL. Having been a Cobol programmer for 10 years, I am an advocate of good standards. I do not believe SQL is a good standard, but it is "the standard." Too bad the standard was set so quickly. As long as Relational Technology will support and enhance QUEL, I will be in no hurry to switch to SQL and make my job more difficult. Thanks, IBM, for the relational concept! No thanks for SQL!

Greg Collver
Manager/Programmer
Josephine County
School District
Grants Pass, Ore.

DDM, DBMS differ

The article, "DDM holds distributed DBMS key" [CW, Feb. 23], is inaccurate in its characterization of IBM's Distributed Data Management architecture as the basis for a distributed data base management system. There is a considerable difference between managing data and data base management. DDM is not a distributed DBMS. It is a way to distribute access to data. However, a distributed data base is a future consideration for the Distributed Data Management architecture.

Charles B. Holleran
Director
Communications Operations
IBM
Rye Brook, N.Y.

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- 65 Public Utility/Communications Systems/Transportation
- 70 Mining/Construction/Petroleum/Refining/Agriculture
- 80 Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85 Computer Service Bureau/Software/Planning/Consulting
- 90 Computer/Peripheral Dealer/Distributor/Retailer
- 75 User Other ______________
- 95 Vendor Other ______________ (Please specify)

2 TITLE/FUNCTION (Circle one)

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- 19 Vice President, Asst. VP
- 21 Dir. Mgr. Suprv., IS/MIS/DP Services
- 22 Dir., Mgr. Suprv. of Operations, Planning, Adm. Services
- 23 Dir. Mgr. Suprv. Analyst, of Systems
- 31 Dir. Mgr., Suprv., of Programming
- 32 Programmer Methods Analyst
- 36 Dir. Mgr. Suprv. OA/WP
- 38 Data Comm. Network/Systems Mgt.

OTHER COMPANY MANAGEMENT
- 11 President, Owner/Partner General Mgr.
- 12 Vice President/Asst. VP
- 13 Treasurer Controller, Financial Officer

ENGINEERING
- 41 Engineering, Scientific, R & D, Tech. Mgt.

SALES
- 51 Manufacturing Sales Reps., Sales/Mktg. Mgt.

OTHER PROFESSIONALS
- 60 Consulting Mgt.
- 70 Medical, Legal, Accounting Mgt.
- 80 Educators, Journalist, Librarians, Students
- 90 Others ______________ (Please specify)

3 COMPUTER INVOLVEMENT (Circle all that apply)

Types of equipment with which you are personally involved either as a user, vendor, or consultant.
- A. Mainframes/Superminis
- B. Minicomputers/Small Business Computers
- C. Microcomputers/Desktops
- D. Communications Systems
- E. Office Automation Systems
- F. No Computer Involvement

3317-8713

AI, Mozart and the thermos

Solving expert system dilemmas with an 'Average Joe' system

ASHLEY GRAYSON

The word in the industry is that when a computer company gets in trouble and starts losing money, it claims to be in the artificial intelligence business.

This cynical observation may be correct, but why should the payback to artificial intelligence companies be so thin? Is it because AI is a great mirage that can be pursued but never caught, or that AI is the label for anything that is hard to do?

Serious AI researchers keep shooting themselves in the foot by redefining the term to refer to whatever doesn't work — yet. But simultaneously, they avoid areas in which they could succeed gloriously without much effort.

The problem is that so many smart people work in AI. They are the ones who are always looking for challenging things to do. Of course, only the most undeveloped areas will appeal to such researchers. What they are doing and why will have to be explained to us mortal folk, which increases the cost to companies attempting to market the results.

COGITO ERGO... HUH?

Encoded wisdom

Consider expert systems. The goal here is to capture the wisdom of a highly skilled expert by encoding it in a computer program. The program can then advise a not-so expert on the critical topic, giving him the benefit of the expert's knowledge without the expert being present. Since most of the attempts have undertaken arcane subjects, success has been hard to achieve.

The reason seems twofold: First, not only is becoming an expert on a subject time-consuming and difficult, but knowledge of technical subjects rapidly becomes obsolete unless it is constantly updated. Semiconductor engineers, for example, can only learn useful skills on the job.

Second, an expert becomes a target for attack. The key in any legal trial is to discredit the other side's expert witness. The typical American response to a lofty opinion is, "Says *who*?" It is human nature to look for the exception that will invalidate the expert.

It's also expensive to hire an expert system. People accept entry-level jobs when they graduate from school and earn more as their experience grows on the job. A typical expert system asks for a starting salary equivalent to almost a half million dollars a year because it knows a lot about a special topic. How long would a human expert have to search for a position with such a pay package?

I propose two solutions to the Expert System Dilemma. First, to get the cost down, let's produce the Average Joe System. Average Joe isn't an "expert," but he's cheap and eager. Consider the counter person at the burger chain. This individual doesn't know everything about the hamburger industry, but he or she can take your order and make change and maybe even smile. Average Joe will be the computer equivalent.

What should Average Joe know? A small story will explain: Three construction workers sat down to lunch on the steel girders of a skyscraper they were building. They started talking about the world's greatest inventions. The first said he thought the light bulb was the greatest invention. "Without the light bulb, we couldn't do any work at night except by candlelight, and can you imagine trying to find the way home without streetlights?"

The second disagreed. "No, it's the wheel. Without the wheel, we couldn't have wheelbarrows or backhoes or cars or trains or anything! Day or night, we'd have to walk!" he said.

"No, no," the third countered, "It's the thermos bottle."

"The thermos bottle!" cried the other two. "What's that got to do with it?"

"Well," replied the third, "it's artificially intelligent. It keeps your coffee hot and your lemonade cold. How do it know?"

Like the thermos bottle, Average Joe should be operable by anyone who can pour coffee and should do what is appropriate to the situation. It will be easy to hire, work cheaply (for awhile) and learn on the job — and perhaps even smile.

Dialogue extruction

My second solution to the Expert System Dilemma is to recreate experts who are no longer available to us. The latest developments in AI indicate that while it is difficult for an expert to describe how he reasons, inference programs can deduce his methods, given sufficient examples. The inference program then develops the expert system program, bypassing the interview techniques used in dialogue extraction.

Surely we have enough works of Mozart to test the inference theory. Mozartian composition obeys certain rules. His creativity was tested in how he applied or broke the rules. If an inference approach can compose mock Mozart that is as pleasant to listen to as the original, we have a program that can earn royalties.

Likewise, we can draw on extensive writings of Jefferson and Lincoln to develop a potentially valuable presidential adviser. I'd give an extra buck in my income taxes if I thought such an expert system could provide Thomas Jefferson's insight to the president. Wouldn't you?

Grayson is the founder of ADG, a San Pedro, Calif.-based organization that develops sales tools and programs for high-technology companies. Having spent 11 years marketing large systems for Digital Equipment Corp., he now works extensively with IBM-compatible micros.

Debunking the myth of relational systems

C. J. DATE

The relational performance myth has finally been exposed for what it is — a myth. A genuine relational data base management system (DBMS) has finally demonstrated transaction rates equal to or better than the rates of the fastest nonrelational DBMS — rates in the hundreds or even thousands of transactions per second.

Benchmark tests of the new Tandem Computers, Inc. Nonstop SQL DBMS, conducted by Tandem and audited by the Codd and Date Consulting Group under contract to Tandem, measured transaction rates of more than 200 transactions per second. This figure easily puts Tandem's Nonstop SQL in the same league as typical high-performance nonrelational systems such as IBM's IMS Fast Path.

Furthermore, the Tandem transactions were conventional application programs, written in a mixture of Cobol and SQL — no special coding tricks were used, no SQL function was sacrificed and no low-level assembler language programming was necessary. The 200 transactions per second were achieved on a normal Tandem configuration. That figure should scale up to more than 1,000 on a larger system, with a theoretical limit of many thousands on the maximum possible configuration.

The transaction used for the benchmarks was the well-known debit/credit transaction, the de facto standard. Debit/credit is derived from the banking industry and is widely accepted as a typical transaction. In other words, the results are not measurements of an artificially simplified or tailored work load.

Why are these results so significant? The answer is simple: The last barrier to the acceptance of relational DBMSs in the commercial world has finally been removed. Relational data base now must be the technology of choice for all application areas — not only those in which it has traditionally been strong, such as ad hoc query, but now also performance-critical areas, such as on-line banking, in which performance requirements have previously been prohibitive.

The relational model was originally proposed in 1969 by E. F. Codd. During the 1970s, there was dramatic progress in the research world; many prototype relational systems were built, and many fundamental data base problems were solved.

By 1980, the first relational products appeared. However, most of those early products concentrated on end-user facilities, such as ad hoc queries. While the advantages of relational systems — usability, flexibility, data independence, productivity, ease of prototyping and so on — were widely recognised and accepted, the fact is that relational systems did not at that time provide the kind of performance needed for high-volume production applications. And some people claimed they never would. Here are typical remarks:

- "Practically speaking, relational systems can handle far less data and far less processing than operational systems." (William Inmon, CW, Oct. 1983.)
- ". . . relational is inherently slow." (Frank Sweet, *Datamation*, July 1984.)
- ". . . [nonrelational] and relational DBMSs are working toward different [and irreconcilable] design objectives — performance vs. ease of ad hoc use." (Hugh Ryan, CW, Sept. 1984.)
- "Relational data bases are powerful and flexible but are slow performers." (Bao Nguyen, CW, Sept. 1985.)

The truth is that there is absolutely nothing in the relational model that precludes excellent performance. However, it is also true that to achieve good performance requires skilled and careful work on the part of the DBMS designers and implementers.

By contrast, to achieve good performance in a nonrelational system requires skilled and careful work by DBMS users (data base administrators and application programmers). This fact explains why nonrelational systems require such a high investment in trained personnel to use and maintain them.

Now, people knowledgeable in relational technology have known these facts for years; the arguments that relational systems could never perform were always basically nonsense. But the truth did need to be demonstrated in a realistic environment; in other words, someone needed to show that a practical, commercial, relational DBMS could actually achieve production-level transaction rates on genuine, realistic applications.

Now, at last, someone has. The relational performance myth is finally debunked once and for all. It is a milestone in data base history.

Date is an independent author, lecturer and consultant specializing in relational data base technology. He is co-founder, with E. F. Codd, of The Relational Institute and the Codd and Date Consulting Group, both located in San Jose, Calif.

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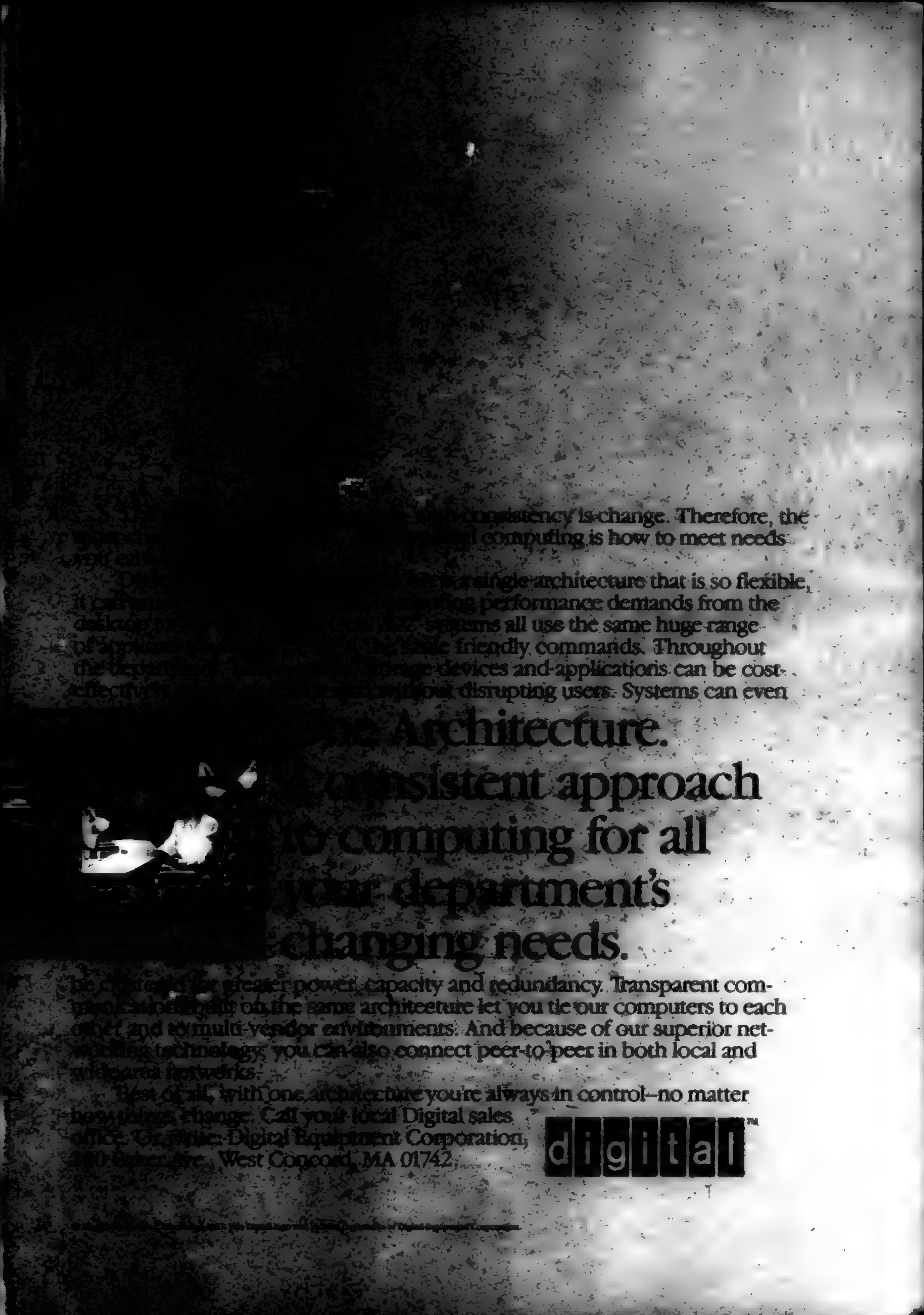

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Howard Fosdick

ISPF key in convergence

While the world criticizes IBM for the incompatibility of its mainframe operating systems, the company has been quietly following a strategy of operating systems convergence.

Since 1979, IBM has nurtured a shell program for its key operating systems. This shell surrounds those operating systems, making them appear the same to programmers and end users. Programmer and user skills, as well as program source code, become transferable across operating systems.

This IBM shell is composed of two program products: the Interactive System Productivity Facility (ISPF) and the ISPF/Program Development Facility (ISPF/PDF). ISPF supplies a runtime environment for interactive applications. It also contains callable services used in the development of those applications. These ISPF services handle full-screen I/O, data management, batch-job submission, library access and control and other functions.

ISPF/PDF is an ISPF appli-

Continued on page 28

All-In-1 spurs DEC success

BY NINAMARY BUBA MAGINNIS
CW STAFF

Digital Equipment Corp.'s office automation package, All-In-1, enjoyed its biggest year ever in 1986, which observers said is helping the company sell computers.

DEC shipped 1,173 All-In-1 licenses last year, bringing the U.S. installed base to 3,254, according to Heidi Gabrielson, a researcher for Framingham, Mass.-based International Data Corp (IDC).

Since its debut in 1982, the integrated office automation package has become increasingly popular. By 1983, All-In-1 was installed at 645 sites, Gabrielson said. An IDC survey shows the firm shipped 641 licenses in 1984 and 795 in 1985, she added.

DEC's office package includes electronic mail, word processing, a time manager calendar, a desk manager that gives users an on-line what-to-do list, an on-screen calculator and a filing system. Optional features include Decalc, a spreadsheet application; business graphics; Decslide, a tool for creating overhead slides; and a series of data-query and manipulation tools, including DEC's Datatrieve, Teamdata and Rally.

The software runs on the DEC VAX hardware line, ranging in price from $6750 for the Microvax 2000, with a limit of four users, to $106,880 for the high-end mainframe 8978 Vaxcluster that can handle hundreds of users.

All-In-1 faces tough competition from Wang Laboratories, Inc.'s Wang Office, IBM's Professional Office System , Data General Corp.'s Comprehensive Electronic Office and Hewlett-Packard Co.'s Personal Productivity Center, according to IDC's Gabrielson.

Initially, All-In-1's integrated packaging gave DEC an edge in the office automation market,

Continued on page 27

Vollie ties development between IBM systems

BY CHARLES BABCOCK
CW STAFF

Applied Data Research, Inc. (ADR) has announced a release of ADR/Vollie, its on-line development system that allows programmers to share program development across IBM VM and VSE operating systems.

Vollie Release 4.0 duplicates the screens and commands previously reserved to VSE users in the VM/Conversational Monitor System (CMS). The environment is simulated in CMS, with actual execution being transferred to the VSE Vollie system. Results are then passed back to the CMS programmer, according to Greg Walsh, Vollie product mangager.

Programmers want to go back and forth between VSE and CMS because in many smaller mainframe shops, VSE serves as the production system and VM/CMS as the development system. An estimated 18% of all mainframe sites use this dual operating system approach, Walsh said.

Vollie performs its cross-system services where VSE is running as a guest under VM. Many of the shops that use the dual-system approach are eventually planning on migrating to VM and are maintaining applications in both environments, Walsh noted.

Release 4.0 allows programmers to switch back and forth between VSE and CMS for test executions of their programs or to shift test data from one operating system to the other, Walsh said.

For example, a production program can be transferred from Vollie's on-line library in VSE to the CMS equivalent, a VM minidisk, Walsh said. From there, it can undergo modification or development in the CMS environment and then be sent back to the Vollie library.

ADR officials said a Vollie user may wish to drop into CMS to test or execute a program. When he transfers back, he returns to the point where he was working in Vollie. "It's like a

Continued on page 32

PC-based 4GL added to tool

BY ALAN ALPER
CW STAFF

EDISON, N.J. — Multisoft, Inc. has brought out a release of its Super-Link development tool for building peer-to-peer applications within IBM environments.

Super-Link features a personal computer-based fourth-generation language, a background communications facility (BCF) and connectivity to Digital Equipment Corp. VAX computers running VMS.

Super-Link can be used to build cooperative peer-to-peer applications under CICS, TSO, VM/CMS and IDMS/R-DC in IBM environments, or under RDB on VAX hosts running the VMS operating system, Multisoft said.

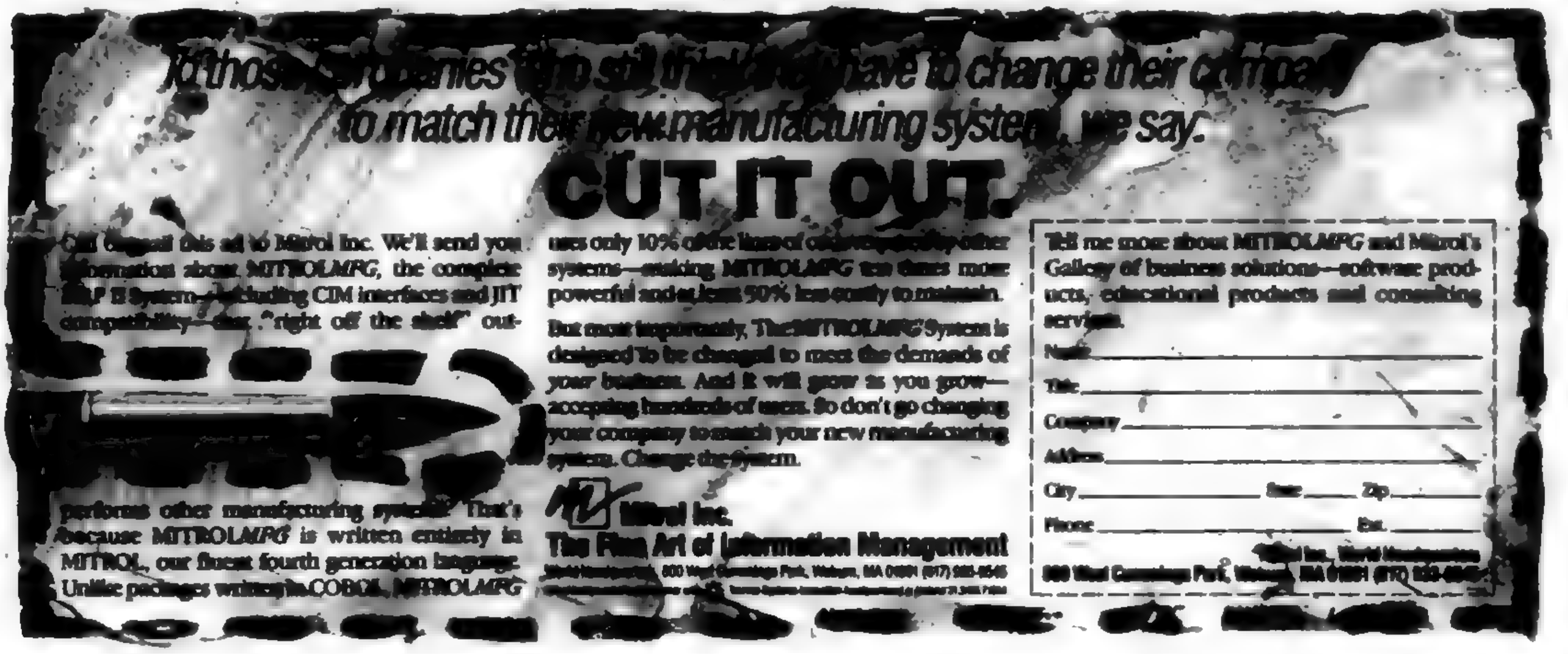
"While this is Version 3 of the product, it is the first version to run in the VAX environment," noted Donald Wszolek, vice-president of marketing and sales.

The 4GL offered with Super-

Continued on page 28

Inside

- DTSS introduces an integrated micro and mainframe software distribution system. Page 30.
- Context adds to its series of Documentation Workstations. Page 32.



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Advance registration is requested for the half-day seminars. To register or get more information, call Cincom today. Or, write Marketing Services Department, Cincom World Headquarters, 2300 Montana Avenue, Cincinnati, Ohio 45211.

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All-In-1

CONTINUED FROM PAGE 25

according to Marty Gruhn, market research vice-president for The Sierra Group in Tempe, Ariz. "Today, All-In-1 is probably not as different as it used to be. If I was a user, I would have to look at what functions are most important to me," Gruhn observed.

DEC word processing is not considered as friendly or powerful as Wang's, Gruhn said. "DEC's electronic-mail and networking functions are a tad better than some others," which is one reason DEC emphasizes its networking, Gruhn added.

Others will catch up

In time, other vendors will catch up with DEC in networking and architecture, said Judith R. Davis, associate editor for Boston, Mass.-based Patricia Seybold's Office Computing Group. "DEC needs to make sure it pays attention to functionality in the future, because it may come down to that," Davis said.

DG's Comprehensive Electronic Office uses an integrated filing system that includes spreadsheet filing. With All-In-1, users can only file word processing documents and mail messages. "Once you get away from that, the user is back in the more complex DEC Record Management System," she added.

"At the time All-In-1 was announced, it was an excellent product," Davis observed. "DEC is on such a roll right now. A lot of people are finding DEC's hardware and networking strategy is what they need. And what comes along with that is All-In-1."

All-In-1 was instrumental in the decision by Corroon & Black Corp., a New York insurance brokerage firm, to retain DEC hardware, said Valerie Hanna, the firm's office automation director.

Corroon & Black depends on the software's electronic-mail system for remote communications. The firm's financial department, for example, electronically publishes quarterly results as soon as they become available.

Before installing All-In-1, Corroon & Black relied on overnight courier and facsimile to disperse timely information. "All-In-1 is quicker, more confidential and allows us to use data bases," Hanna said.

Libbey-Owens-Ford Co., a Toledo, Ohio-based glass manufacturer, is an IBM shop that disperses VAX systems throughout the company to run local applications, according to MIS director David Fryer.

Slow during peak hours

With more than 600 All-In-1 users, the office tool performs slowly during peak hours. "It's resource consumptive. It uses VAXs up quickly," Fryer observed. "But then again, it's very easy to use machines up because everyone is so enthusiastic to use the system. It's difficult to say no to users. We keep just adding on more, one more, one more. If it's a performance problem, we bring it on ourselves."

A proper All-In-1 configuration considers many factors, including users, memory size and disk capacity, said Claire Messier, DEC's All-In-1 product manager, explaining that some users do not configure systems according to recommendations.

Wang Office and HP office solutions are generally faster during peak periods than DEC's All-In-1, according to John McCarthy, research manager at Cambridge, Mass.-based Forrester Research, Inc. "Particularly in Wang's case, where you can off-load word processing to terminals," he said.

Libbey-Owens-Ford's Fryer admitted performance is definitely a hardware bottleneck. "DEC would rather see people spend money on more million instructions per second for outstanding service," he said.

Saves money

Yet All-In-1 has served the glass maker well since its installation in 1983. "I think the product has probably saved us a lot of money over time," Fryer observed.

Edward D. Jones Co., a St. Louis-based brokerage firm, evaluated All-In-1 last year and plans to purchase it for 1,100 branch offices, said Rich Malone, general partner responsible for data processing.

"We're asking DEC for enhancements to give us standard functionality," Malone said. With calendaring, for example, Malone said his secretary cannot view his time to schedule meetings.

The All-In-1 spreadsheet does not follow the industry standard, Lotus Development Corp.'s 1-2-3, he added. "Moving information from one field or cell to another isn't as easy to do with DEC's spreadsheet as it is with Lotus," Malone explained.

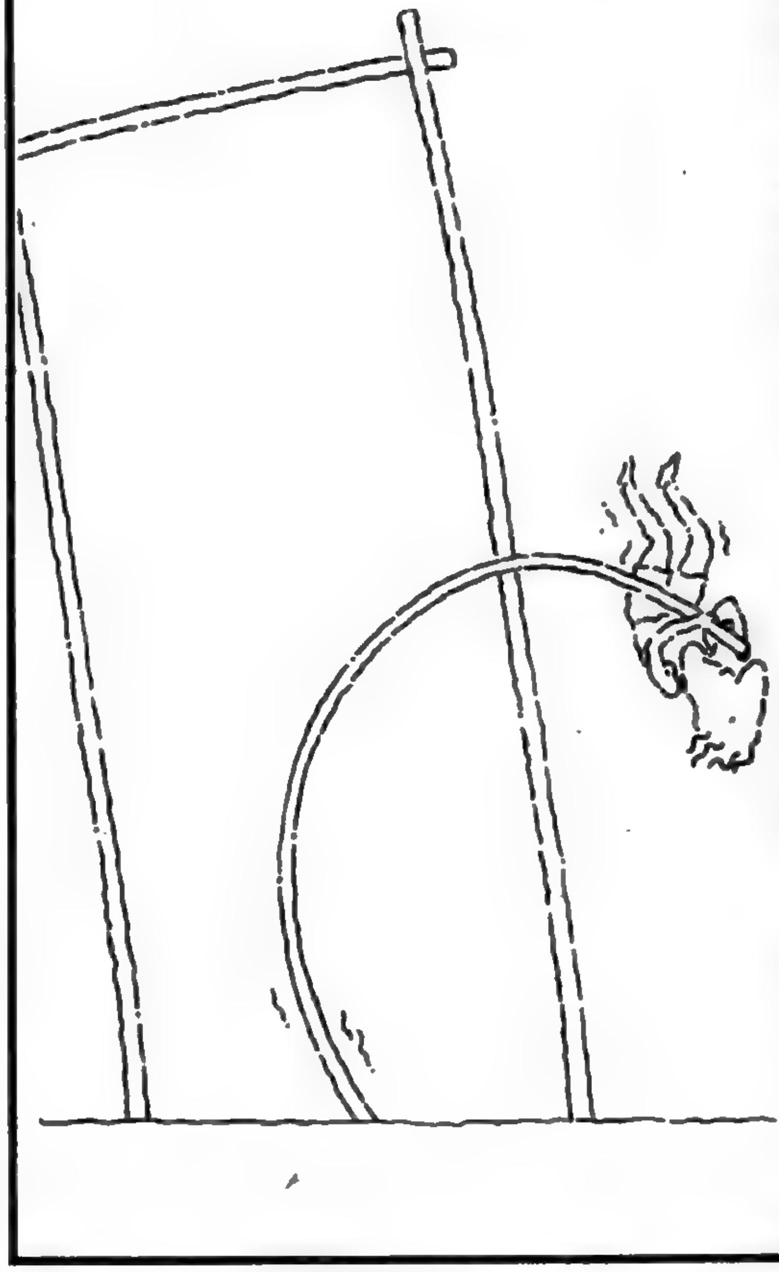
DEC's All-In-1 training is superficial, at best, Corroon & Black's Hanna said. "It's a layered product, with layers of mystery. There's a lot more you can do with All-In-1, and I find out more and more when I attend user groups," she said. "We want to do sophisticated things quickly, and the training doesn't allow us to do that."

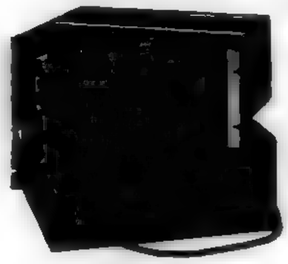
Access not easy

Corroon & Black users cannot always access departmental information easily.

"We'd like access without getting involved with electronic mail. We can access departmental data, but it's not as smooth or clean as we would like it to be," Hanna observed.

Still, All-In-1 remains a viable office solution. "Realistically, to the MIS person, it's the best system out there. It uses resources more economically," Hanna said.





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4GL

FROM PAGE 25

Link Version 3.0 — Cooperative Processing Language/I — allows users to create PC/Host peer-to-peer applications by providing language statements that can request host computer services, such as initiating transactions and performing data base I/O, Multisoft officials said.

The new BCF is said to enable PC applications written in C, Pascal and assembler to initiate and monitor background transactions on the IBM or DEC host, which a foreground PC application continues to process simultaneously. The background tasks can be CICS record-oriented transactions or more sophisticated data extraction and transfer functions, the firm noted.

Other features include autolink, a scripting facility for automatic dialup and logon sequences; dynamic path; forms library; and array processing.

Benefits of the release include up to 80% reduced host computer consumption and up to an 80% faster response time as well as reduced communications traffic, while using existing Systems Network Architecture/Synchronous Data Link Control bisynchronous and asynchronous communications, the firm said.

Super-Link's base price is $48,000 and includes file transfer, software distribution and peer-to-peer communications. The new BCF and CPL/I options should be available in April and are priced at $10,000 each for IBM mainframe host environments. VAX host prices range from $12,000 for the Microvax II to $42,000 for the VAX 8800.

Five customers currently use Super-Link, Multisoft's Wszolek said. They are The Dun & Bradstreet Corp., The Hertz Corp., Compass Computer Services Corp., Hilton Hotels Corp. and Intercontinental Hotels Corp.

"During the last year when we released Versions 1 and 2, the product was in a quiet embryonic stage. We were working with customers trying to flesh out the product and enhance the tools and facilities to cover a wide variety of TP monitors," Wszolek said.

ISPF

FROM PAGE 25

cation designed to help programmers in the design and development of their ISPF programs. ISPF/PDF contains extensive on-line debugging facilities and offers a generalized, full-screen interface to operating system services.

Together, ISPF and ISPF/PDF surround the operating system, giving it a new software personality. For example, a programmer developing a Cobol program under IBM's MVS/TSO with ISPF or ISPF/PDF does not need to know anything more than he does to develop the same program under IBM's VM/CMS. ISPF/PDF gives the programmer the same development environment under both systems, while ISPF supplies the same callable program services.

ISPF renders the code largely portable across systems. The common ISPF runtime environment means that the finished application looks about the same to end users under either operating system.

Comparable to CICS

ISPF and ISPF/PDF compose a complete environment for the development and execution of on-line applications. The system is comparable to CICS and IMS DB/DC — but the difference is that ISPF and ISPF/PDF play a very different role in IBM's strategies.

IBM promotes CICS and IMS DB/DC as its transaction-oriented systems, optimized for volume updating. ISPF and ISPF/PDF play the key role in IBM's operating systems convergence strategy. As the linchpin of this strategy, ISPF and ISPF/PDF run under MVS/TSO, VM/CMS, DOS/VSE/ICCF and their variants, such as VM/IS, VM/E, VM/PC and SSX/VSE.

IBM also extended the ISPF environment to the desktop in two forms: the EZ-VU product for the Personal Computer family and full ISPF running under VM/PC on the PC AT Model 370. The result is that IBM offers ISPF, rather than CICS or IMS, for the programmer workstation.

High connectivity

In addition to their wide cross-systems availability, ISPF and ISPF/PDF feature high interproduct connectivity. ISPF and ISPF/PDF interface to IBM's interactive monitors (TSO, CMS, ICCF), all compiled programming languages, all command-procedure languages (C List, Exec2, Rexx) and all full-screen terminals. ISPF and ISPF/PDF run on all models of IBM mainframes and the PC family. Without the industry fully recognizing it, ISPF and ISPF/PDF have matured into a complete environment for applications development and execution. In this sense, ISPF and ISPF/PDF are fully comparable to CICS and IMS and DB/DC.

Moreover, IBM has cleverly repositioned ISPF and ISPF/PDF to address the major defect in the company's product line — IBM's diversity of operating systems.

Howard Fosdick is a widely published industry analyst. His book *IBM's ISPF: Under MVS, VM and VSE* is available from Van Nostrand Reinhold in Florence, Ky.

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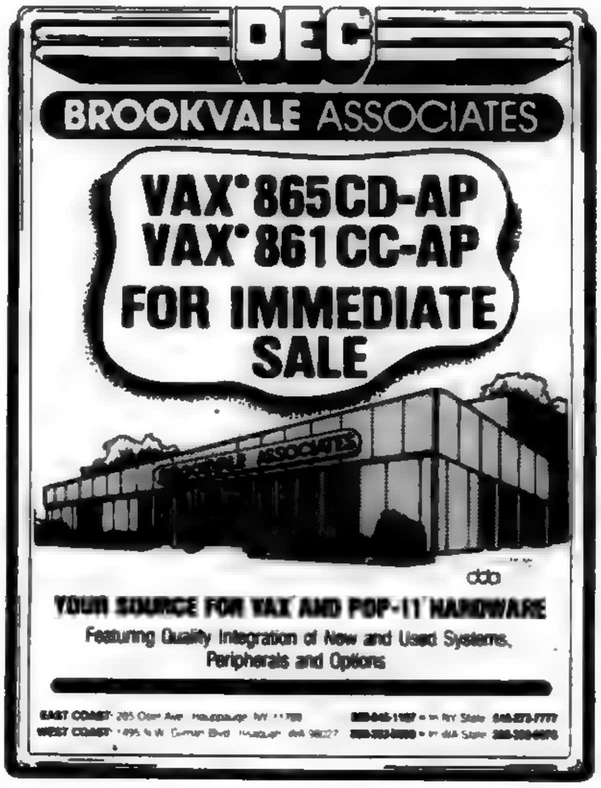

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The system did stop, though, for a major water leak that flooded three mainframes. Tom Wilson did the only gentlemanly thing. He evacuated his own office at Unisys so Census personnel, with fierce adherence to data confidentiality, could work with Unisys computers until their new one was installed.

"I keep a pair of rubber boots in the office just to remind me."

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NEW PRODUCTS

Systems software

DTSS, Inc. has announced **Sofstore**, an integrated micro and mainframe software distribution system.

The electronic system is said to incorporate host and personal computer systems software along with Datapass, the vendor's micro-to-mainframe link that permits both asynchronous and synchronous communications:

The Sofstore system offers report writing features as well as the ability to automatically announce software updates and deliver them to the users.

The initial release of Sofstore runs under IBM VM/CMS host computers utilizing the SQL/DS data base. The microcomputer portion requires an IBM Personal Computer or compatible.

Sofstore costs $75,000.

DTSS, Box 70, Buck Road, Hanover, N.H. 03755.

Softool Corp. has announced **Release 3.0** of its **Change and Configuration Control** environment specifically for Digital Equipment Corp.'s VAX computers running the VMS operating system.

According to the vendor, all components of a given product can be organized, managed and tracked as a unit with the release. Release 3.0 provides support for multiple module levels, the ability to automatically apply changes from one configuration to another, data base and journal file-integrity checkers, an enhanced build facility, a programmable interface to Change and Configuration Control and the ability to communicate between Release 3.0 and the data base across a network.

The cost of Release 3.0 on the DEC VAX/VMS systems ranges from $10,000 to $30,000.

Softool, 340 S. Kellogg Ave., Goleta, Calif. 93117.

Silicon Compilers, Inc. has announced five systems for its family of **Genesil** silicon compilation products.

The systems include the Genesil Macrocompiler, Genesil Mentor Series, Genesil Server, Genesil Logicdesigner and Genesil Chipbuilder. The products are said to provide designers access to silicon compilation and allow them to tailor silicon compilation to their design needs.

The Macrocompiler costs $75,000. The Mentor Series costs $159,500. The Genesil Server costs $450 per node. The Logicdesigner costs $79,500, and the Chipbuilder costs $119,000 on the Digital Equipment Corp. Microvax II and $295 on the VAX 8650.

Silicon Compilers, 2045 Hamilton Ave., San Jose, Calif. 95125.

Prime Computer, Inc. has introduced **Prime Medusa/PC** software, a two-dimensional version of its Prime Medusa mechanical computer-aided design software system that can be used on an IBM Personal Computer AT operating within a Prime 50 Series minicomputer environment.

Prime Medusa/PC is said to be compatible on the data base level with Prime Medusa on a 50 Series system. It includes variational geometry and super syntax, a graphics programming language.

Other features include a simplified menu and a sketcher.

Prime Medusa/PC is available to Prime Medusa customers.

It costs $5,000 per license with a monthly maintenance fee of $65.

Prime Computer, Prime Park, Natick, Mass. 01760.

Applications packages

Britz Publishing, Inc. has announced **Release 5.5** of **Bword**, a word processing package for IBM System/34 and 36 computers.

Release 5.5 offers users a choice of a full-screen editor or a source-entry utility. Other features include support for bold print and underlining, centering, single or double spacing, justified and nonjustified text within the same document and a dictionary with more than 31,000 words. The print option allows legal- or standard-length documents.

Bword is priced at $99.

Britz Publishing, 1814 Capital Towers, Jackson, Miss. 39201.

McDonnell Douglas Computer Systems Co. has introduced the **Advanced Distribution System**, a distribution package to run on its line of relational data base management business computer systems.

The product is said to manage a large inventory, track receivables, analyze sales and costs and control cash disbursements. It provides information on products, customers, financials and inventory through on-line inquiry and reports. It contains 14 interactive modules, including cashier and point-of-sale merchandising.

The Advanced Distribution System operates on the McDonnell Douglas M6000 and M9200 series of minicomputers. It is priced from $20,000 to $60,000.

McDonnell Douglas, 17481 Red Hill Ave., Irvine, Calif. 92714.

NBI, Inc. has enhanced the Time Accounting facilities of its **Lexpert** integrated software package for management of billing, accounting and administrative information in law firms.

Enhancements include expanded capabilities for tracking and maintaining client, firm and billing files, the addition of several user-defined data base fields and a billing remarks field. Also included is the option to print in the background while performing other functions in the foreground.

The Lexpert series runs on the vendor's 500 series minicomputers.

The Time Accounting software enhancements are priced at $21,500.

NBI, P.O. Box 9001, 3450 Mitchell Lane, Boulder, Colo. 80301.

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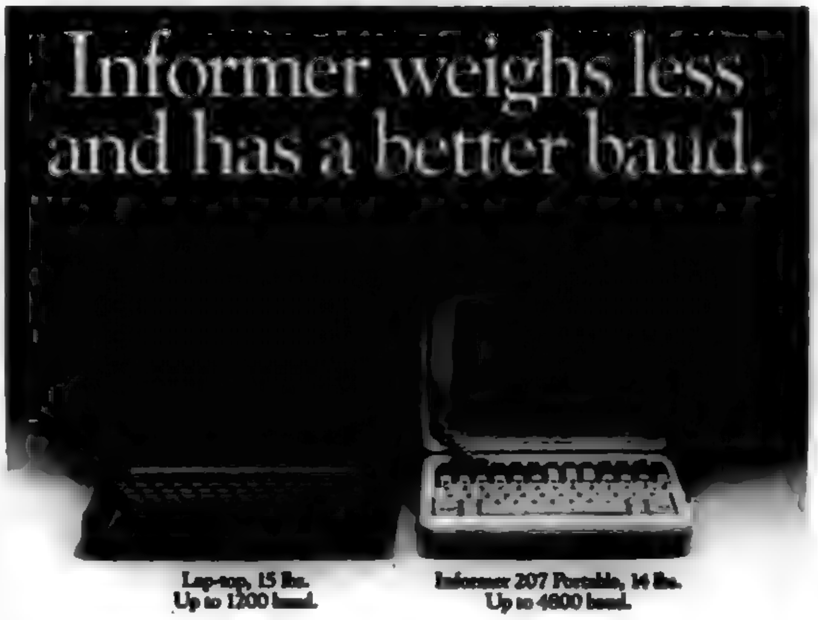

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How To Register For Our Free Seminar

Interchart Software, Inc. has announced a reduction in the price of its mainframe organization-charting software package, **Interorg.**

Interorg is said to be a complete system for the preparation of presentation-quality organization charts. To produce the final chart it must be used in conjunction with Computer Associates International, Inc.'s Tell-A-Graf.

Interorg runs on IBM systems under VM/CMS and MVS/TSO and on Digital Equipment Corp. systems under Total Operating Systems 10 and 20 and on VAX systems under VMS.

Interorg costs $4,500 on IBM systems and $2,500 on VAX systems for a perpetual license.

Interchart, 104 Carnegie Center, Princeton, N.J. 08540.

Computer Associates International, Inc. has announced **Release 4.21** of its **Megacalc** spreadsheet software for IBM mainframes.

The product is said to allow file sharing with the Supercalc4 integrated spreadsheet for microcomputers.

Release 4.21 of Megacalc is said to allow users to transfer spreadsheet information including data, labels, formats, formulas and other parameters.

Other features include on-line mainframe data file-access to read data from Information Builders, Inc.'s Focus data bases and 34 advanced macro commands supporting conditional branching subroutines.

Megacalc Release 4.21 costs $7,800.

Computer Associates, 711 Stewart Ave., Garden City, N.Y. 11430.

Lawson Associates has ported its **Pinstripe** applications software packages to the IBM DB2 data base environment.

The Pinstripe packages, which were designed to be integrated with DB2, include applications such as General Ledger, Accounts Payable, Purchase Order, Payroll, Human Resources and Fixed Assets.

Pinstripe Purchase Order is priced at $115,000, according to the vendor. Packages designed for SQL/DS are said to range in price from $105,000 to $120,000.

Lawson Associates, 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

Context Corp. has added the **Engineering Writer** and **Engineering Writer Plus** documentation systems to its Context series of Documentation Workstations.

The Engineering Writer software features electronic-mail capabilities and shares the same version and data base management system with other Context products. It provides full what-you-see-is-what-you-get document editing with automatic page, section, figure and list numbering, table of contents generation and cross-reference resolution. Graphics and tables are included by reference.

The Engineering Writer Plus software offers the same capabilities as the Engineering Writer and Piced, the Context picture editor.

Engineering Writer costs $4,900 and Engineering Writer Plus costs $8,900.

Context, 8285 S.W. Nimbus Ave., Beaverton, Ore. 97005.

Frame Technology Corp. has released **Frame Maker 1.0**, a computer-aided publishing package for Sun Microsystems, Inc. workstations under the Sunview window system.

Frame Maker is said to integrate editing and drawing tools with an automatic document-design and layout system. Features include the ability to create original art, tables of contents, indexing, a programmable keyboard, freeze pagination, file locking, kerning, eight graphics anchoring options, ASCII input and output language and support for foreign languages.

Frame Maker software costs $2,500 per workstation.

Frame Technology, 2240 Lundy Ave., San Jose, Calif. 95131.

Vollie

CONTINUED FROM PAGE 25

bookmark," Walsh noted.

Since programmmers frequently develop VSE programs in the CMS environment, "it gives them a great deal of flexibility to be able to move data back and forth," Walsh said.

Unlike earlier versions, Release 4.0 allows the programmer to execute a VSE program in an interactive virtual partition established by Vollie, rather than being limited to VSE batch mode. The virtual partition functions like a time-sharing facility, allowing 28 Vollie users to execute a program concurrently, Walsh said.

A total of 512 CMS users and an unlimited number of VSE users may access the features of the Vollie installation.

Intelligent screens have been added to the release. They provide multiple functions on one screen or the option of executing one function against several members in the on-line library. In the past, a Vollie user was restricted to the one command he could type on a screen's command line acting on one member. Now he can delete all unwanted members, such as several collections of data, by executing a Delete command against all target members on the screen at the same time, ADR spokesmen said.

ADR/Vollie Release 4.0 is priced at $20,600 for a permanent license. Six-month, three-year and five-year leases are also available. The development system was introduced in 1978 and has an installed base of 2,300 licenses, Walsh said.

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Utilities

Empact Software, Inc. has announced **WTO/Manager**, a message management system for MVS automation.

WTO/Manager is said to manage all write-to-operator (WTO) and write-to-operator-with-reply (WTOR) messages. It reviews all messages sent to the operator console and can issue automatic commands that have been defined by an installation.

The user has control over which messages are selected for processing and the actions the software is to take. Capabilities are said to include automatic immediate or deferred commands to a WTO message, automatic replies to WTOR messages and automatic routing of urgent messages.

WTO/Manager is priced from $5,000.

Empact Software, 1275 Parker, Conyers, Ga. 30207.

Computervision Corp. has announced the **Personal Designer/CADDS 4X Direct Translator** designed to facilitate the translation of data bases between its personal computer-based computer-aided design and manufacturing (CAD/CAM) system, the Personal Designer and CADDS 4X, the CAD/CAM software residing on the vendor's premium workstations.

The product consists of two data base converter programs. One translator takes as input Personal Designer Micro-CADDS Geometric Construction and Detailing, MicroCADDS Surfaces or Microdraft fields and creates a CADDS 4X file. The other does the opposite. The conversion in either direction is from one binary file to another.

The Personal Designer/CADDS 4X Direct Translator costs $1,200.

Computervision, 100 Crosby Drive, Bedford, Mass. 01730.

The Dylakor Division of Sterling Software, Inc. has announced **Release 2.0** of its **Dyl-Interface IDMS/R** interface between Cullinet, Inc.'s IDMS/R data base and Dylakor's information management systems, Dyl-280 and Dyl-280 II.

The product is said to provide information retrieval, updating and report writing capabilities for IDMS/R users. Release 2.0 is said to have eliminated the requirement to use a subschema in a program when copying record and field descriptions from the IDMS Integrated Data Dictionary.

The product costs $8,690. A retrieval-only version costs $6,380.

Dylakor, P.O. Box 2210, 9340 Owensmouth Ave., Chatsworth, Calif. 91313.

Silden-Software, Inc. has announced **EZoff/36**, a utility designed to automatically monitor and sign off idle workstation terminals connected to the IBM System/36.

EZoff/36 automatically monitors all workstations on the system, signing off any CRT that has been idle for longer than a user-specified time limit.

EZoff/36 is priced at $475.

Silden-Software, 5007 Odessa Ave., Encino, Calif. 91436.

Boole & Babbage, Inc. has introduced **Resolve Plus** and the MVS Performance Manager.

Resolve Plus is an on-line multiple virtual system (MVS) performance tool said to aid in the detecting, diagnosing and solving of common system problems. The MVS Performance Manager provides integration for Resolve Plus as well as split-screen capabilities, interactive dialogues for defining and executing functions, session-output management with a journal facility and high-resolution color graphics.

Resolve Plus costs $19,000 for MVS/370 and $24,000 for MVS/XA.

Boole & Babbage, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Development tools

National Semiconductor Corp. has introduced an **optimized Fortran compiler** designed for use with the firm's Series 32000 family of 32-bit microprocessors.

The compiler is said to improve execution speed of Fortran code by more than 50% over the earlier release, while making the compiled code more compact by as much as 40%. In operation, the compiler converts syntax into an intermediate representation, optimizes the representation and converts the optimized code into compiled code. It separates the front end from the back end.

The optimized Fortran compiler is priced at $2,500 for the Digital Equipment Corp. VAX/VMS or VAX/Unix cross-compiler.

National Semiconductor, P.O. Box 58090, 2900 Semiconductor Drive, Santa Clara, Calif. 95052.

Rem Associates has announced **Release 5** of its **Remdoc** automated documentation package for IBM System/36 computers.

Features of Release 5 include the ability to analyze Cobol programs more extensively, print layouts, run book features, system flowcharts, file labels and name cross-references and display reports on-line with a character-string search facility.

According to the vendor, Release 5 also offers reduced disk space for RPG-based systems.

Remdoc is priced at $1,250.

Rem Associates, P.O. Box 527, Village Station, New York, N.Y. 10014.

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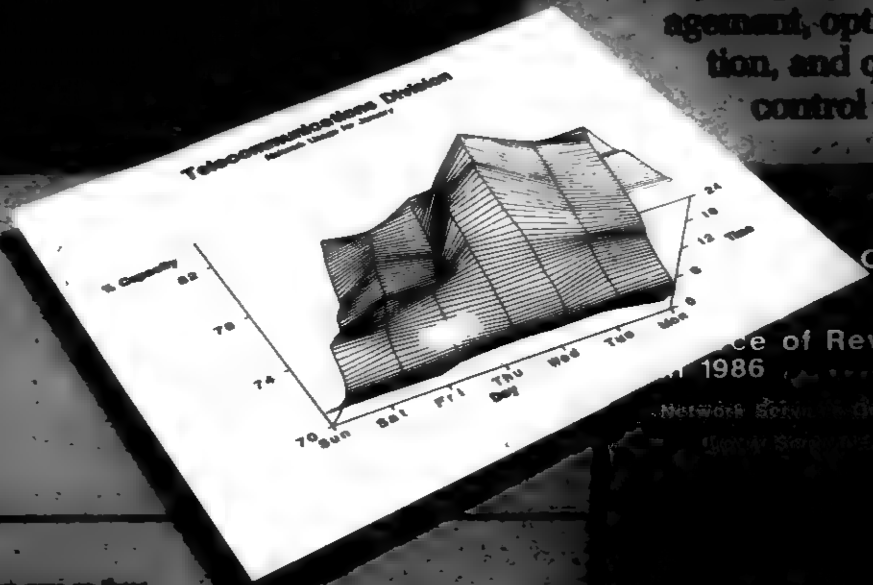

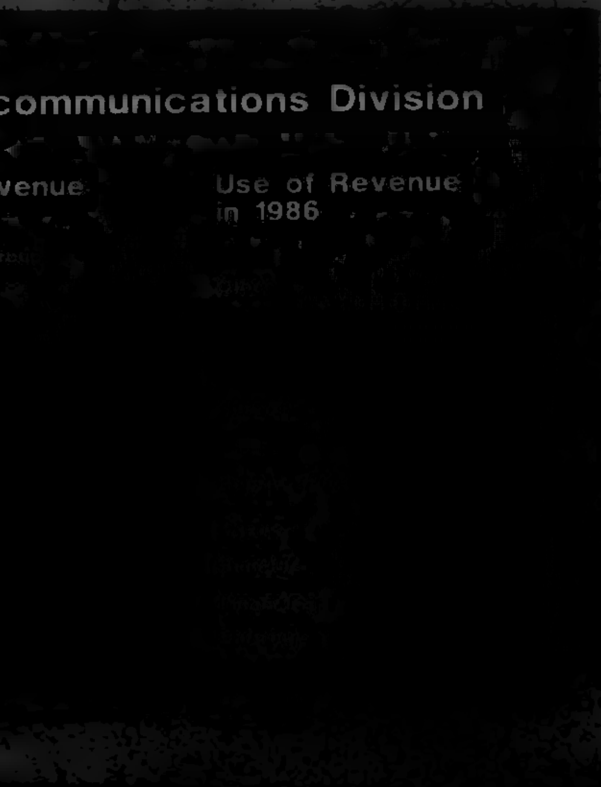

The SAS System runs on these minicomputers: Digital Equipment Corp. VAX™ 8xxx and 11/7xx series under VMS™ and MicroVAX II™ under MicroVMS™; Prime Computer, Inc. Prime 50 series under PRIMOS®; and Data General Corp. ECLIPSE® MV series under AOS/VS. The SAS System also runs on IBM 370/30xx/43xx and compatible machines under OS, CMS, DOS/VSE, SSX, and ICCP; IBM XT/370 and AT/370 under VM/PC; and IBM PC XT and PC AT under PC DOS. Not all products are available for all systems.

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MICROCOMPUTING

SMALL TALK

William Zachmann

Relational reaches a boil

Relational data base management systems (DBMS) have composed an area of technology that is ready to start cooking, and much of the heat will come from basic concepts that were spelled out more than 10 years ago.

A key component is the Structured Query Language (SQL) syntax developed by IBM, which was first implemented in the late 1970s. My first acquaintance with SQL was at IBM's Cambridge, Mass., Scientific Center in 1978 and 1979 under VM/CMS.

Although the wait has been a long one, the bubbles in the pots of relational DBMSs and SQL are truly starting to appear. IBM's DB2- and SQL-based products from companies like Relational Technology, Inc. and Oracle Corp. are getting to be big news. Tandem Computers, Inc.'s recently announced SQL data base is yet another log on the fire.

Fox Research, Inc.'s 10-Base, a very usable DBMS for IBM Personal Computers and

Continued on page 38

Data search pokes at CD-ROM

Borland system reads data bases, includes specialty lexicons

BY PEGGY WATT
CW STAFF

SCOTTS VALLEY, Calif. — Borland International has developed a new technology for standard data search and retrieval that can be used with a variety of applications, including large data bases, on compact disk/read-only memory (CD-ROM).

The first application of Borland's Linguistic Technology reportedly will be included in Sprint: The Word Processor, which was recently announced by Borland and is scheduled to ship this spring.

Linguistic Technology's Thesaurus includes 300,000 synonyms and 30,000 root words. Borland said it plans to add specialty lexicons for vertical markets. CD-ROM tools and full text Search tools are scheduled to be available later in the year.

The technology has also been licensed as an OEM product by Turner Hall Publishing Co., a Cupertino, Calif., publisher of spreadsheet enhancement products.

Turner Hall will build the Borland technology into future products that interact with spreadsheets and need text search-and-retrieval tools, Tom Byers, general manager of Turner Hall, said.

"People who use Lotus Development Corp.'s 1-2-3 need a spelling checker, too," Byers said. He declined to describe the product further, but said it would not appear until the second half of this year.

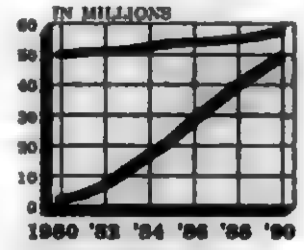
The Linguistic Technology concept is an outgrowth of Borland's Turbo Lightning information management package and will not be sold as a stand-alone product, according to the vendor.

Instead, the technology will always be built into an application, according to Spencer Layton, vice-president of business development for Borland. He called the technology an "operating system for words" that includes a synonym dictionary, spelling checker and automatic hyphenation and works in English and other languages.

Linguistic Technology is not intended strictly for CD-ROM; the product can also be applied to any mass storage that needs full text retrieval, Layton said.

Data View

U.S. white-collar employment vs. workstations
From 1980 to 1990



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP
CW CHART

Instaplan ships $100 PC project manager

BY DOUGLAS BARNEY
CW STAFF

MILL VALLEY, Calif. — Instaplan Corp. announced and shipped this month a $100 project management package for IBM Personal Computers and compatibles that was designed in the U.S. but developed in India.

The package, called Instaplan, sells for far less than many competing packages and integrates project management features with presentation graphics, a work assignment spreadsheet and outlining capability, the firm claimed. "There is nothing that is a complete system for that price," claimed Gary M. Cole, chief executive officer of Instaplan.

According to Cole, the package is the first major microcomputer application to come out of India, a country that has recently become known for its minicom-

Continued on page 36

Hand-held scanner inputs text

BY PEGGY WATT
CW STAFF

BEAVERTON, Ore. — Saba Technologies, Inc. is today slated to introduce Handscan, a mouse-like hand-held text scanner that can input printed text directly into many personal computer application programs.

The product is aimed at banks, auditors, authors and any office staffs that need to transfer data printouts into IBM Personal Computer applications, according to Robert Petkun, president and chief executive officer of Saba.

Like most scanners, Handscan provides an alternative to rekeying data. Handscan scans one line at a time. At the user's command, text can be edited as it is transferred.

Saba said the product's use is straightforward. The user slides the scanner across the line of text to be transferred, with a red hairline acting as a guide. Text is inserted into a spreadsheet grid, data base field or word processing file. The keyboard remains

Continued on page 40

Inside

- **A micro played a part in the recapture of the America's Cup. Page 36.**
- **[illegible] LCD for the T1100 Plus. Page 41.**

Betterbasic breaks away from a crowded pack

This is the first in a four-part series on Basic products for IBM Personal Computers and compatibles.

Best in Breed

BY T.A. ELKINS
SPECIAL TO CW

It may surprise naive users, those who have not spent much time on different systems, to learn that there are at least small variations between nearly every version of Basic. Even within interpreters and compilers written by Microsoft Corp., variations exist. As a result, the first criterion for judging a Basic programming language is compatibility with the millions of existing copies of GWBasic, which is bundled with Microsoft's MS-DOS, and Basica, which comes with IBM's PC-DOS.

My choice for best in breed among the tested Basics is Betterbasic from Summit Software Technology, Inc. in Norwood, Mass.

The first version of Betterbasic substituted a fair number of Summit Software's improved alternatives for standard GWBasic commands. This superficially innocent action, however, caused no end of troubles, because an important percentage of existing programs would not work with Betterbasic Version 1. The management of Summit Software learned from this experience, and Betterbasic Version 2 is about as compatible with the Microsoft standard as is reasonable.

Betterbasic is a genuinely modular language and uses this modularity in many ways, beginning with compatibility. For example, there are two modules bundled with the Betterbasic system just to provide GWBasic compatibility. The second module even allows a tokenized Basic program to be loaded directly into Betterbasic; as a first-rate refinement, the end user can load these and other specialized modules if and when required or omit them when they are not needed.

Other modules support the IBM environment with its function keys, its sound system and its DOS/BIOS interrupts.

There is a non-English module for foreign character sets and optional, though additionally priced, modules for automatic support of virtual memory support.

Makes the grade

The second criterion for judging a Basic programming language is power and flexibility. Betterbasic rates high in power — three to a dozen times the speed and many times the space of GWBasic — and earns high marks for flexibility. Betterbasic can use the entire 640K bytes of random-access memory space available with PC-DOS and MS-DOS. With the DOS Version 3 family and the optional virtual-memory module, it can use nearly unlimited space in expanded memory or on a hard-disk system without programmer intervention.

In addition, Betterbasic is an incrementally compiled system. The standard GWBasic interpreter is notable for its convenience in use, but interpreters are almost always slow to run. This problem results from the requirement, intrinsic in an interpreter, that every line of code be translated into machine language every time it is encountered, and most interpreters must search down through their code, starting with the first line, each time they encounter a GOTO statement.

Betterbasic compiles each line of code as it is entered. This action greatly improves a program's running speed and forces the system to check syntax as a

Continued on page 40

Portable helped clinch America's Cup

BY ALAN J. RYAN
CW STAFF

WESTBORO, Mass. — While patriotic Americans were cheering Dennis Connor and his *Stars and Stripes* crew to victory down under earlier this year, the U.S. America's Cup challenger had some added American support in the form of a portable personal computer.

Connor and his 10-man crew defeated Australia's *Kookaburra III* yacht 4-0 to bring the cup back to the states, and the Data General Corp. DG/One portable may have had a hand in that victory.

Systems analyst designer Dick McCurdy, speaking here recently, said the DG/One was selected for on-board use because "it was the only computer available that addressed all of our needs."

Those needs included graphics capabilities, the ability to display results on a screen that could be read in bright sunlight, enough power to handle data on wind and sea conditions and a package that would add little weight to the yacht.

McCurdy noted that although the DG/One met his criteria, one major concern was the unit's ability to survive. To ensure its life, he removed the screen and displayed it in the cockpit beneath a waterproof cover. The computer's body was placed under the deck in a watertight compartment. A special waterproof keyboard developed by McCurdy and his team allowed the crew members to call up information screens.

Storage, transmission

The portable was connected to a hand-held range finder aimed at the competing boat to determine relative position between the boats. It stored all race data on local disks and transmitted instrumentation data to another DG/One on the nearby tender boat via a telemetry link for post-race plotting and analysis.

Additionally, the unit was connected to other instruments and sensors that indicated wind speed and direction and was connected to a radio navigation system that located the boat's position within one meter.

On the screen, seven different graphics applications could be displayed and would automatically change whenever a reading was taken, McCurdy explained. A course view was provided.

McCurdy, vice-president of Ockam Instruments, Inc., pointed out that computers have been in use in America's Cup yachting since the mid-70s, and he predicted that with the use of portable micros, the trend will grow.

Instaplan

CONTINUED FROM PAGE 35

puter software development.

Instaplan will introduce more products in the management area based on its royalty-based development agreement with the Indian firm of Wipro Systems Ltd., Cole said, but he declined to be more specific.

The firm claimed that several firms have been beta-testing the product, including General Electric Co., San Diego Gas & Electric Co. and Westinghouse Electric Corp. Site licenses are available, and the product is available direct from Instaplan with a 30-day money-back guarantee.

Neophytes targeted

The package is aimed at users who have not taken advantage of project management software, the firm said. "Full-time project managers like it as a tool to get others into the discipline of project management," Cole said. The target market, however, is "people who have never used automated planning tools," Cole added.

In addition to the package's low price, the firm said it aims to compete on the basis of technology and pointed to the work assignment spreadsheet and outlining features as innovations in project management products. "Instead of treating the project plan as a data base, we put the key elements in a spreadsheet," Cole said.

People assigned to tasks are charted on the vertical axis, activities are charted on the horizontal axis, and work assignments fill the spreadsheet, he added.

The outline format allows users to develop a list of broad objectives and later create a more detailed view of the project. The presentation-graphics component allows users to make overhead charts, which are particularly useful for sales proposals and presentations, Cole said.

Output from Instaplan includes presentation-style Gantt, Gantt-Pert and conventional detail reports.

In addition to the Instaplan package, the firm announced Instaplan Tracker, a $50 project tracking program. Tracker allows the user to compare current activity and actual progress against the original plan, track shifts in cash flow and manhours, and view time and budget changes for each step of a particular project.

The firm recommends 640K bytes with a hard disk drive. The product supports monochrome, color and Enhanced Graphics Adapter modes and most major printers.

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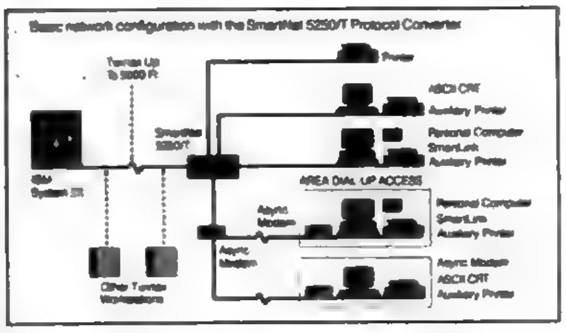

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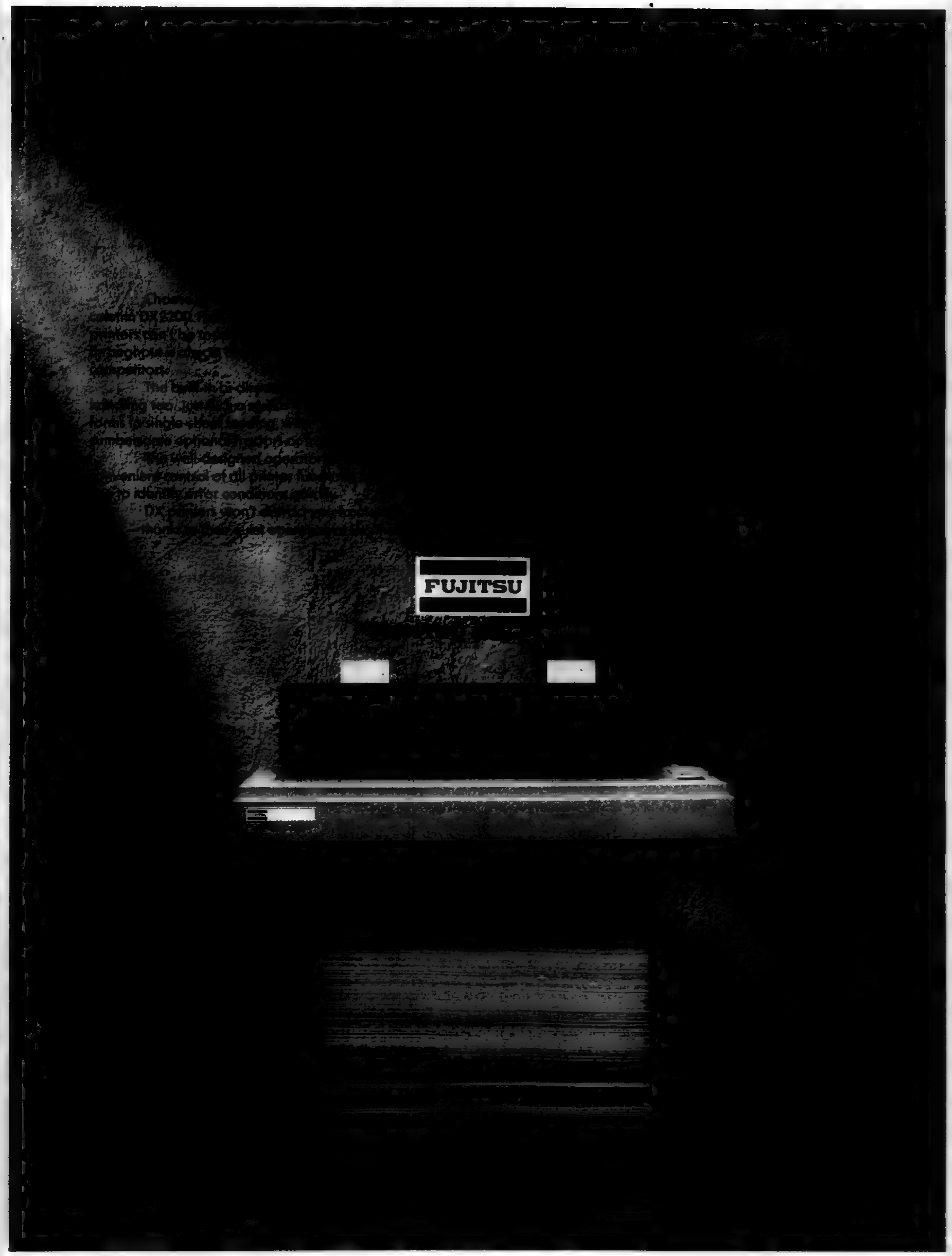

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Relational

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compatibles, offers an excellent low-cost introduction to SQL as well. List-priced at $495 in the standard version and $895 in a multiuser version, 10-Base is a powerful tool for developing sophisticated data base applications.

Employed with the Dayton, Ohio-based company's increasingly successful 10-Net local-area network, 10-Base can be used to build distributed data base applications. Users interested in building serious applications on a foundation of networked personal computers will find 10-Base and 10-Net well worth considering.

Relational DBMSs organize data in individual tables that may be dynamically linked. Updates, queries and reports can be done across multiple tables that are connected logically by common values of data elements. The result is a much more powerful and flexible system than older hierarchical, network or simple flat-file data bases could provide.

The SQL syntax provides a language for the manipulation of relational data bases. It makes it possible to define and modify tables, create indexes to speed up data base access, define views of the data and query against the data base. It is nearly certain that SQL will emerge as the key standard for basic relational data base manipulation over the next few years.

Fox's 10-Base provides an SQL implementation that, though it works handily on a personal computer, has nearly the full power and versatility of the basic SQL syntax. It makes it possible to gain experience with SQL easily and at a remarkably low cost.

Limitations SQL-based

The limitations of 10-Base are largely those of SQL itself. Unlike personal computer DBMS packages aimed at beginning users, 10-Base is not totally menu driven. The SQL syntax must be learned before the package can be effectively used. While the complexity of using 10-Base compares favorably to a package like Ashton-Tate's Dbase III, it is not as easy on casual users as a product like Ansa Software Co.'s Paradox.

Nevertheless, 10-Base can be a powerful tool in the hands of a somewhat more sophisticated user or computer professional.

In addition, the recently available Version 3.0 incorporates many features that make it much easier to use than the raw SQL syntax. A data entry editor provides useful extensions to SQL that make it easier to enter and edit data base records.

More sophisticated customization of input forms as well as powerful report formatting capabilities that go beyond the basic SQL query and reporting are available through a forms manager.

The basic SQL ORDER BY syntax is also supplemented with 10-Base's sort extension. This can be used to sort data bases permanently and offers performance advantages when dealing with large data bases. Bridging of data to and from other applications, unfortunately, is available only in conversion to delimited ASCII formats.

However, a powerful procedural language makes it possible to design systems that can easily be used by inexperienced personnel. Optional programming interfaces to Basic and C, priced at $50 each, can also be used for those who want to design even more complex applications.

> USERS interested in building serious applications on a foundation of networked personal computers will find 10-Base and 10-Net well worth considering.

The 10-Base system is architected to employ the relational data base tables for its own internal use. System configuration parameters, lists of the data base's tables, report specifications and other directories are themselves maintained in SQL tables.

An important consequence of this is that 10-Base has an internal data dictionary built in. This naturally follows from 10-Base's maintaining tables of tables in managing its data bases.

10-Base also has a handy facility for saving SQL commands. This is particularly useful since SQL syntax can be very verbose at times. Commands are saved in named files that are retrieved within 10-Base's SQL command editor rather than as keyboard macros. In practice, this works well because the facilities of the command editor make it easy to manipulate saved text as desired.

Data types supported include character, integer, decimal and date. 10-Base can support up to 420 fields per record, 13,000 char. per record and up to 1,550 char. per field. The number of records and indexes per file and files per data base is limited only by the capacity of DOS and the system.

Fox's 10-Base has a lot to offer organizations interested in building data base applications on a platform of individual or networked personal computers. It also makes it very easy to gain initial experience with SQL and relational data base management for a very modest investment.

Zachmann is vice-president of research at International Data Corp.

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by design.

Betterbasic

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line is entered. If a Basica program has a syntax problem with an as-yet-unused line of code, it can remain an unsuspected time bomb. In Betterbasic, a bad line of code is rejected just after the Enter key is pressed and, with incremental compilation, GOTOs can reference a table and run much faster than they do in pure interpreters. And Betterbasic loses little of the interpreter's ease.

Betterbasic supports the important block structures such as IF THEN, FOR and WHILE loops, but its real flexibility comes from its procedures and functions. A procedure or function can be declared at any time, and its declaration puts the system into a fresh programming environment. Each procedure or function has its own line numbers, and unless declared differently, all its variables are local.

Procedures are called using only their names. Their parameter lists may require parentheses or not. A passed parameter can be altered by the procedure or protected from alteration, as required, and passed parameters can be given optional default values for use when no parameter is passed.

Different procedures and functions with the same name can be mixed, provided each works with a unique parameter type, and the system will automatically search only functions or procedures, as implied by the program context, when checking against the parameter type passed. Any set of procedures and functions written by a user or acquired elsewhere can be made into a disk module that can then be loaded as a standard part of the system as a whole. Betterbasic can be customized to a degree that is almost unbelievable — and unbelievably convenient.

Betterbasic has a pleasant built-in windowing system, handles errors with sophistication, offers different environments accessible from the DOS command line, has a pretty good built-in editor, supports — with limits — recursive function and procedure calling and has an optional runtime system that will produce independent .EXE files.

Betterbasic's downfalls

Of course, any system has its faults and limitations. Betterbasic is pricey, and NDP support is a sizable extra-cost item. There is no on-line Help system. It presently only supports graphics in color graphics adapter system, which is terrible. The documentation is quite spotty. The introductory material can be embarrassing, featuring such lines as, "You just entered your first command to Betterbasic, and Betterbasic obeyed!" The very powerful and often unfamiliar features in the reference section are not always explained well enough and have far too few examples.

Using Betterbasic is easy. But using it well is not a trivial undertaking. Also, the runtime system, which is quite expensive, produces huge files. Tiny programs start at 45K to 50K bytes; file size does grow rather slowly, however. Recursive operations, which are very useful, are limited by manual stack resizing. As far as I can determine, the program lacks the automatic stack resizing needed for truly free, recursive programming.

An annoying but rather minor matter arises from the incremental compiler. Most program characteristics can be changed easily with the use of an interpreter, but where a type declaration is made, change becomes an involved process. Betterbasic has some hefty restrictions about going into block structures and some minor restrictions about leaving them. This material is just a forewarning.

In summary, Betterbasic should run just about any standard Basic program and run it much faster than the original interpreter. The product allows, and even encourages, anyone from a casual tinkerer to a master programmer to be more productive much more frequently.

T. A. Elkins is a Huntington, W. Va.-based computer and management consultant with a degree in electrical engineering.

Scanner

CONTINUED FROM PAGE 35

fully operational when Handscan is in use.

Handscan has five buttons: four for cursor keys and programmable macro commands and one to activate scanning.

The scanner can transfer minus signs from the back to the front of scanned negative numbers or automatically add a series of numbers and enter only the total.

The user can also configure the scanner to read only numbers or only text characters for specific applications. Handscan supports Lotus Development Corp.'s 1-2-3, Ashton Tate's Dbase III and Multimate, Microrim's Rbase, Micropro International Corp.'s Wordstar and other common applications.

Saba has been developing Handscan for three years and is releasing it as the firm's first product. The firm is also working on technology to scan handwriting, Petkun said. "We think this is a new kind of peripheral and that scanners will eventually read anything," he said.

The scanner is based on standard optical-character reader technology and can read most common office typewriter and printer fonts. The machine does not reliably read typeset text, Petkun said.

Handscan requires a full-slot expansion board and controller software that takes up 180K bytes of memory. The entire package is priced at $649 and is scheduled to be available April 15 through dealers only, Petkun said.

The better you understand
the better your company c

The MIS perspective.

For years text management software has received scant attention from MIS.

Which is strange, considering how vital it is to some of the key people MIS has to serve.

Like the CEO plotting global competitive strategy.

For planners, strategists, and senior marketing executives, text management systems have proved their value repeatedly in recent years—delivering powerful bottom-line benefits, and creating a wave of demand that's headed right for you.

How do you prepare for this demand? Several ways:

First, make sure you understand text management software—before your users do. (Hint: we're *not* talking word processing.)

Second, select a text management approach that combines the features *users* need to obtain information—with the features *you'll* need to maintain system integrity. Users need specialized text search and reporting facilities conventional DBMS's don't offer; you need a new level of system controls dedicated retrieval systems don't offer.

And third, start evaluating text management systems and vendors without delay. You can begin that evaluation today with a look at INQUIRE/Text—the most comprehensive, proven text management software system on the market.

**Text management:
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Traditional corporate information systems do a great job managing structured data. Unfortunately, the information most needed by decision-makers is often unstructured—embedded in the text of documents such as letters, reports, and contracts. Because this material has traditionally been beyond the reach of online systems, access to it has been slow, tedious, and error-prone. Word processors and office automation systems, for all their other merits, have been practically useless in making the actual information content of documents available online.

A text management system fills this void by providing highly sophisticated facilities for online index, search, and retrieval of information in stored documents. With a text management system, users can pinpoint specific pieces of information within vast volumes of text—instantly. And once they've found the information, they can edit, combine, and report it with complete flexibility.

Traditionally, the biggest text management users have been in industries that are subject to extensive regulation and/or frequent litigation. Now others are taking advantage of the systems' capabilities for a broad range of corporate information management tasks. And high on the list of these tasks is competitive intelligence gathering for senior management.

The result has been a dramatic improvement in the quality of information available to decision-makers. And a dramatic increase in pressure on MIS to deliver text management capability.

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The control you need.**

As the demand for text management capability has grown, so has the number of vendors claiming to provide it. But few of these vendors offer the features, the flexibility, and the track record of Infodata's INQUIRE/Text.

INQUIRE/Text's automatic indexing and powerful keyword search and retrieval facilities have set industry standards in text management for years. And INQUIRE/Text's capacity, ease of use, and flexible interfacing options have made it a hit not only with end users, but also the MIS personnel charged with implementing it. Finally, INQUIRE/Text's worldwide track record makes it comfortable for top management.

INQUIRE/Text. It's the first thing you need to know about text management. And the only text management software system you'll want to live with. ◆

INQUIRE/Text runs on IBM and compatible mainframes under MVS/TSO, MVS/CICS and VM/CMS

NEW PRODUCTS

Systems

Applied Data Communications, Inc. has introduced its intelligent personal computer-based **TM500-ST Media Conversion/Duplication system.**

The system is said to translate data between incompatible media formats without requiring additional reconstruction. Media conversion capabilities for more than 500 media formats are possible. Media formats include 8-, 5¼- and 3½-in. diskettes and magnetic tape.

According to the vendor, the TM500-ST eliminates the need for manual clean-up o` data. The TM500-ST operates through an interface running on the personal computer.

The TM500-ST is priced at $15,750 including a preconfigured PC-compatible system with a 20M-byte hard disk drive.

Applied Data Communications, 14272 Chambers Road, Tustin, Calif. 92680.

Toshiba America, Inc. has added a **supertwist LCD** to its T1100 Plus portable personal computer.

The computer features two 3½-in. 720K-byte diskette drives and interfaces for a red-green-blue monitor, monochrome composite monitor, parallel printer, RS-232C serial communication device and expansion chassis. An external 5¼-in. diskette drive is also available.

The units cost $1,999 for 256K bytes of random-access memory (RAM) and $2,399 for 640K bytes of RAM.

Toshiba America, 9740 Irvine Blvd., Irvine, Calif. 92718.

Rapi-Serv Cash Systems, Inc. has introduced its **RS-2010** point-of-sale system.

The personal computer-compatible RS-2010 is packaged as a cash register but can support various languages and tools. It features a 20M-byte hard disk and a 360K-byte floppy drive. It supports an internal credit-authorization module with credit card scanner.

Rapi-Serv's *RS-2010 system*

The RS-2010 is said to be capable of running all PC-compatible software.

The RS-2010 is priced from $3,659 for a basic machine without disks to $8,140 for a unit with the credit-authorization feature.

Rapi-Serv, 1550 Old W. Henderson Road, Columbus, Ohio 43220.

Daisy Systems Corp. has introduced a line of computer-aided engineering workstations consisting of the **Personal Logician 386**, the **Logician 386** and the **Personal Logician 286.**

The Personal Logician 386 is a desktop 32-bit IBM Personal Computer AT-compatible workstation. The Logician 386 is a 32-bit accelerated graphics workstation. The Personal Logician 286 is based on the PC AT.

All three support Daisy's computer-aided design and engineering applications. All workstations share a single distributed data base, identical icon-based multiwindow user interface and can be configured with SD LAN, Daisy's Ethernet-based local-area network.

The Personal Logician 386 starts at $20,000. The Logician 386 starts at $50,000, and the Personal Logician 286 starts at $15,000.

Daisy Systems, 700 Middlefield Road, Mountain View, Calif. 94039.

Software applications packages

Tempo Investment Products, Inc. has introduced **Market Action Timer**, a software template for performing weekly stock market analysis with Lotus Development Corp.'s 1-2-3.

The program is said to interpret market indexes, moving averages and advance and decline ratios. It utilizes a proven formula for the analysis of advancing and declining issues on the New York Stock Exchange. It compares signals from the formula for a market-indexes moving average.

Market Action Timer costs $149.95.

Tempo Investment Products, Suite 123, 2014 N. Saginaw Road, Midland, Mich. 48640.

Scientific Systems, Inc. has reduced the price of its business forecasting program, **Forecast Master.**

Forecast Master is said to feature statistical techniques ranging from least-squares regression, exponential smoothing, curve fitting and auto correlation through econometric modeling, Box-Jenkins forecasting and Baysian Vector autoregression. The program is also said to handle seasonal decomposition and multi-

Continued on page 43

text management software,
an handle the competition.

The corporate strategist's perspective.

The amount of information that must be factored into major corporate decisions is increasing every day. And few categories of information are as sensitive or time-critical as competitive intelligence.

Whatever its source, whatever its nature, competitive information can be vital one day—and virtually worthless the next. To be used successfully in the timing and execution of any new initiative, competitive intelligence must be both accurate and actionable—and available to you ahead of your competition. And there's no better way to turn raw information into actionable intelligence than through a centralized online system under INQUIRE/Text.

INQUIRE/Text: Making the most of both internal and external information.

Competitive information comes from many internal and external sources: correspondence and memos, articles in trade journals, press releases, financial reports. Assimilating this information and making sense of it in time to act requires sophisticated text management capability. And INQUIRE/Text provides that capability in a proven, cost-effective manner that meets the needs of corporate strategists as well as MIS.

With INQUIRE/Text, the full range of appropriate internal and external information (in both text and alphanumeric forms) can be maintained online. Document searches can be conducted quickly and accurately, and people can share integrated, relevant information instantaneously—speeding decisions while minimizing potential errors due to faulty or incomplete information.

No wonder hundreds of companies are already using INQUIRE/Text to make the most of their opportunities. No wonder we're convinced it will work for you, too.

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For all its sophistication, INQUIRE/Text is easy for non-DP-oriented users to master. Which makes it especially powerful as a means of presenting strategic information to top management.

But these managers aren't the only ones who benefit from INQUIRE/Text. Many of the features that make INQUIRE/Text such a superior business intelligence tool also lend themselves to other uses in legal departments, regulatory affairs, marketing, the library—and not least of all, MIS itself.

The fact is, INQUIRE/Text is a perfect system for the online maintenance of an almost limitless variety of technical and non-technical documentation. With its large capacity and flexible database facilities (including automatic backup and recovery, usage monitoring and accounting, and multilevel security), INQUIRE/Text protects the organization's interests while serving the individual with unmatched flexibility.

So if you're looking fof an intelligent approach to competitive intelligence, start your search with INQUIRE/Text. And finish ahead of your competition. ♦

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Susan Kennedy should know. She's a product analyst at Leasametric, a company that rents, sells, and services DP equipment all over the country. Including thousands of terminals. And since reliability is crucial to Leasametric, they tear each evaluation unit apart piece by piece. Then, they give it a series of tests that make MIT exams look easy.

"Too many terminals just don't measure up," says Susan. "I've seen machines with questionable ergonomics… keyboards that flex in the middle when you type… even cheap little diodes that could drop off.

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And there's more to the 9220 than quality and reliability. There's also an extended feature set, including full VT-220 compatibility. A super-dark 14" amber screen. A tilt and swivel base. 30 programmable function keys. Plus the best thought-out ergonomics around. All for exactly $619.

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Continued from page 41

variate state-space.

Forecast Master is menu driven and includes integrated graphics and Help. Forecast Master costs $595.

Scientific Systems, One Alewife Place, 35 Cambridge Park Drive, Cambridge, Mass. 02140.

Computer Associates International, Inc. has announced **Superimage**, a graphics editor and drawing system for IBM and compatible microcomputers.

Superimage is said to offer such capabilities as freehand drawing of circles, lines, text, boxes and polygons; editing of charts and graphs; advanced functionality for generating backgrounds for artist-quality presentations; clip-art symbol libraries; word charts generated from stencils; and slide service.

Superimage is said to edit standard binary metafiles generated from any mainframe or personal computer graphics software.

Superimage is priced at $495.

Computer Associates, 711 Stewart Ave., Garden City, N.Y. 11530.

Visionics Corp. has announced the **2-D Designer** drafting package.

Features of the package include English and metric measurements supported to five decimal places; unlimited size scaling of drawings; creation of polygons, arcs, rectangles and circles using contract points or sketch mode; calculate-area and fill; and macro functions. Users can create and manipulate symbol libraries.

The 2-D Designer runs on IBM Personal Computers and compatibles with 640K bytes of memory. It supports color graphics cards such as IBM Color Graphics Adapters and AT&T Personal Computer 6300 Hi-Resolution. Input devices include Mircosoft Corp. bus or serial mouse and certain digitizers.

The 2-D Designer costs $195.

Visionics, 343 Gibraltar Drive, Sunnyvale, Calif. 94089.

Softcraft, Inc. has announced the **Softcraft Font Editor**, a software program said to allow users to create their own fonts and modify existing ones.

The program works on any IBM Personal Computer or compatible with Hercules Computer Technology, Inc., IBM Color Graphics Adapter or Enhanced Graphics Adapter graphics card. It has full printer resolution and any character created can be saved in a font of as many as 256 characters.

Features include the ability to draw multisegment lines and splines (smooth curves) of specified widths; draw rectangles, circles and elipses; mirror objects around horizontal and vertical axes and rotate them; invert an object; cut and paste; enlarge; reduce; and slant.

Versions are available for Hewlett-Packard Co., Canon U.S.A., Inc. and NCR Corp. laser printers and certain dot matrix printers.

The Softcraft Font Editor costs $290.

Softcraft, Suite 500, 16 N. Carroll St., Madison, Wis. 53703.

Software utilities

Tektronix, Inc. has ported its **Structured Analysis Tools** to the IBM Personal Computer XT and AT.

According to the vendor, the software allows users to automate system modeling using the IBM PC. All operations can be performed via a mouse or cursor-driven window menu environment. Data flow diagrams can be nested 25 levels deep. The PC version is said to support all aspects of a structured analysis specification.

The IBM PC can serve as a local workstation or emulate a Tektronix terminal attached to a Digital Equipment Corp. VAX system.

Structured Analysis Tools costs $1,950.

Tektronix, P.O.. Box 500, Beaverton, Ore. 97077.

Supermac Software has introduced **Diskfit**, a hard-disk backup utility for the Apple Computer, Inc. Macintosh.

Diskfit is an automatic program that backs up a hard disk incrementally. It revises the file on the same floppy disk, rather than rewriting the altered files to a new disk. The product keeps all files in Apple standard format that appear as individual icons on the desktop.

Diskfit is priced at $74.95.

Supermac Software, 950 N. Rangstorff Ave., Mountain View, Calif. 94043.

Visual Age has announced **Turbosmith**, a source code debugger for Borland International's Turbo Pascal.

Turbosmith is said to speed and simplify program debugging by providing users with the actual source statements they wish to execute along with the variables the procedure is about to act upon. The program runs as an invisible shell around Turbo Pascal. It provides four window types that provide different views into the Turbo Pascal code. Windows are stackable in levels up to eight deep.

Turbosmith operates on IBM Personal Computers. It costs $69.

Visual Age, 642 N. Larchmont Blvd., Los Angeles, Calif. 90004.

The Font Factory has announced that its library of **Compugraphic typesetting fonts** is now compatible with Xerox Corp.'s Ventura Publisher Edition and White Sciences, Inc.'s Pagebuilder desktop publishing software packges.

The fonts are packaged into 15 separate typeface products including such typefaces as CG Times, CG Triumvirate,

Continued on page 45

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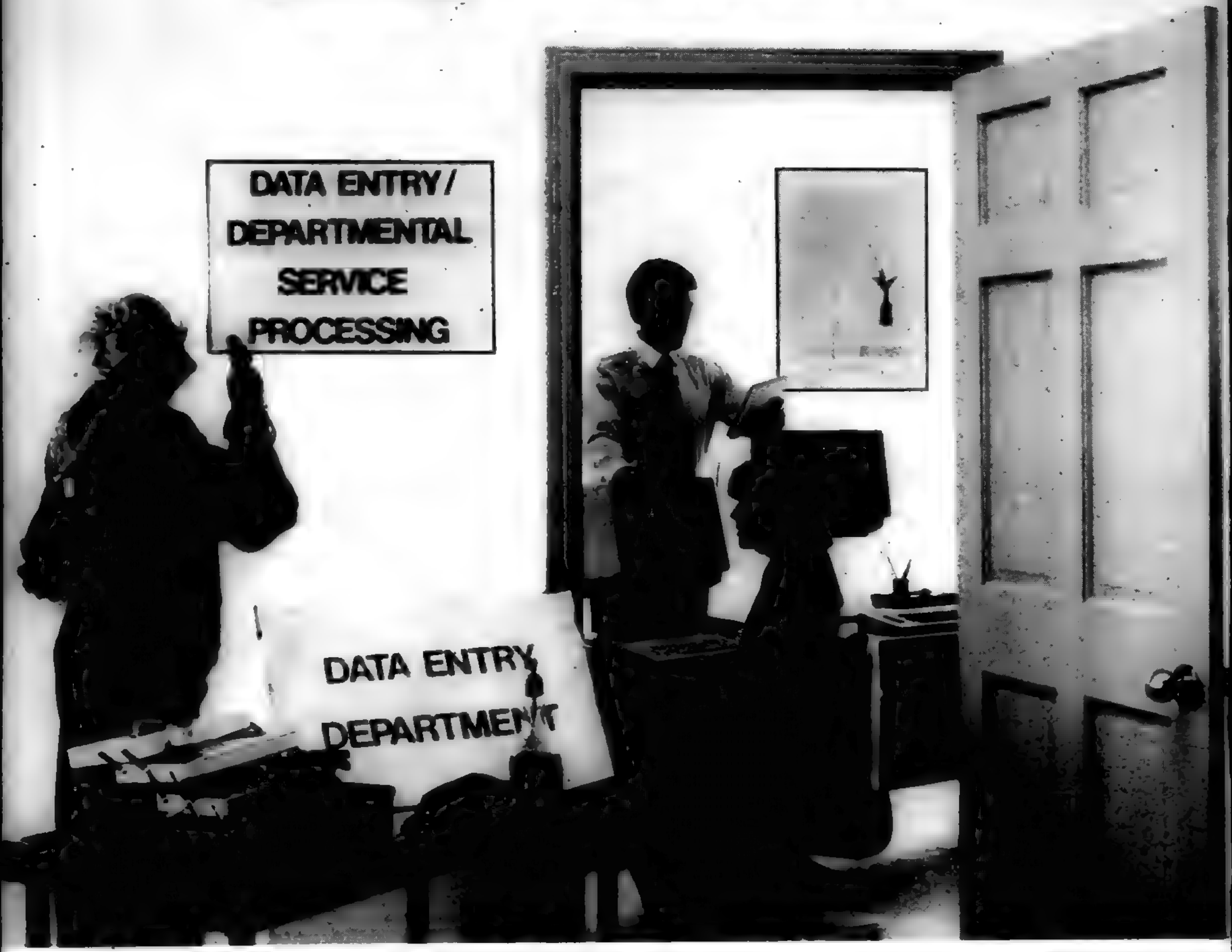

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NIXDORF
COMPUTER

Continued from page 43

Antique Olive and Century II. The typefaces are provided in normal, bold, italic and bold italic and are provided in point sizes ranging from six to 30 points in both portrait and landscape orientations.

Each typeface family is priced at $199.95 except for the CG Triumvirate, which costs $299.95.

The Font Factory, P.O. Box 5429, Kingwood, Texas 77339.

Software enhancements

Softway, Inc. has announced an **interface for its High Screen** user interface development tool, which is said to make High Screen compatible with Ashton-Tate's Dbase III Plus.

In addition to providing compatibility with Dbase III Plus, the interface provides compatibility with the Dbase compilers from Nantucket, Inc.'s Clipper and Wordtech Systems, Inc.'s Quicksilver programs.

High Screen features screen generation, Help and window management, automatic field checking and menu management.

High Screen costs $129. It runs on IBM Personal Computers and compatibles.

Softway, Suite 222, 500 Sutter St., San Francisco, Calif. 94102.

Computer Associates International, Inc. has announced **Version 4.2** of its **Easybusiness Systems** integrated accounting software.

Enhancements include the ability of General Ledger and Financial Reporter to handle both 12 and 13 accounting periods per year. Accounts Payable features a check reconciliation function that can record and report the status of computerized and manually prepared checks generated by Accounts Payable. Other new features include enhanced transaction editing in Accounts Payable and Accounts Receivable and tailored Job Costing to handle a variety of industries.

General Ledger and Financial Reporter cost $695; Accounts Receivable costs $695; Accounts Payable costs $695; and Job Costing costs $795.

Computer Associates, 2195 Fortune Drive, San Jose, Calif. 95131.

Concentric Data Systems, Inc. has announced **Version 2 of R & R Relational Report Writer** for Ashton-Tate's Dbase.

R & R is said to allow users to create reports without programming. Version 2 features relational merge, said to allow users to prepare form letters directly from related Dbase files.

The letters can contain detailed records and related calculations. Other features include 16 printer fonts available for fields and texts and the ability to mix fonts and pitches on a report. In addition, line, box and other non-ASCII graphic characters can be selected from menus, memo fields can be queried and fields can be merged and word-wrapped within memo fields.

R & R costs $149.

Concentric, P.O. Box 4063, 18 Lyman St., Westboro, Mass. 01581.

Jurisoft, Inc. has announced that its **Comparerite** document editing software now works with Micropro International Corp.'s Wordstar 2000, Multimate International Corp.'s Multimate, Lifetree Software, Inc.'s Volkswriter and Officewriter word processing packages.

Comparerite is said to enable users to compare two drafts of a document for style and accuracy. Users can compare alternate wording side by side and ensure that changes in text have been made.

Comparerite is priced at $99.95 for use on any one of the supported word processors. Versions that support any two word processors, or all of them, are priced from $129.95 and $159.95.

Jurisoft, 763 Massachusetts Ave., Cambridge, Mass. 02139.

Data storage

Innovative Devices, Inc. has announced **Cardrive**, a plug-in hard-disk card for IBM Personal Computers, AT&T 6300, 6300 Plus and compatibles.

Cardrive offers unformatted capacities of 69M bytes and 83M bytes, no more than 27-msec access time and a data transfer rate of 7.5M bit/sec. It is certified to operate 2.7 Relocating Linker Loader encoding on a 3½-in. hard disk.

Features include a 48-bit error correction code, an 8K-byte buffer, automatic locking of heads in a dedicated landing zone on power down, voice coil actuator, self diagnostics and automatic track deal location for media defects.

The 69M-byte model costs $1,810 and the 83M-byte model costs $1,995.

Innovative Devices, Suite 204, 300 Wheeler Road, Hauppauge, N.Y. 11788.

Acknowledge, Inc. has announced the **Interceptor Series** of portable cartridge-tape subsystems for personal computer backup.

The units are said to provide file-by-file backup and restore functions at streaming speeds and do not require a separate controller card. Formatted tape capacity ranges from 40M to 150M bytes.

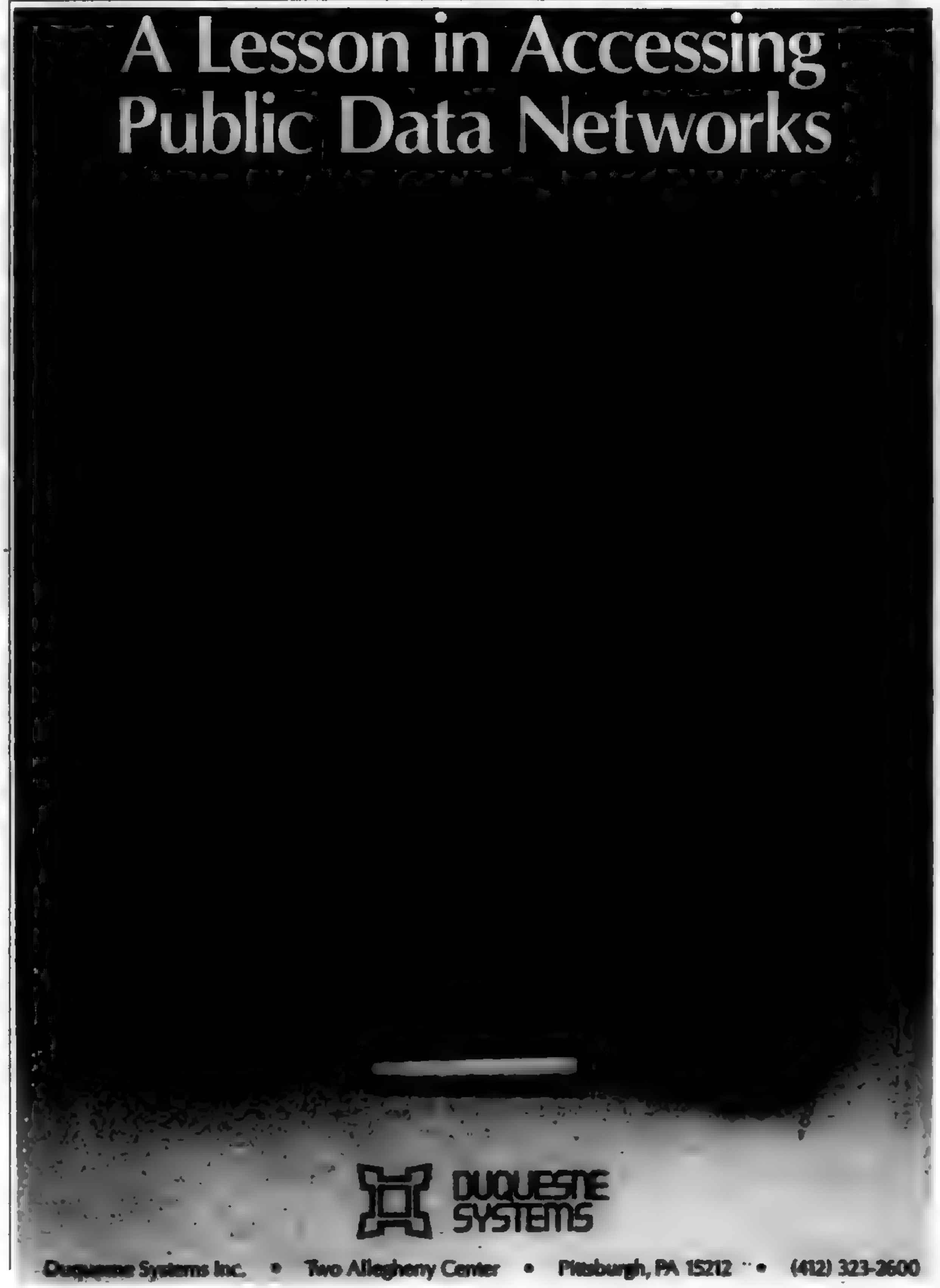
Prices for the Interceptor Series range from $1,395 to $1,795.

Acknowledge, P.O. Box 767, Sudbury, Mass. 01776.

Printers/Plotters/Peripherals

Personal Touch Corp. has introduced

Continued on page 46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Continued from page 45

Turbotouch 1910, a 19-in. color touch-screen monitor.

The IBM Personal Computer-compatible monitor is said to accept red-green-blue and National Television Standards Code signals. The monitor has a resolution of 350 television lines and 640 by 240 pixel. The integral touch screen has a resolution of 256 by 256 pixel and can be interfaced to the RS-232 serial port or the analog game port, the vendor said. The transparent touch-screen membrane is attached directly to the front of the monitor glass tube so there is no parallax.

The Turbotouch 1910 is priced at $1,519.

Personal Touch, Suite 290, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

Board-level devices

NEC Home Electronics (U.S.A.), Inc. has introduced the **Multisync Color Graphics Board Model GB-1** for use with a NEC Multisync Color Monitor.

The GB-1 features 640- by 480-pixel resolution and 16-color display from a palette of 64 colors. The board offers compatibility with IBM's Color Graphics Adapter, Enhanced Graphics Adapter and Monochrome Display Adapter and Hercules Computer Technology, Inc. modes. Users can display a full page of text, measuring 80 char. by 60 lines, or spreadsheets with up to 132 col. by 44 lines. The board comes with a parallel printer port, a printer-spooler utility, hardware zoom and viewport and Media Cybernetics, Inc.'s Dr. Halo II software.

The GB-1 Multisync Color Graphics Board costs $649.

NEC, 1255 Michael Drive, Wood Dale, Ill. 60191.

Tatung Company of America, Inc. has introduced **Supreme EGA**, an enhanced graphics adapter (EGA) for personal computers.

Supreme EGA is said to run all EGA, Color Graphics Adapter (CGA), Monochrome Display Adapter (MDA), Hercules Computer Technology, Inc. software and a 132-col. test display. The adapter works with any IBM-compatible EGA, CGA, monochrome or composite monitor.

According to the vendor, when running CGA software on an EGA monitor, a resolution of 8 by 14 pixels is displayed, and graphics are double scanned. The card also offers soft scrolling, smooth pixel panning, windowing and 256K bytes of video memory.

Supreme EGA costs $399.

Tatung, 2850 El Presidio St., Long Beach, Calif. 90810.

Boca Research, Inc. has announced the **Bocaram/AT**, a memory board for IBM Personal Computer ATs, XT 286s and true compatibles.

The Bocaram/AT is said to offer up to 4M bytes of memory per board. The board may be configured with 128K bytes of conventional memory and with up to 2M bytes of expanded memory supporting the Lotus/Intel/Microsoft Expanded Memory Specification 3.2. A total of four Bocaram/AT boards can be combined.

The Bocaram/AT costs $245 for the 128K-byte version; $395 for the 1M-byte version; $595 for the 2M-byte version; $995 for the 4M-byte version; and $199 for the 1M-byte random-access memory chip kit.

Boca Research, 6401 Congress Ave., Boca Raton, Fla. 33431.

Paradise Systems, Inc. has announced the **Paradise Autoswitch EGA-480** card, a video-display adapter for IBM Personal Computers.

The card is said to display selected enhanced graphics applications in 640- by 480-pixel resolution and 132-col. modes on multifrequency monitors. It features automatic switching between different video modes and automatic monitor detection. Software drivers for applications such as computer-aided design, desktop publishing, spreadsheets and word processing are included.

The short-size card includes 256K bytes of video memory and costs $599.

Paradise Systems, 217 E. Grand Ave., South San Francisco, Calif. 94080.

Vutek Systems, Inc. has introduced the **Short Megamem**, a memory expansion board designed for the IBM 286 XT.

According to the vendor, the Short Megamem permits expansion of up to 2M bytes using 64K bytes of random-access memory (RAM) and 256K-byte RAM chips. The board provides zero-wait states and split memory addressing.

The board costs $230 with no installed memory, $380 with 512K bytes, $530 with 1M byte and $830 with 2M bytes.

Vutek Systems, 10855 Sorrento Valley Road, San Diego, Calif. 92121.

Alps America has enhanced its **Imagenhancer** personal computer add-on board.

The Imagenhancer is said to allow users to produce plotter-like graphics on dot matrix printers. It now accepts output from any software package using Hewlett-Packard Co.'s HPGL plotter commands. Other new features include a pop-up menu that allows users to jump between programs and functions and an interactive installation program.

The board has a 512K-byte storage buffer that can hold data in either printer or plotter modes. It supports all Alps monochrome and color printers in 9-, 18- and 24-pin configurations.

Imagenhancer costs $595.

Alps America, 3553 N. First St., San Jose, Calif. 95134.

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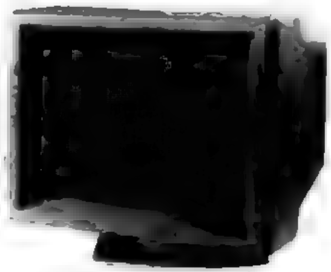


NETWORKING

DATA STREAM

John Carosella

IBM 9370 anchors nets

IBM's 9370 has turned a lot of heads. It's a mid-size, departmental processor that not only communicates with existing IBM systems — for IBM, a feat in itself — but with other vendors' products as well. I say the real place for the 9370 is as IBM's key to the local networking environment, providing the first real reason to invest in the IBM Token-Ring local-area network (LAN).

After being chastised for years about its uncoordinated mid-range system strategy, Big Blue has finally come up with what everybody had been saying they wanted. The 9370 will support IBM's VTAM, CICS and Distributed Office Support System (Disoss) under the VSE operating system and Professional Office System (Profs) under VM.

And as a full-fledged Physical Unit Type 5 using VSE, the 9370 can do anything the bigger boys can in an IBM Systems Network Architecture (SNA) environment.

IBM is billing VM/IS as a modular, easy-to-install flavor of VM that doesn't require you to have an expensive VM systems programmer on-site. This is critical if IBM wants to sell fleets of 9370s to office environments. Initial reviews of VM/IS

Continued on page 48

Emulator spans IBM, DEC gap

BY ELISABETH HORWITT
CW STAFF

FREMONT, Calif. — Interlink Computer Sciences, Inc. has announced what it claimed is the first product offering to support full-screen terminal access to both IBM and Digital Equipment Corp. hosts.

The 327X Emulator permits DEC VT100 and VT200 terminal users to connect to IBM's Systems Network Architecture networking environment and to access ACF/VTAM applications on IBM mainframe hosts, the vendor said. The VTXX Emulator allows IBM users to log on to a DEC VAX or RSX system as a VT100 or VT220 terminal.

Both software products run on Interlink's existing 3711 Gateway (MVS), a DEC PDP-11 communications front end plus software that converts an IBM MVS host into a communications gateway. "Full-screen IBM/DEC terminal emulation is not new, but other products don't have things like 500K bit/sec. total throughput, bidirectional file transfer and record-level access," claimed Interlink President Lambert Onuma.

The 3711 enables DEC users to access sequential-access method files under IBM MVS and VM operating environments and provides IBM users with access to sequential files on DEC VAX/VMS systems.

Through integration with software from Soft-Switch, Inc., the 3711 gateway also provides electronic mail exchange among systems from DEC, IBM, Wang Laboratories, Inc. and other vendors. The gateway also routes requests and files among multiple DEC and IBM hosts.

The 327X Emulator is priced at $5,950; the VTXX Emulator costs $10,950.

Net offers $100-per-PC link

BY PEGGY WATT
CW STAFF

HOPKINTON, Mass. — Avatar Technologies, Inc. has introduced the Alliance ZSL, a local-area network that uses twisted-pair cable and RS-232 serial ports to connect IBM Personal Computers, PC ATs and compatibles at a cost as low as $100 per PC, the company claimed.

In the Alliance ZSL star-shaped configuration, PCs running proprietary multitasking software communicate directly through virtual circuits established through a central network controller. This eliminates the need for a dedicated file server or for equipping each PC with a network board, Avatar claimed.

While continuing to run a PC application in the foreground, the user can hot-key to Avatar's menu-driven networking software program, send a file to a printer, connect with another PC across the network and send or request a file, Avatar marketing director Neal Checkoway said.

While the system does not support multiuser concurrent data base access through a server, PCs can access one another's file directories and files directly without interrupting applications activity, he explained.

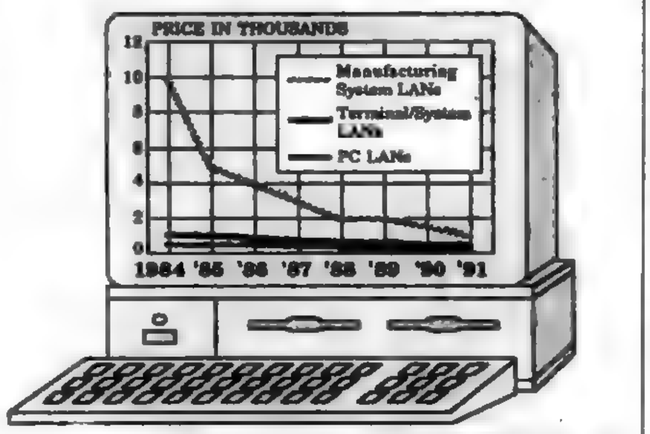
Requests for file transfer are

Continued on page 49

Data View

Factory LAN prices due to fall this year

PC, terminal network prices have leveled off



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP.
CW CHART: SUSAN ALDAM

Proteon to enhance token-ring

BY DONNA RAIMONDI
CW STAFF

LAS VEGAS — Proteon, Inc. in Natick, Mass., is expected this week to roll out an enhanced Pronet-4 token-ring network product line to support additional IBM Personal Computer networking software as well as support for VMEbus-based computers.

The announcement is due to take place at Interface '87, being held here this week.

The vendor reportedly will introduce upgraded versions of its P1340 PC and P1344 PC AT interface adapters, which link the IBM PC and PC AT, respectively, to Pronet-4. As a result of the enhancements, Pronet-4 will be able to support applications written for IBM's Advanced Program-to-Program Communications (APPC)/PC interface, PC LAN program and Netbios for the Token-Ring network.

APPC/PC implements IBM's LU6.2 peer-to-peer networking protocols on the PC. Netbios and the PC LAN program both provide standardized hooks used by a wide range of PC software vendors to port their packages to IBM PC networks.

Proteon's enhanced interface

Continued on page 49

Inside

- Gandalf Data introduces SSM 2083 four-channel synchronous module. Page 50.
- Micom Systems doubles transmission range and speed of Instalink [illegible] voice and data multiplexer. Page 52.

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IBM 9370

FROM PAGE 47

have panned its user friendliness, however. Apparently, the addition of a few menus to the installation process isn't enough to simplify an IBM host operating system. On the IBM-to-non-IBM connectivity front, the 9370 will come with slots for plug-in adapters for which both Ethernet and Token-Ring cards are available. Used in conjuction with Transmission Control Protocol/Internet Protocol (TCP/IP), these cards can be used to support LAN-based intervendor communications.

TSAF has potential

Another 9370 element with a lot of connectivity potential is the new Transparent Services Access Facility (TSAF), which runs under VM/SP Release 5. It was designed to enable users running a query program based on IBM's Structured Query Language to access data bases split among up to eight 9370s, which can be clustered together on a Token-Ring network or an Ethernet LAN.

Essentially, TSAF is a VM implementation of Advanced Program-to-Program Communications (APPC) with an important difference: It doesn't require, and in fact cannot use, the rest of SNA. Initially, it makes use of host-channel bisynchronous connections. In the future, support will be available for communications over Ethernets and Token-Ring networks and regular SNA networks. Users will also have to wait for TSAF to attain support of the full set of LU6.2 verbs that provide peer-to-peer communications under SNA.

OK, so the 9370's communications facilities still have a way to go. But let's envision a future 9370 incarnation in which a really user-friendly VM/IS supports TSAF, which in turn communicates with APPC PC, the IBM Personal Computer implementation of APPC. Equipped with a Token-Ring card, the 9370 becomes the primary server for PCs on a Token-Ring network and server functions such as disk sharing and print spooling.

With a configuration like that, IBM could really start playing hardball with the competition in the office systems communication arena. First, it would provide IBM's most fully functioned PC-to-mainframe communications mechanism to date, providing distributed data base functionality that is missing from IBM's file-oriented Distributed Data Manager, and greater micro-to-mainframe functionality than IBM's current Extended Communication Facility.

Through the APPC link, users have access to the mainframe world without sacrificing the native power of their PCs in the process. In addition, using the 9370 as a server would provide IBM with a badly needed anchor for the Token-Ring — and the first real reason to go with IBM for PC networking.

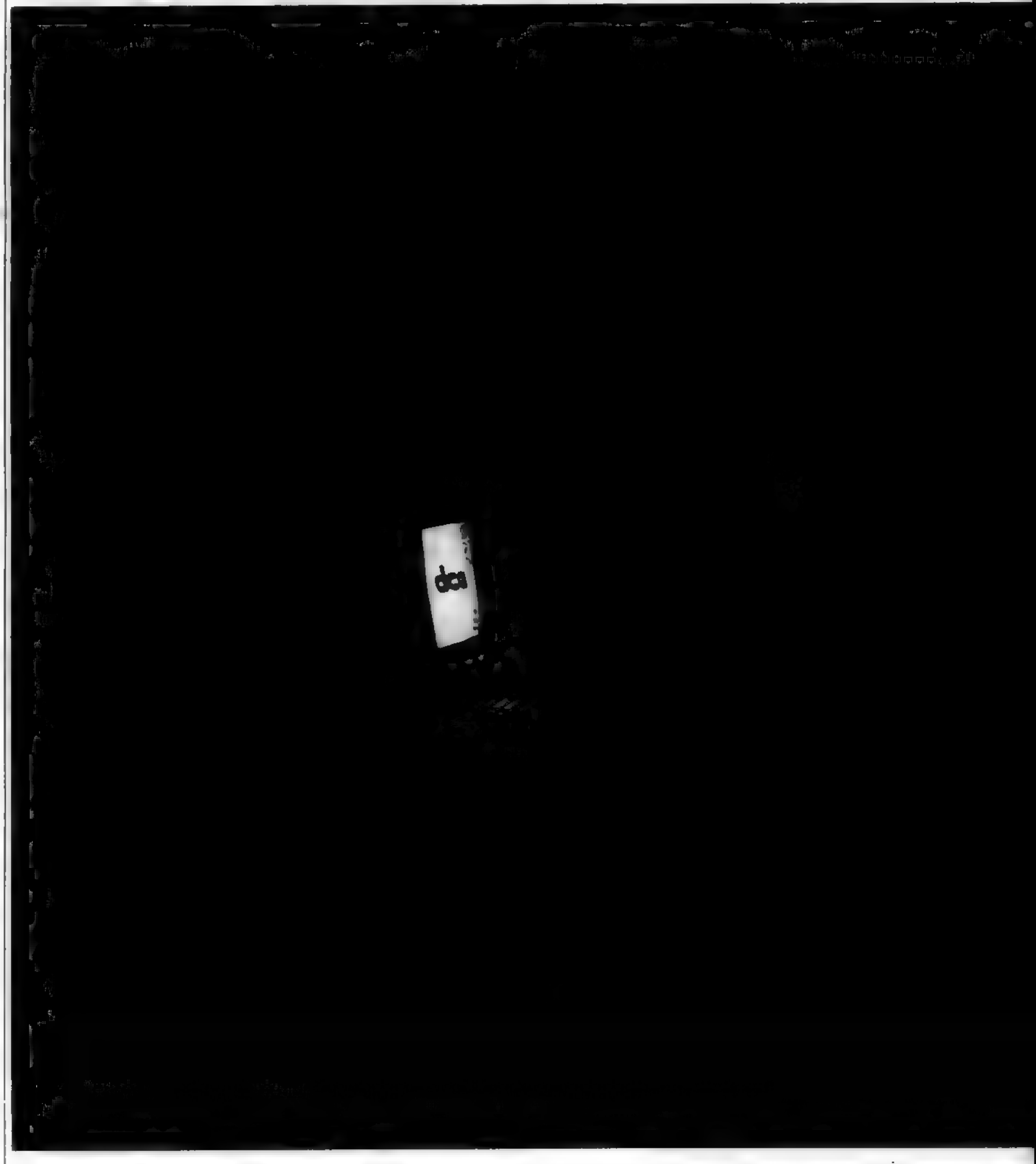
By tightly coupling a mainframe to a PC using a LU6.2-based TSAF-APPC PC interface, IBM will encourage applications developers to write to LU6.2 — and foster a migration away from the less functional Netbios MS-Net networking environment.

Up to now, application developers have held off from LU6.2 because it is extremely complex and processor intensive. The 9370 as Token-Ring server could help IBM wean developers away from companies like Novell, Inc. and Banyan Systems, Inc. that provide standard Netbios interfaces to their essentially proprietary networks.

By providing the 9370 with Ethernet connectivity, a floating-point processor boost and TCP/IP, IBM is drawing a bead on Digital Equipment Corp.'s bread and butter, the engineering niche.

But how about the departmental processing LAN market, which is orders of magnitude larger? The 9370's Profs still has a long way to go before it can give DEC's All-In-1 serious competition. In addition, VM/IS is still far less friendly than VAX/VMS and thus less suitable for the dispersed office environment.

Users who look carefully



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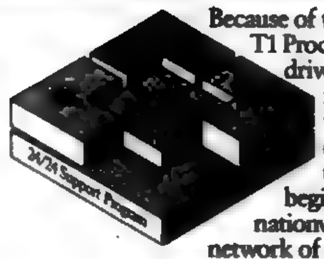

Because of the DCA System 9000 T1 Processor's software-driven, "building block" modularity, your T1 voice/data network can grow from a small two- or three-site beginning, to a powerful nationwide, multi-node mesh network of any size or complexity.

down the road should see the 9370 emerging as a key link between the office PC and MIS department. The 9370 will interact with PCs as peers, leveraging their collective power. At the same time, it will provide departmental processing compatible with existing MIS/DP infrastructure.

In addition to raw horsepower and reliability, the success of the 9370 as Token-Ring server and departmental processor will depend on how quickly IBM and third-party developers can bring to market applications that use TSAF and APPC PC, and just how easy it is to drop what is essentially a VM mainframe into an office environment.

Carosella is a consultant for Fairfax, Va.-based Network Strategies, Inc.

Proteon

FROM PAGE 47

cards also will support IBM's 3270 Emulation Program Version 3.0.

Proteon's Pronet-4 interface cards already support third-party vendor networking products such as Banyan Systems, Inc.'s Vines, Novell, Inc.'s Netware and the Transmission Control Protocol/Internet Protocol.

The enhanced interface boards will support IEEE 802.2 logical link control protocols and IBM's Adapter Support Interface (ASI), which IBM provides as part of its Token-Ring PC Adapter card. Pronet-4 interfaces can communicate or be interchanged with these adapter cards, Proteon said.

Priced at $695, the enhanced adapters are scheduled for commercial release in May. Existing Pronet PC and PC AT interfaces can be upgraded at no charge, Proteon said.

Proteon is also expected to announce the P1542 interface, which links VMEbus-based computers and workstations to the Pronet-4 IEEE 802.5-standard network. This interface will allow high-speed VMEbus-based computers to communicate with personal computers, minicomputers and mainframes on IEEE 802.5 networks such as Proteon's Pronet-4 and the IBM Token-Ring network. The $2,200 P1542 supports either 16-, 24- or 32-bit memory addressing and has full-duplex direct-memory access.

"With the P1542, IEEE 802.5 network users can connect VMEbus-based computers from vendors such as Sun Microsystems, Inc., Charles River Data Systems, Inc. and Motorola, Inc. with IBM PCs, ATs and Multibus-based systems," said Tony Bolton, director of marketing. IBM mainframes can use IBM 3174, 3270 or 3725 Token-Ring network products to communicate with VMEbus workstations using the P1542 Pronet-4 interface. Similar connectivity is available to IBM 9370 and System/36 hosts, Proteon said.

Avatar

FROM PAGE 47

queued in the network controller's buffer. PC networking software has password-controlled network access and file locking.

The Alliance ZSL can connect up to 20 PCs, peripherals or host computers. Asynchronous hosts can be linked to the network and exchange files with PCs using applications based on Kermit, the widely used asynchronous communications protocol. IBM hosts can be linked to the network through Avatar's 3270 gateway product.

Apple Computer, Inc. Macintoshes can be linked to the network controller via serial cable and then can share printers with other network nodes. Checkoway said proprietary software under development will provide file transfer between Macintoshes and PCs on the network sometime in the future.

The network supports transmission rates of 115K bit/sec. for PC ATs and 76K bit/sec. for PCs with no degradation, according to Checkoway. PCs are linked to the network controller via RS-232 connections at distances of up to 500 ft between PC and controller.

The Alliance ZSL is available now. An eight-node package is priced at $1,195. A 14-node package is $1,595, and a 20-node version is priced at $1,995.

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NEW PRODUCTS

Local-area network hardware

Digital Products, Inc. has announced the **Printdirector 6**, a mid-range six-port model of its Printdirector family of printer management systems.

The Printdirector 6 is said to support resource sharing of hardware such as laser or daisywheel printers. The system utilizes asynchronous RS-232 communications, microprocessors and various buffering options. Users can share one or more printers with up to five personal computers.

The system comes with a 250K-byte expandable print buffer and different combinations of I/O ports.

Printdirector 6 costs $795.

Digital Products, 108 Water St., Watertown, Mass. 02172.

Micom Systems, Inc. has introduced **8-4-1**, an IEEE 802.3-compliant, multiport transceiver for Ethernet networks.

The 8-4-1 is said to allow up to eight Ethernet-compatible devices to be grouped together in various stand-alone and network-connected configurations. It provides the user with eight Ethernet transceivers in a single box. In a stand-alone configuration, 8-4-1 acts as a network hub, allowing all stations in the network to be linked with transceiver cabling. The product switches between stand-alone and network-connected modes automatically, the vendor said.

The 8-4-1 is priced at $995 per unit.

Micom Systems, 155 Swanson Road, Boxboro, Mass. 01719.

Gandalf Data, Inc. has introduced a synchronous interface board, called the **SSM 2083**, for its PACX 200 and PACX 2000 networking nodes.

The four-channel, synchronous module is said to allow the PACX systems to be used in front-end and matrix switching applications in networks with IBM, Unisys Corp. and other mainframe computers that communicate synchronously.

Features include 19.2K bit/sec. data operation, support of flexible channel configurations, control-signal pass-through of up to six signals per device, selectable data communications equipment and data terminal equipment configuration and transparent operation.

The SSM 2083 is priced at $1,400.

Gandalf Data, 1020 South Noel Ave., Wheeling, Ill. 60090.

Local-area network software

Waterloo Microsystems, Inc. has introduced the **Port Irma Server**, software said to allow personal computer users on a Waterloo Port local-area network (LAN) to communicate with an IBM mainframe.

The Port Irma Server runs on an IBM Personal Computer or compatible connected to a mainframe via a Digital Communications Associates, Inc. Irma board. Multiple Irma servers can run in the same Port network at only one per PC. Users on other PCs on the Port LAN can share the server for mainframe communications.

Port Irma provides IBM 3278 terminal emulation that can run concurrently with other applications on the PC. Users can transfer files to and from the mainframe. An audit trail of all sessions is provided.

The Port Irma Server costs $995.

Waterloo Microsystems, Suite 200, 3597 Parkway Lane, Norcross, Ga. 30092.

Meridian Technology, Inc. has announced **Carbon Copy Plus**, data communications software for IBM Personal Computers and compatibles.

Carbon Copy Plus is said to combine PC-to-PC remote control, PC-to-host terminal emulation and X-Modem and Kermit file transfer protocols. Terminal-emulation capabilities simulate the Digital Equipment Corp. VT52 and VT100, Televideo Systems, Inc. 920 and IBM 3101.

Features include the ability to operate on an asynchronous dial-up link or direct PC-to-PC connection through serial ports, a log file with full audit trail, dial-back security, remote printer support, support of interactive graphics and pop-up windows.

Carbon Copy Plus costs $195.

Meridian Technology, Suite 120, 1101 Dove St., Newport Beach, Calif. 92660.

Network management

NCR Comten has announced **Comten Overview**, a network control and management software product.

The software is said to allow a single-system console to consolidate information for local and remote Comten 3600 and 5600 communications processors operating in either Systems Network Architecture (SNA) or non-SNA networks. It monitors incoming information such as trunk and X.25 statistics from the communications processors to which it is assigned. A single-operator console can monitor up to 20 communications processors.

Features include command lists, an alert window and operator Help screens.

The initial license fee for Comten Overview is $600. The continuing license fee is $200 per month or $2,200 per year.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

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Telcor Systems Corp. has announced the **Network Administrator.**

The Network Administrator is said to allow host-site personnel working at a personal computer to monitor and control an entire dial-data network. According to the vendor, it can directly set all the option and security parameters of both host-site and remotely located Telcor modems without operator assistance.

Features include immediate status reporting, maintenance of an audit trail of all network traffic, a variety of security procedures and compatibility with 212A and 103 modems. The units also contain Telcor's data compression technology, said to increase data transfer rates to 9.6K bit/sec. full duplex.

The Network Administrator software costs $895.

Telcor, 12 Michigan Drive, Natick, Mass. 01760.

Customer-premise equipment

Natural Microsystems Corp. has introduced **Watson VBX**, an IBM Personal Computer-based voice messaging and telephone management system for businesses with up to 100 employees.

Watson VBX is said to automatically answer incoming calls, route calls to the proper extensions and record and deliver voice messages. It consists of four application systems: call director, outbound telemarketing, voice mail and voice bulletin board. It also comes with Watson VIS, which allows users to create custom applications.

Watson VBX, consisting of two Watson circuit boards, voice branch exchange software and an IBM PC AT-compatible microcomputer, costs $8,495. A Watson VBX Upgrade Option, including everything except the microcomputer, costs $3,995.

Natural Microsystems, 6 Mercer Road, Natick, Mass. 01760.

Xerox Corp. has announced its **Xerox Voice Message Exchange System V** designed to serve 800 to 10,000 users.

System V is said to be able to handle more than 3,000 calls per hour and to store up to 526 hours of messages. It is available with 12 to 64 ports and is compatible with the entire Xerox Voice Message Exchange line.

The system incorporates double-density disk drives. It features a front panel display and a control microprocessor, according to the vendor.

System V costs from $123,000. It may be rented annually starting at $4,700 per month.

Xerox, Xerox Square, Rochester, N.Y. 14644.

Links

Computer Protocol Corp. has announced **CPBlue**, a micro-to-mainframe communications board for information transfer between IBM and compatible personal computers and host systems.

CPBlue is said to support more than seven protocols and emulations. It can be connected locally via synchronous or asynchronous cable or remotely by modem. It offers data transmission speeds of up to 19.2K bit/sec. and does its own formatting, according to the vendor. It also allows simultaneous access to wide-area and local-area networks.

CPBlue is priced at $795.

Computer Procotol, Exchange Complex, 155 West St., Wilmington, Mass. 01887.

Attachmate Corp. has enhanced its **Coaxstation** and **Remotestation** personal computer to mainframe software.

Release 3.0 retains all original Attachmate features such as multiple mainframe sessions, windowing, file transfer and printer emulation. Additional functions include 43-line by 132-col. display, support for IBM's Send/Receive file transfer including IBM Structured Field protocol, an application program interface compatible with IBM's 3270 Personal Computer Emulation Program Version 2.0 or 3.0 and improved printer support.

The software is included with Attachmate 3270 coaxial and remote adapters. It costs $395 when purchased separately for use with IBM Adapters.

Attachmate, 3241 118th S.E., Bellevue, Wash. 98005.

Intelligent Technologies has enhanced its **Bisync Exchange 3780 Communications System.**

Designed to allow remote connections of personal computers to mainframe or minicomputer hosts, the new model features 3780 Remote Job Entry running under Concurrent DOS and 19.2K bit/sec. transfer speed. According to the vendor, foreign character support is provided as well.

Bisync Exchange 3780 costs $695.

Intelligent Technologies, 737 Lincoln Centre Drive, Foster City, Calif. 94404.

Novell, Inc. has announced the **Netware Remote Bridge X.25** and **Netware X.25 Gateway.**

The products, developed with Eicon Technology Corp. in Montreal, were designed for wide-area communications and support X.25 protocol.

The Netware Remote Bridge X.25 provides invisible remote connections between multiple Netware local-area networks (LAN).

It can communicate with any X.25 public or private network and up to 32 remote Netware LANs through a single synchronous dial-up or leased-line connection. The product supports up to 64K bit/sec. transmission, according to the vendor.

The Netware X.25 Gateway allows users to communicate and share data with non-Netware environments. It uses asynchronous terminal emulation software to initiate a session on a remote X.25 host through the gateway.

Both products cost from $1,995.

Novell, 1170 N. Industrial Park Drive, Orem, Utah 84057.

Technology Concepts, Inc. has announced **Community-DOS/UB**, a software package designed to allow IBM Personal Computers to access Digital Equipment Corp. VAX systems.

Community-DOS/UB operates with an Ungermann-Bass, Inc. Personal-NIU intelligent Ethernet controller and allows the personal computers to become nodes in a Decnet Phase IV network.

Users can take advantage of such Decnet Phase IV functions as task-to-task communications, file transfer, remote directory, virtual terminal and network management.

The software costs $600 per PC. The Personal-NIU intelligent controller costs $895.

Technology Concepts, 40 Tall Pine Drive, Sudbury, Mass. 01776.

Software Results Corp. has announced the **Comboard Unix/SNA Q-bus.**

The Comboard Unix/SNA Q-bus is said to be a hardware and software interconnect that allows Digital Equipment Corp. computers to communicate with IBM and other central mainframes. It works as a front-end processor handling all character translation, compression and decompression, transmission error recovery and

Continued on page 52

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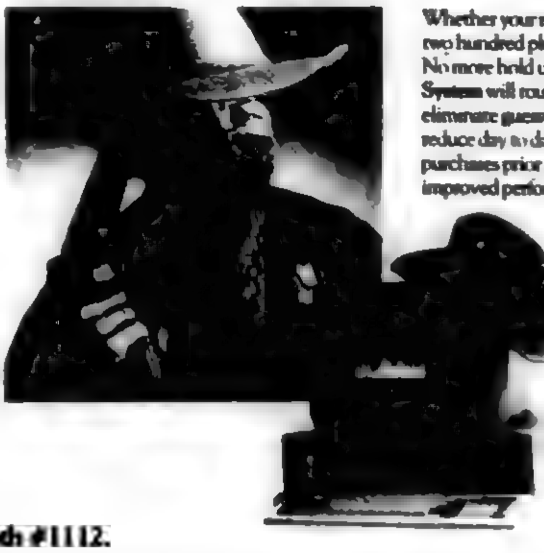

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Continued from page 51

other protocol operations.

It supports 3278 terminal, 3777 remote job entry file transfer and 3287 printer emulation software, according to the vendor. It operates at speeds up to 56K bit/sec.

The Comboard Unix/SNA Q-bus costs from $8,700 to $11,300.

Software Results, 2887 Silver Drive, Columbus, Ohio. 43211.

Communications Solutions, Inc. has enhanced its **Access/BSC 3270** software said to enable microcomputers and multiuser workstations to remotely access and process information on IBM mainframes.

Release 3.0 of Access/BSC is said to provide IBM 3270 Personal Computer-compatible file transfer capability, international keyboard mapping and extended screen attributes.

Access/BSC 3270 emulates IBM's bisynchronous 3274 and 3276 communications controllers, 3278 and 3279 display terminals and 3287 printers. Release 3.0 is available in Unix and Microsoft Corp. MS-DOS versions.

Access/BSC is available as source code. It costs from $150 per node.

Communications Solutions, 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

Electronic mail

Western Digital Corp. has announced that it is bundling **The Network Courier**, an electronic mail software applications package from Consumers Software, Inc., with its Starlan products.

The Network Courier is said to allow local-area network users to exchange messages and complete files without having to exit current applications. Mail and files can also be exchanged with remote networks, the vendor added.

The Network Courier operates on any Netbios-compatible network. It requires 192K bytes of disk space on the network server.

The Network Courier costs from $295.

Western Digital, 2445 McCabe Way, Irvine, Calif. 92714.

Modems/ multiplexers

Lantel Corp. has added five modems to its **Series 900** line.

Called T-Channel modems, the units are said to be channel-selectable in 50 kHz increments from 23.75 mHz to 41.75 mHz. The modems include the 900 A for asynchronous data communications to 9.6K bit/sec.; the 900 S for synchronous or asynchronous communications to 19.2K bit/sec.; the 900 T for voice hot lines; the 900 BPT portable voice unit; and the 900 DC for telephone-to-private branch exchange links and off-premise extensions.

The 900 A costs $820; the 900 S costs $1,080; the 900 T costs $980; the 900 BPT costs $1,290; and the 900 DC costs $980.

Lantel, 3100 Northwoods Place, Norcross, Ga. 30071.

Micom Systems, Inc. has announced that it has doubled the data transmission range and speed of its **Instalink 460** voice and data multiplexer.

The Instalink 460 is said to provide point-to-point data channels for connecting data terminals and personal computers with host computers.

According to the vendor, it now transmits data up to 23,000 ft at up to 19.2K bit/sec.

It also provides synchronous or asynchronous transmission in a single unit.

An Instalink 460 system consists of terminal units located at the telephone and central units at the private branch exchange end of telephone circuits, the vendor said.

Prices for terminal units start at $195 and central units start at $750.

Micom, 4100 Los Angeles Ave., Simi Valley, Calif. 93062.

Diagnostic equipment

Verilink Corp. has announced its **Extended Superframe (ESF) Diagnostic System** and **551VST ML Network Management Controller.**

The ESF Diagnostic System is said to collect, display and gather real-time T1 performance data from Verilink's ESF Channel Service Units.

The 551VST controller is said to house up to 28 ESF Channel Service Units and a Network Management Controller. It is compatible with D4 or ESF Data Terminal Equipment and is said to provide T1 users with logic-error performance information gathered on the users' own data while the line is in service.

The ESF Diagnostic System is priced at $5,000. A 28-line configuration for the 551VST, including the Network Management Controller, is priced at $1,990 per T1 line.

Verilink, 145 Baytech Drive, San Jose, Calif. 95134.

The Network Evaluation and Test Center of the Industrial Technology Institute has announced a **MAP 2.1 Conformance Test Package.**

The software is said to allow users to pre-evaluate product conformance to the Manufacturing Automation Protocol (MAP) 2.1 specification. It contains MAP 2.1 protocol test systems, including Network Management, Directory Services, FTAM, computer-aided software engineering (CASE), Session, Transort, Internet, Executable Test Cases and a test-system manager program.

The test package also contains a software tool kit including protocol monitors for Transport, Internet, Session and CASE as well as a Transport protocol analyzer.

The Conformance Test Package works on a Sun Microsystems, Inc. Sun-3/160M-512 workstation. It costs $20,000.

Industrial Technology Institute, P.O. Box 1485, Ann Arbor, Mich. 48106.

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"It's incredible" says a software manager at a Silicon Valley instruments company, "I've never seen programmers get up to speed in C so fast. They get totally drawn in, and they *remember everything.*"

Gil Roeder of Hands On Learning, who developed this remarkable workshop, says customers like C for its power and portability, but hit snags getting staff up to speed. "C can be tricky at first. On the job training is too slow and distracts senior staff. Seminars (and travel) are too costly, and often disappointing".

The Solution: Now, the *All Hands On C Video Workshop* gets staff up to speed faster and better than ever before, at far lower cost. The workshop contains six professionally produced video modules that teach the full features and capabilities of the C language from operators and expressions through pointers and structures.

Students review lesson content with workbook exercises, and each module builds practical programming experience with sample programs provided on the C Video Workdisk. The package includes the acclaimed text "Learning to Program in C" by Dr. Thomas Plum, international authority on C and technical advisor to Hands On Learning.

The Secret: Roeder and his company have helped thousands to master computers and software. The secret of their system is its focus on people: using human experience to teach technical concepts. "It's like learning by osmosis" says one student, "I had no idea I was getting so much. When the tapes ended, I just started programming."

The All Hands On C Video Workshop is available in VHS or Beta at $995, and other formats at additional charge. We are sure you will find it an exceptional value. However, if you are not fully satisfied, return it for a full refund for up to 30 days. To order, or for more information, please call us or send this coupon with your business card or letterhead. Thank you.

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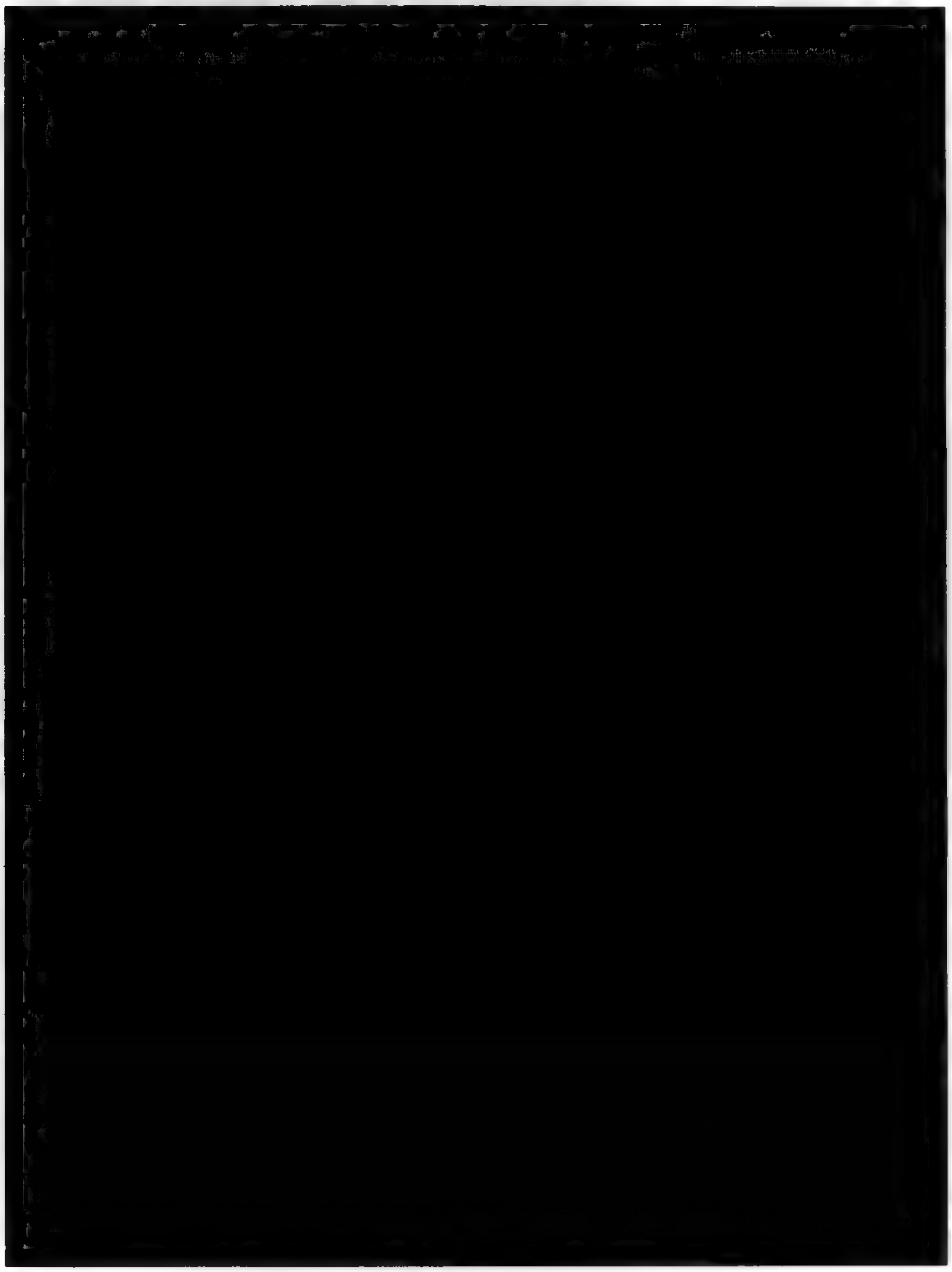
SPOTLIGHT

MODEMS



Communication interface units are evolving rapidly, if only to keep pace with developments in telecommunications network technology. The new breeds are not only faster but are more flexible and more intelligent.

MARCH 30, 1987 • SPOTLIGHT NO. 5

We designed our V.32 modem on the premise that speed is useless without reliability.

At Codex, we understand that all the speed in the world won't get you anywhere if you can't depend on it. And that's why we developed our V.32 modem to give you 9600 bps full-duplex dial transmission, rivalling the reliability of a dedicated leased line.

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But then, it's really what you'd expect from the recognized leader in high speed modems. In fact, more data communications professionals prefer Codex than any other brand.* And it's our high speed modem expertise that has allowed us to make a modem that not only meets, but exceeds the V.32 standard.

Our V.32 modem uses the same VLSI technology and forward error correction scheme (Trellis Coded Modulation) as our high speed leased line modems that reliably transmit data up to 19,200 bps.

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We've even added a proprietary long haul echo cancellation feature, eliminating both local and distant echoes that can plague dial networks. So even if the phone company sends your data over satellite links, it arrives intact.

Plus our V.32 modem includes a soft strap front panel, multiple ACUs, a nest card option for maximum space savings, and operates in synchronous or asynchronous applications.

To find out more about the Codex V.32 modem, call **1-800-426-1212,** Ext. 235. Or write Codex Corporation, Dept. 707-35, 7 Blue Hill River Road, Canton, MA 02021-1097. You'll discover that when we tell you about a V.32 with high speed performance and reliability, we're not blowing smoke.

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INSIDE

Banking Connections
Digital telecommunications equipment and services promote cooperation among Texas ATMs. Page S2.

Product Face-Off
Comparisons of leading products in both medium- and high-speed categories reveal differences in approach and applicability. Pages S6 and S13.

Fiber for Health
Fiber-optic modems and multiplexers and a fiber-optic network improve the cost outlook for a health complex. Page S7.

Ask the Vendor
Modem users interrogate manufacturers about standards, cabling requirements and upgrade paths. Page S9.

Vendor Viewpoint
Standards serve a purpose, but waiting for them to develop can take the edge off technology. Page S10.

Product Charts
Comprehensive guides to fiber-optic and digital modems, including features and prices. Pages S11 and S14.

SENIOR EDITOR
Joanne Kelleher

ASSOCIATE EDITOR
Penny Janzen

RESEARCHER
Sally Cusack

DESIGN EDITOR
Marjorie Magowan

ASSISTANT RESEARCHER
Bonnie MacKeil

Cover photo:
P. Charles Ladouceur

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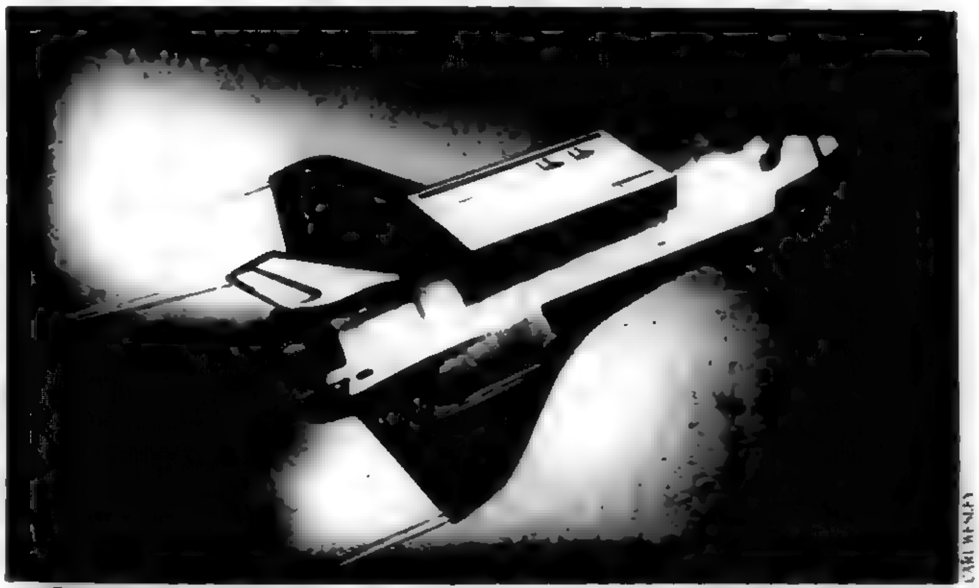
Modems are breaking old speed barriers and moving into new spheres, such as data framing and protocol conversion.

FRONTIERS IN DATA DISPATCH

BY DANIEL GROSS AND BRUCE PAGE



CARL WESLEY

Once secure in its role as a digital-to-analog converter, the modem is now called by names it never knew it had: digital modem, line driver, fiber-optic modem — none of which perform digital-to-analog signal conversion. Whatever the name, modems still perform the same essential task of converting computer data into a form in which it can be transmitted over a telephone network.

But today's telephone network is changing so rapidly that the term "data communications" means something different from one day to the next. Dial-up circuits compete with leased lines for speed; T1 break-even costs fall through the floor; and software-defined voice and data networks lay new foundations for building private and public networks.

The extent of consequent modem transformation is apparent in corporate data communications centers where self-diagnosing, multiplexing, digital computers, using the latest microprocessor technology, calculate complex mathematical functions and gather real-time data about network traffic and line quality. These computers are fully interactive, but they have no screens, no keyboards and no mass storage. These computers are modems.

Advances on all fronts

Technological advances in modems fall into three categories: analog dial-up, digital leased line and fiber-optic line.

The voice, or public, network has a bandwidth of 4.8 KHz. Until recently, this meant the speed limit of dial-up modems was set at 9.6K bit/sec. However, recent breakthroughs forged in transmission technology have made much faster dial-up speeds possible. In the dial-up world, two commercially available techniques — data compression and a new method of continual line analysis — have gained acceptance as reliable methods of increasing throughput on analog dial-up circuits.

The continual line-analysis method now being used cuts the bandwidth in a standard phone line into several channels and sends portions of a data stream along each of them. This technique is conceptually similar to multiplexing but is used for sending data over a single channel rather than several.

In addition to increasing data transfer rates, this scheme constantly monitors the transmission quality of each channel. It also dynamically selects the number of channels that would be used for sending and receiving, a method known as adaptive duplex. The Trailblazer modem from Telebit Corp. in Cupertino, Calif., achieves communications rates of 18K bit/sec. using this technique.

Telcor Systems in Natick, Mass., recently announced a patented data compression algorithm that achieves an average 4-1 ratio on data. Since there is four times less data to send, the Telcor Systems Accelerator quadruples the effective speed of a modem.

For example, with a regular 9.6K bit/sec. modem, Accelerator users can send data at effective

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Gross and Page are principals of Magnetic Press, Inc., a New York software development firm. The company specializes in custom-designed software for data base, graphics and communications applications.

Frontiers

CONTINUED FROM PAGE S1

rates of up to 38.4K bit/sec. over normal dial-up phone lines.

There are some important implications attached to the new high-speed dial-up modems. First, they may be used on existing analog, unconditioned dial-up lines. This increases the usefulness of these modems and allows them to be used anywhere at any time, even for occasional or portable use. Second, these technological advances are generic and may eventually be applied to existing digital and fiber-optic channels as well as to analog circuits.

Standard dial-up modems have speeds of 300 or 1,200 bit/sec. Some users have moved to 2,400 bit/sec. now that it has become less expensive and more widely available, but the industry did not see the great migration it enjoyed when people flocked in droves from the 300 to the 1,200 bit/sec. speed. Part of the reason is that 2,400 bit/sec. is an awkward speed: It is faster than what most occasional users feel they need but too slow for anything more than remote access.

A speed of 2,400 bit/sec. is a sort of threshold: Slower speed modems are associated with personal computing and occasional data transmission, whereas 4.8K bit/sec. is frequently the lowest cost-effective speed for leased-line users.

The recently formalized CCITT V.32 standard for dial-up communications at 9.6K bit/sec. led to a flurry of 9.6K bit/sec. dial-up product releases. While the standard is set, 9.6K bit/sec. is still quite fast for most noisy telephone lines.

This situation may change with the use of more digital switching products and fiber transmission, which result in cleaner end-to-end circuits than those of older network technologies. But more than 80% of end-office switches in the telephone network are still analog switches, leading to the conclusion that 9.6K bit/sec. will remain the practical speed limit in dial-up applications for some time, at least for modems that use Bell and CCITT standards.

Dial-up vs. leased lines

Most users make the jump to leased, conditioned lines for reliable data transmission. It's possible, though that what is really needed is not leased lines, but faster modems. If you are using 2,400 bit/sec. dial-up and your data phone bill is less than twice the cost of a leased line, you win in the long term by buying 4.8K bit/sec. dial-up modems instead of leasing the phone line. Even if your data transmission needs increase, many higher speed dial-up modems will work on leased lines as well.

For even greater control, most communications software allows you to specify a dial suffix for the modem. By using suffixes intelligently, telecom managers can set up an accounting system for reporting data calls in conjunction with a call accounting system normally used only for voice calls. Hence, dial-up modems provide better cost control than leased lines, which have fixed prices regardless of data traffic.

While high-performance dial-up modems will reduce the need for some users to install new leased circuits, many users will still need the better data integrity and, for volume users, lower cost of leased lines.

DDS and digital modems

Beginning with AT&T's Dataphone Digital Service (DDS) and moving toward the Integrated Services Digital Network (ISDN), increasing use of digital technology promises to bring even greater speed and flexibility.

Originally developed in predivestiture days, DDS is now an AT&T trademark. The divested Bell operating companies developed their own product names for digital leased-line service.

DDS and its clones are synchronous, 2,400, 4.8K, 9.6K and 56K bit/sec. leased private lines. Since they are not switched services, these lines offer better bit-error rates than their dial-up counterparts. In addition, various degrees of line conditioning make it possible for DDS circuits to support data speeds of up to 56K bit/sec.

DDS may be used in either point-to-point or multipoint networks. In the case of multipoint networks, most telephone companies that offer DDS service will perform bridging between network hubs, creating a leased network in which any node on the network can talk to another.

Since there is no need for them to convert digital signals to analog, DDS customers, in place of a standard modem, use a data service unit/channel service unit (DSU/CSU), also known as digital modem, to connect to their digital leased-line service. The DSU part of a DSU/CSU is used to prepare the data stream for entering the digital network, performing such tasks as data framing, network addressing and so forth. The CSU half of the unit provides a loopback circuit for testing the data link from telephone company offices.

DSU/CSU equipment vendors abound because demand is growing at a fast clip. The units are also getting cheaper. According to Bob Brown, product manager for Digipath digital service at New York Telephone Co., "The DSU/CSU needed to connect with DDS service is less technically complicated than most modems, particularly the higher speed modems. Therefore it costs less while providing, in most cases, higher speed and more reliable data transmission than can be achieved over analog lines."

COM, Inc. in Wheatridge, Colo., offers an interesting solution for leased-line modem users. COM's VNS-COM is a high-speed network controller for leased-line circuits. It allows companies to set up their own hybrid networks of private and public lines by providing an automatic roll-over capacity to handle peak data transmission periods. Companies that use the COM switch can save money by buying leased lines for their continuous data transmission needs and using dial-up lines for the peak period overflows. VNS-COM can also be used to provide automatic dial-up redundancy for leased circuits.

The impact of fiber-optics

Just as dial-up users eventually find a point at which it is cheaper for them to switch to digital leased services, DDS users also find a point at which it is cheaper to maintain a T1 circuit than it is to continue leasing several DDS links.

The break-even point on leasing T1 circuits has dropped dramatically in the past several years, making T1 the fastest growing transmission service at both AT&T and the nation's telephone companies. A digital service, T1 circuits move 24 64K-bit channels together on a point-to-point route.

The point-to-point nature of T1 is disagreeable for many users, but there is a new technology that allows T1 networks to be created using fiber optics.

At Fiberlan, a systems integrator in Research Triangle Park, N.C., engineers have developed the TDM Ring, a T1 transport technology that uses fiber coupled with M13 multiplexers to switch bit streams anywhere from DS-0, a 64K-bit channel, to DS-2, which consists of four T1s. The TDM Ring is a fully redundant system that handles both voice and data service. Its maximum capacity is 28 T1 links, making it ideal for campus-style industrial environments.

To install the TDM Ring, users place T1 DSUs at all points of entry to their private network. Instead of providing only a point-to-point T1 link, the TDM Ring allows users to switch voice and data in a multipoint configuration. They get the benefit of unswitched leased-line transmission quality and the configuration flexibility of a switched network. It is a bit like having your own private dial-up T1 network.

Customers interface with the TDM Ring at standard T1 rates or lower. There is no need for special equipment. Companies using RS-232, V.35 or other media can multiplex signals together into a T1 using products such

Continued on page S3

ATM network holds all the cards in Texas

BY BRUCE PAGE

Linked *with Texas ATMs*

One of the most important and exciting uses of telecommunications and computer technology in recent years has been the growth of automated teller machine networks.

"In Texas, 98% of the financial institutions are members of one network or another," says Mike Shea, vice-president of operations at Transfirst Corp., operator of the Moneymaker ATM network.

Along with Moneymaker, the networks include Mpact and Teller 24. The Pulse network, in turn, connects the regional networks into one vast, all-embracing ATM network in which any ATM accepts nearly any card from any Texas bank.

As recently as five years ago, such a concept would have seemed a nearly impossible dream of bureaucratic cooperation and technical dexterity. But digital telecommunications services and equipment made that dream a reality.

> FIVE years ago, an all-embracing ATM network would have seemed a nearly impossible dream of bureaucratic cooperation and technical dexterity.

Transfirst built its financial network on Tandem Computers, Inc. processors, digital service unit (DSU) equipment from Racal-Milgo and Megalink digital data service from Southwestern Bell Telephone Co.

Transfirst, a subsidiary of First Texas Bancorp, is the country's largest operator of off-bank-premises ATMs, supplying network communications to more than 750 ATMs dotting the state from Dallas to El Paso. In addition, it supplies electronic funds transfer and credit verification services to banks and financial institutions nationwide.

Since Transfirst's business revolves around the transmission of computer-based information, the cost of the telecommunications network is one of its largest business costs, according to Shea. "Any way we can reduce our telecommunications costs while maintaining or improving service levels improves our profitability," Shea says.

Recently, Transfirst upgraded its leased-line network from the Megalink 2, a digital leased service of Southwestern Bell, to Megalink 1, which includes secondary-channel capability. Racal Milgo Model 1500 DSUs provide both interfacing to the digital 2.4K-bit lines and secondary-channel capability for network management and diagnostics.

According to telecommunications manager Dale Quisenberry at Transfirst, Megalink 1 lowers costs and brings better service to the Moneymaker network.

Transfirst's Shea observes, "We get all the quality of digital service and also get the diagnostic channel. That allows us to lower the price a little and get quality up."

"We were never able to get diagnostics from a digital line before. With the secondary channel of Megalink 1, along with the DSUs from Racal-Milgo, we can," Quisenberry says.

Currently, the Moneymaker network maintains a single processing center in Dallas with Tandem TXPs. All ATMs in North Texas are connected directly to the processing center by the Megalink network — the first multipoint application of that network to date.

In addition, Moneymaker has two points of presence in Austin and Houston from which transaction data is multiplexed and then sent to the Dallas processing center on fiber-optic lines. In areas that do not yet have access to digital services, Moneymaker uses 4.8K bit/sec. Omnimode 48 modems from Racal-Milgo on standard analog lines.

But the advantages of digital technology are compelling: higher quality, lower overall costs and better control.

"The Megalink," Shea says, "helps us improve our business overall." ●

Frontiers

FROM PAGE S2

as General Datacomm, Inc.'s Megamux. It is also possible to interface Ethernet and token-ring local-area networks to the TDM Ring.

TDM Ring is just the beginning of a pervasive move toward fiber-based network services both public and private. What is happening here? The history of technology repeats itself: Just as no one is sure where to draw the line between a phone and a computer or a mini and a mainframe, the new generation of data communications products makes it unclear where the modems end and the multiplexers begin.

The distinction between product and service is also blurring. Less equipment is needed on customer premises; more is found in the central office or built in to the network itself.

Modem innovations

Two of the most important features being added to modems are remote control and diagnostics. These capabilities will make life much easier for private-network managers, who will now be able to test, configure and control remote equipment from a single central site. This kind of flexibility is being built into modems across the spectrum: low-speed dial-up, low- and high-speed leased lines and fiber-optics.

The visionary promise of such systems is the ability to gather information about network behavior in real time, proving an enormous boon to network management because it will allow network planning to be backed by actual data rather than estimates. Vendors offer complete network management systems in which all current traffic and routing information can be viewed on a single terminal or even a PC with software that allows custom reporting of network status.

These new modems and DSU/CSU devices also allow end-to-end testing of a circuit via remote loopback and other methods. With such remote testing, many diagnostic nightmares disappear, including the task of figuring out which vendor to blame for transmission problems. Is it the modem manufacturer, the local telephone company, the long-distance carrier, the remote telephone company or the software? With end-to-end diagnostics, users can now test their own lines and determine for themselves where the problem lies.

Some of the newer intelligent dial-up modems will work on both leased lines and dial-up circuits. If the leased-line quality drops below a certain threshold, the data is transferred automatically to a dial circuit, initiating an alarm in the process. This introduces more possibilities than just security. Users gain the flexibility of implementing least-cost routing schemes, using dial-up lines as overflow when leased channels are full or using leased lines and dial-up interchangeably, depending on the cost and demands of the application.

Digital media and modems

The possibilities — and problems — raised by the arrival of digital media are legion. What will become of modems in a digital environment?

Traditional low- and medium-speed modems will still probably be the preferred solution for "final-mile" applications to connect a distant remote terminal to the network. In fact, analog modems will be necessary parts of data communication until such time as the phone network is completely digital — an event not likely to happen for several decades, if ever. The low cost and large existing base of traditional analog technology will also give modems a secure future in portable data communications.

> THE possibilities — and problems — raised by the arrival of digital media are legion. What will become of modems in a digital environment?

One particular application in which analog modems are likely to remain dominant is videotex, or analog dataphone service. Regulatory developments in Washington, D.C., favor the passage of Computer Inquiry III, the Justice Department resolution that would allow the divested Bell operating companies to sell equipment and long-distance and information services. This promises to pave the way for operating company-sponsored data services, giving videotex the official sanctioning it has heretofore lacked.

In the longer term, a high-speed digital telephone network such as the ISDN will ultimately require digital network interfaces in the place of modems; in the meantime, videotex will become an increasingly popular way of recycling analog telephone networks.

The wholesale conversion of the public network to digital will create a huge market for analog-to-digital protocol conversion devices, that is, protocol-converting modems. It is through these devices that small analog networks or "islands" will communicate with the digital infrastructure.

Standard modems and personal computers can already connect users with computer data base services from Copenhagen to Columbus.

In these centers, the PC revolution puts demands on MIS to handle the greatly increased requests for mainframe data. Higher speed intelligent modems are needed to handle this kind of load, not only with synchronous connections, but also with asynchronous, dial-up traffic.

Tandem Computer, Inc.'s own data network connects 180 different data centers all over the world and processes more than a billion transactions per second, according to Kirby Wadsworth, a systems analyst at the firm's Newton, Mass., office. But the high-speed dial-up modem accelerator from Telcor Systems has given Tandem a new potency in hiring outside software design consultants.

Typically, Tandem invites outside developers to one of its 17 design centers nationwide. There, the developers can use a Tandem Nonstop computer to develop code for the Tandem machines. Now, according to Wadsworth, the company is equipping its design machines with the Telcor Systems Accelerator units along with 9.6K bit/sec. dial-up modems. When the system is complete, developers will be able to dial in from their own offices and gain access to Nonstops for development. At 38.4K bit/sec., developers will get the same — or faster — response time than if they were in Tandem's office.

Convenience is not the only advantage this plan offers. It will also make it possible for Tandem to hire design teams that normally couldn't make it to one of the design centers — increasing the pool of talent the company can draw on to produce all-important software for its Nonstop-series computers.

The newer, superhigh-speed dial-up modems are even giving leased lines a run for their money. Mike Miller, an engineer at A. C. Nielsen Co., the television ratings organization, set up a multipoint data collection system using Telebit's 18K bit/sec. modems. "We've got 15 data collection points around the country," Miller says. "Leased lines are expensive, and with fast modems it takes about 10 minutes to send the data from each site. . . . We wrote our own internal communications software using [Lattice, Inc.'s] Lattice C with the [Greenleaf Software, Inc.] Greenleaf communications library."

In the Nielsen setup, computers monitor television signals, and a pattern-recognition program identifies the advertisements the company is tracking. The ad's identification number and the time, date and broadcasting station identification are added to a local data base, and all information is sent daily to a central site.

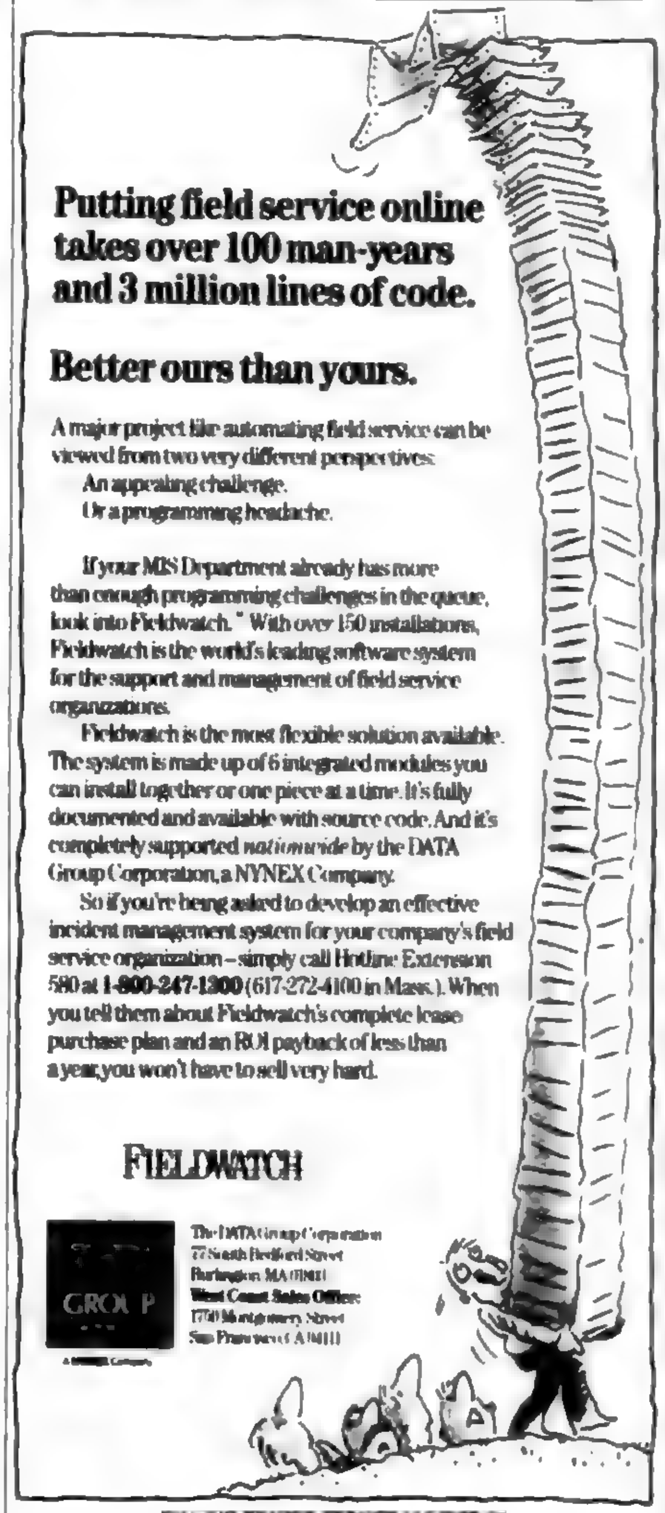
Nielsen's system illustrates how improved modem technology circumvents limits in transmission media — in this case, the low quality of the public network and the high cost of leased lines. Miller trusts the tried and true: "We looked at leased lines, and they weren't really effective for our needs," he says. "At this point we're satisfied with the Telebits. I think people using leased lines may be a little reluctant to switch to the new technology. People exploring new technologies might consider these high-speed modems."

The utility of modems extends beyond mere data transfer. Protocol-converting modems such as those from Digital Communications Associates, Inc. or Ideassociates, Inc. provide an inexpensive way for corporate PC users to access mainframe data resources without the costly option of expanding the corporate data network.

VM Personal Computing, Inc., a Danbury, Conn., software development firm, even has a communications program that allows IBM 3270 terminal emulation using regular dial-up modems simply by running the company's personal computer package in conjunction with its mainframe software.

Modems can also be used to solve compatibility problems between competing data formats. Transmitting asynchronous ASCII text by modem is still the easiest way to transport files between incompatible word processing systems and computer architectures. Synchronous data streams, moving at much higher rates, can also provide channels between incompatible environments; but these solutions are

Continued on page S5



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DIAL-IN READER SERVICE NUMBER 25

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2. Identify those products/services for which you're requesting more information. Write their respective DIAL-INQ reader service numbers in the boxes provided in step 6.

3. Call *Computerworld* DIAL-INQ inquiry service at **413-637-3170 anytime, 7 days a week, 24 hours a day,** via touch-tone telephone and wait for the recorded instructions.

Please note: You will be asked to use the "star" (*) and the "pound" (#) symbols on your touch-tone telephone set during your telephone call.

4. When prompted by the recording, enter your DIAL-INQ subscriber code and symbols as recorded below.

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COMPUTERWORLD
DIAL-INQ
Reader response service

Frontiers

FROM PAGE S3

generally more expensive and frequently require protocol conversion.

As PC users become more sophisticated, the applications for modems — and the modems they use — will change drastically. For example, higher speed modems in the 2,400 to 9.6K bit/sec. range are creating more applications for larger data transfers and, for the first time, are making it economical to use modems to send large data bases over very long distances. Transaction processing can be used for applications that require greater amounts of data transfer; instead of sending limited data on the line, terminals can download entire account histories or data that would have been too costly or time-consuming to send before. Local-area network (LAN) gateways can be set up at either end of a leased or dial-up line, giving remote users access to the LAN.

As the features of bank automated teller machines become more sophisticated, the data traffic between the mainframe and the ATM will demand faster modems. As the ATM concept evolves into remote banking, faster modems with data encryption capabilities will become essential parts of electronic financial services.

High-speed modems also open up new opportunities in distributed systems. As networks are increasingly used to link office and factory, home and office — and office and office — modems become the linchpin in any company's networking strategy.

Modems are already established as essential devices in multivendor office automation. But the single most important asset of modem technology is its strict adherence — by necessity — to Bell and CCITT standards. The IBM Personal Computer went a long way toward bringing the same solid standards to office automation, but workstations in general have a long way to go. The reliance on standards in modems ensures that multivendor communications, even if difficult, will never be impossible.

Increased use of packet networks, especially on a local basis, suggests the rise of protocol-converting modems. Packet protocols such as CCITT's X.25 are only the beginning of what could be a booming new modem market. IBM Systems Network Architecture, Manufacturing Automation Protocol and the International Standards Organization's Open Systems Interconnect protocol are all likely candidates for protocol-converting modems.

The evolving network

As the telephone network evolves toward a digital local loop that will run a digital line to every telephone company customer's premises, the use of modems is going to be affected: More digital modems or DSU/CSUs will be used to provide the customer interface to a digital line. While today's phone network provides digital lines only to leased-line customers, tomorrow's phone network will offer switched, digital end-to-end connections.

The central-office LAN being marketed by several divested Bell operating companies provides a preview of tomorrow's modem uses. This product gives the customer a digital subscriber line along with a Centrex-like semiprivate networking scheme. Central-office LAN customers use the service to send data on a citywide basis.

Telephone companies' increasing use of fiber transmission paths will also affect modem and modem-related purchasing over the next several years. Higher volume customers will have the option of choosing a fiber connection to the central office. These customers will want optical interface units to connect them to the digital optical network.

Fiber is able to take much higher data rates than even T1 service; consequently the kinds of data applications used for fiber will change, and there will be an increasing need for multiplexing.

Toward a digital world

If Computer Inquiry III makes it through the Justice Department — as seems likely in the light of recent recommendations made to U.S. District Court Judge Harold H. Greene — ISDN will offer users a larger bandwidth alternative to DDS, with the same cost advantages and many more features.

Access to ISDN won't change anyone's desktop: There will still be a box that looks a lot like a modem or a card inside the PC with regular phone lines attached. Those lines, however, will carry voice, data and video, promising to bring data communications up to par with the current state of the art in data processing.

Like every other network architecture, ISDN has more to do with protocols than equipment. Yet, rumors already abound of a Hayes Microcomputer Products, Inc. ISDN interface card for PCs, and several vendors, including Fujitsu America, Inc., Northern Telecom, Inc. and AT&T, have shown NT1 ISDN interface units at trade shows. Product details are still fuzzy, but it is clear at this point that ISDN has more substance than the government's Strategic Defense Initiative.

If some system integrators have their way, the future digital network might mean the end of the modem as we know it. Just as many laptop personal computers supply built-in modems, integrated ISDN access circuitry may become as matter-of-course as a serial port. It may also come with options from network vendors and phone companies to have all the functions provided by the central office, without the need for any premises equipment. ●

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DIAL-INQ READER SERVICE NUMBER 36

PRODUCT FACE-OFF

Fastcomm vs. U.S. Robotics: Different strokes at 9.6K bit/sec.

BY STEPHEN SATCHELL

The ideal for high-speed modems — those designed to transfer data at 9.6K bit/sec. or more — is fast and error-free transmission, regardless of the quality of telephone connection, combined with the ability to communicate with lower speed modems that adhere to industry standards such as Bell 103, Bell 212A, CCITT V.22 and CCITT V.22bis. Support of the industry-standard AT command set pioneered by Hayes Microcomputer Products, Inc. is also desirable, since it ensures that users and existing telecommunications software can work with the modem.

U.S. Robotics, Inc. and Fastcomm Data Corp. are two major manufacturers whose products go a long way toward satisfying these conditions, although their approaches differ significantly.

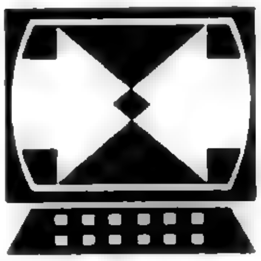
The U.S. Robotics High-Speed Technology (HST) modem uses proprietary technology throughout. Fastcomm Data, a subsidiary of Electronic Vault, Inc., makes use of international standards, sweetened with enabling protocols in its Fastcomm 2496. Both modems are designed to be used with asynchronous interfaces and employ supersets of the basic AT modem command set.

Connections good and bad

Unlike modems designed for leased-line operation, those used on switched networks must be able to handle a wide variation of connection quality, from perfect to just awful.

The Fastcomm 2496, which its maker claims has a top speed of 850 char./sec., uses a large in-modem buffer and a streaming protocol with a standard — V.29 — 9.6K bit/sec. half-duplex connection to achieve this high throughput rate.

At the modem-to-modem link level, the 2496 transparently falls back to either 7.2K or 4.8K bit/sec. When the connection improves, the modem can shift to a faster rate in order to take advantage of the more favorable conditions.



The Ensured Data Integrity protocol (EDI), developed by Fastcomm's parent company and used in the Fastcomm 2496, transmits more than 2,800 bytes in a burst before requiring the modems to turn the line around. This technique minimizes the effect of the rather long turnaround time required by 9.6K bit/sec. on the switched network. EDI also makes smarter use of the channel by requesting only those packets not received correctly.

U.S. Robotics chose a different route for its HST modem. Instead of one channel that is switched constantly, the HST has a 9.6K bit/sec. main channel and a 300 bit/sec. reverse channel. Since the modem does not have to switch directions in bulk transfer, it is capable of transferring 1,100 char./sec.

According to U.S. Robotics, the trellis-coded modulation (TCM) technique used with the HST is more robust than the quadrature amplitude modulation used in the 2496 and other modems. If the HST encounters a less-than-ideal connection, it does not have an automatic fallback rate to decrease the number of packets retransmitted.

Because the asynchronous high-speed stand-alone modem is a comparative newcomer to the market, almost none of the high-speed modems can talk to another brand.

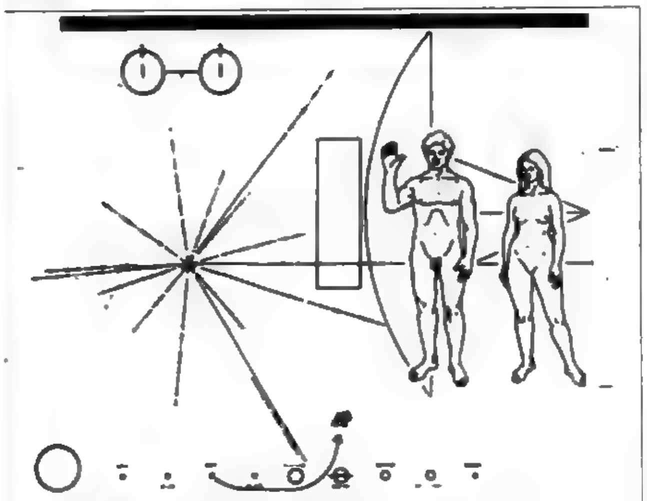
Even though the 2496 uses V.29 signaling, the EDI protocol is unique to Electronic Vault and Fastcomm products. The HST uses TCM, but it does not follow the V.32 recommendation.

Both U.S. Robotics and Fastcomm claim compatibility with modems that support Bell 103 for 0 to 300 bit/sec., Bell 212 for 1,200 bit/sec. and CCITT V.22bis for 2,400 bit/sec.

Both modems are compatible with modems of their own kind and with 300, 1,200 and 2,400 bit/sec. modems in Answer and Originate mode. You can thus upgrade incrementally without installing new lines, ports or access numbers as long as you do not need to support high-speed modems from multiple vendors. U.S. Robotics has an extra edge in compatibility — 1,200 and 2,400 bit/sec. Microcom Network Protocol support.

The difference in price between these products is insignificant: The Fastcomm is priced at $999 in a stand-alone configuration; the U.S. Robotics HST at $995. Currently, the HST is available only in stand-alone mode, while the 2496 is also available in a rack-mount and IBM Personal Computer half-card configuration. ●

Satchell is a free-lance writer and owner of Satchell Evaluation, a microcomputer product evaluation firm in Morristown, N.J.



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DIAL-INQ READER SERVICE NUMBER 38

Paring down the phone bill with fiber-optics

BY DONNA RAIMONDI

A fiber-optic network will save Sutter Health Systems, a Sacramento, Calif., hospital complex, from $30 million to $40 million in the next 20 to 30 years, primarily in leased digital-service lines, according to Binda Mangat, the hospital's telecommunications director.

Sutter's fiber-optic network ties four buildings and supports IBM's Systems Network Architecture, Rolm Corp.'s CBXII private-branch exchange running at 295M bit/sec., a centralized Digital Equipment Corp. VAX laboratory installation and an NBI, Inc. computer installation. The IBM 3081 and the VAX-11/750 reside in the complex's data center, while the NBI is located in one of the hospitals.

"The IBM and the VAX we are feeding from the data center out to the hospitals and the physicians' building. The NBI is coming from one hospital and going to the other on fiber," Mangat explains. In essence, he says, "We are making two systems look like one, although they are four miles apart. For that purpose, we are using T1 multiplexers, which are a combination of fiber-optic modems and multiplexers. We chose the fiber-optic modem/multiplexers because they are the most cost-effective and very reliable."

Fiber-optic modems, which are used only with fiber-optic cable, convert the electrical signals from data peripherals to optical light pulses. Data conversion on traditional analog-to-digital modems is handled within the unit, Mangat explains. With fiber-optic modems, there is no data conversion, just the conversion of electrical to optical signals.

Depending on cable size, data can be sent across distances of up to three kilometers. The transmission speed can vary from 19.2K bit/sec. to T2 speeds, which can reach as much as 7M bit/sec. Portions of Sutter's networks transmit at different speeds.

Mangat says he has had good luck with the fiber system. "But," he says, "it is still an unproven technology we are looking at, so I don't know what the mean time between failure will be." Not enough statistics are available yet to determine failure rates.

Fiber-optic modems are not as sophisticated as traditional modems in features such as diagnostic detection and built-in testing, but that is not necessarily a problem, according to Mangat. "They either work or they don't," he says, and up to this point, he claims, they have worked very well. "The bit error rate has been excellent," Mangat testifies, "and we haven't had any failures."

Fiber-optic networks do have some drawbacks, Mangat says, such as the expenses involved if the company does not own the property on which its buildings sit.

Mangat says he found that while his vendors cooperated and were always available to talk, the project still required putting together a lot of heads to work things out. "An example of that would be handshaking protocols," he says. "Different systems require different protocols, so you have to be sure the company whose equipment you buy can handle that."

Despite the amount of work involved, Mangat is bullish on fiber-optic transmission. "I think fiber modems and fiber multiplexers will become so common a year from now that we will look back and say, 'Why did we even bother to talk about that?' " ●

Raimondi is a senior writer for *Computerworld*.

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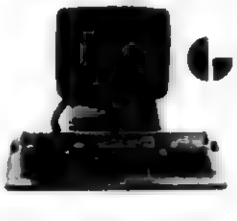

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DIAL-INQ READER SERVICE NUMBER 40

ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

What, if any, new technology is Codex using to replace the old LSI 9.6K bit/sec. dial backup modem?

John Malone
Network systems engineer
Sunguard Recovery Services
Wayne, Pa.

CODEX CORP.: There have been several important technological advances in modems in the past several years, particularly in the area of restoral.

For example, Codex's 2600 series, which is the new-generation high-speed leased-line modem, includes a feature called Enhanced Dual Dial Restoral (EDDR). EDDR automatically senses when the line goes down, switches from the leased line to dial, periodically checks the condition of the leased line and automatically returns to leased-line operation when the line service is restored.

CCITT V.32 modems, such as Codex's 2250 and 2260 series allow two-wire full-duplex 9.6K bit/sec. transmission over dial or leased lines. The 2250 and 2260 series can be used as a primary connection via dial lines for applications for which dial-up is more economical; it can also be used for restoral of leased lines over a single dial line. Codex's V.32 modems are fully compliant with the CCITT recommendation and are trellis-coded at 9.6K bit/sec. They are nestable and have integral autocall units.

We use a Fujitsu 1921L modem. Is this model still being manufactured by Fujitsu? If we wanted to upgrade, what models are available that are compatible with the 1921L?

Wallace Jones
Data processing manager
National Fruit Product Co.
Winchester, Va.

FUJITSU AMERICA, INC.: Fujitsu continues to manufacture the 1921L modem. The next step up from a Fujitsu 1921L would be the Fujitsu 1927L at 14.4K bit/sec. If your requirements for faster data transmission have increased, you probably would find that a new product like the 1927L would meet your needs.

We are using Fujitsu M1921L modems in a network that includes another vendor's T1 management system.

This system includes interface-controlled loopback capabilities, but because the M1921L modems do not support these capabilities, we cannot use them to the extent we would like. Does Fujitsu plan to provide support for diagnostic functions in a future release of this modem?

Christopher Hobbs
Network operations
Boeing Computer Services Co.
Seattle

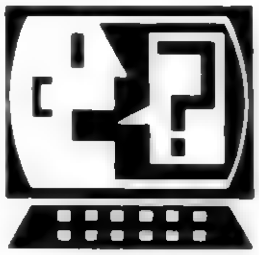
FUJITSU AMERICA, INC.: The trend in modem design today is to provide more and more diagnostic features for the end user. Although we cannot offer specifics on our future development, Fujitsu is always seriously looking at features that will better meet end-user needs in the next generation of modems.

Can eight-wire, flat cable be used for a synchronous local modem application for two circuits over a distance of 300 ft and operating at 9.6K bit/sec?

Dale Osborne
Manager of computer studies
Asea Power Systems, Inc.
New Berlin, Wisc.

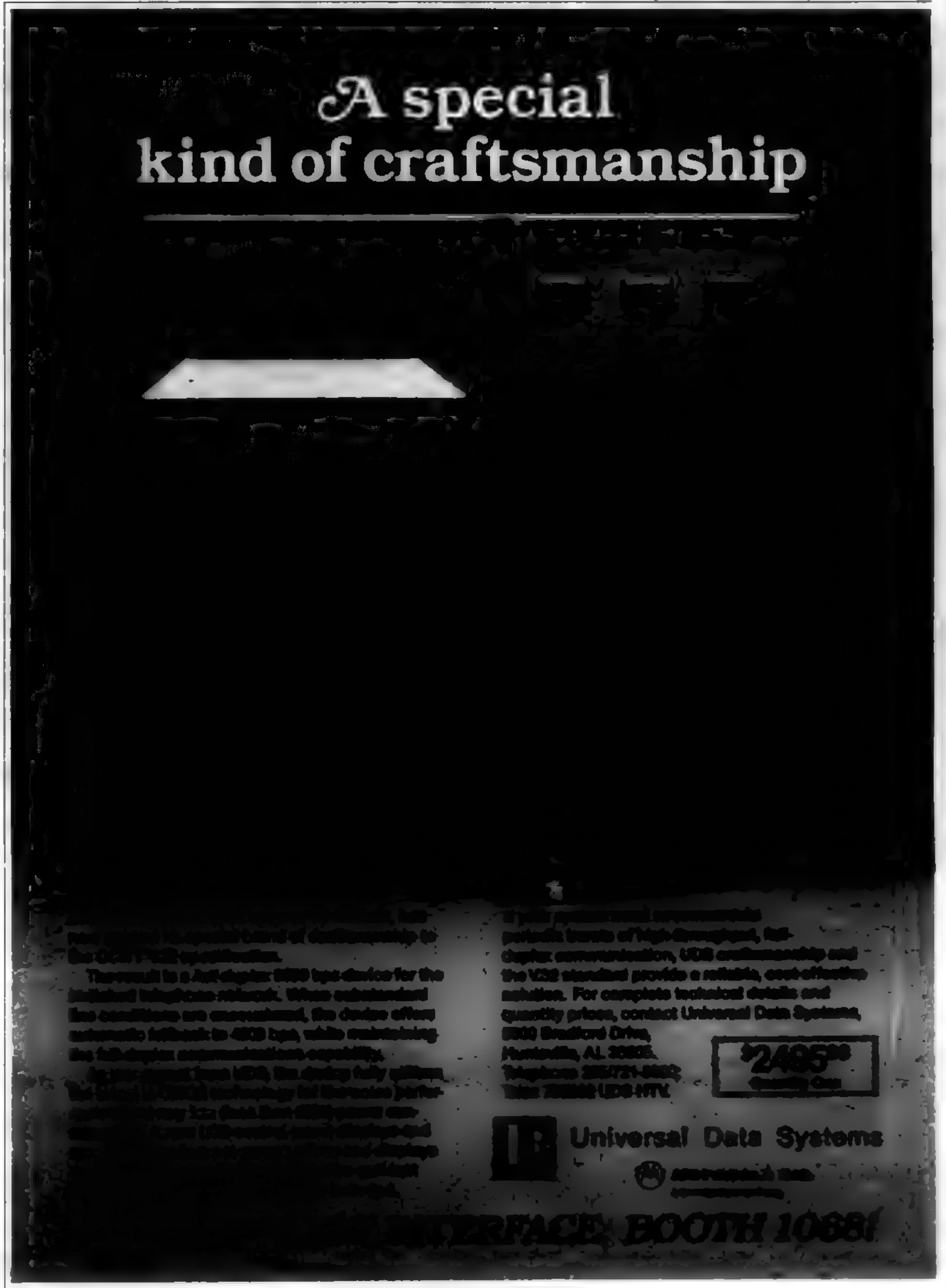
GANDALF DATA, INC.: Yes, assuming use of twisted-pair, this application should present no problems, regardless of whether it is synchronous or asynchronous. Because of the limited distance involved, there would be no crosstalk problem.

We at Sheraton use your asynchronous error-protection modems. There has been much discussion and confusion about error-protection protocols in the past year. We understand that there is an effort under way in the CCITT to select a standard. What is Concord Data System's position relative to conformance to any emerging standard?



Jonathan Chinitz
Assistant manager,
Unix Development Group
Sheraton Corp.
Braintree, Mass.

CONCORD DATA SYSTEMS, INC.: Concord Data Systems' policy is to provide products that conform to international standards when applicable, de facto standards when appropriate and proprietary solutions when no standards exist or when implementing a standard results in poor performance. In this way, we expect to continue to provide the widest variety of protocol support for our customers. ●



A special kind of craftsmanship

[illegible] the CCITT V.32 specification.

The result is a full-duplex 9600 bps device for the [illegible] telephone network. When substandard line conditions are encountered, the device offers automatic fallback to 4800 bps, while maintaining the full-duplex communications capability.

[illegible]

If your applications require periodic bursts of high-throughput, full-duplex communication, UDS craftsmanship and the V.32 standard provide a reliable, cost-effective solution. For complete technical details and quantity prices, contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/721-8000; Telex 752602 UDS-HTV.

$2495.00
Quantity One

Universal Data Systems

[illegible] INTERFACE BOOTH 1068!

DIAL-INQ READER SERVICE NUMBER 41

VENDOR VIEWPOINT

When standard means 'average'

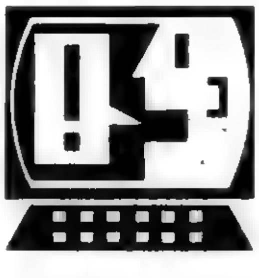
BY HERB HENSLEY

Standards are intended to provide uniformity, compatibility and security. However, in data communications, different vendors' interpretations of standards published by various governing bodies have produced a myriad of incompatible "standard" products.

There is no national agency in the U.S. empowered to establish modem standards or tests for compatibility. In most countries, "the" phone company is a government-controlled monopoly, and the buying public relies on it for telecommunications compatibility. AT&T used to be "the" phone company for all practical purposes, which is why the older, slower Bell-compatible 103 and 212A modems are, for the most part, standard.

Today, however, it is the Consultative Committee on International Telephony and Telegraphy (CCITT), a United Nations-chartered international standards body, that recommends such essential items as interfaces and modulation techniques. The CCITT has issued standards, such as V.22, that most U.S. manufacturers follow. But the existence of standards is no guarantee of compatibility.

When the CCITT V.32 modems hit the market, the Concord Data Systems, Inc. V.32 and Codex Corp. V.32 modems reportedly did not work together, even though both claimed V.32 compatibility.



Then there is a question of applicability. While some of the new CCITT standards specifying V.32 trellis-coded modulation with echo cancellation may result in excellent full-duplex modems for small European countries where very long-distance connections are rare, they could prove too unreliable and expensive to implement in the U.S.

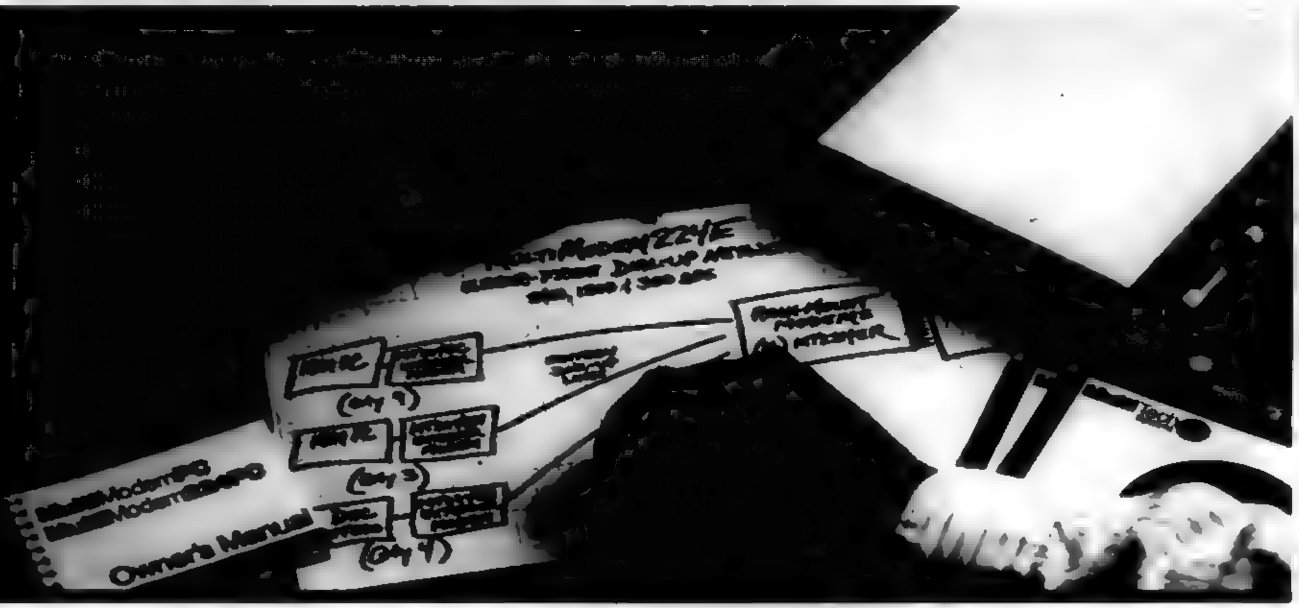
The effective use of computers to process data, text, graphics and office functions relies heavily on interconnectivity at higher speeds on existing public telephone networks. However, the low-cost workstations used for this purpose employ asynchronous serial data streams and possess little or no ability to support sophisticated protocols.

To cost-effectively connect high-performance workstations requires that a modem possess the intelligence to perform sophisticated error correction. This means it must embody functions such as data compression, error control, flow control and protocol conversion.

Modems capable of performing these tasks are available, but no CCITT or Bell standards exist for these functions. Because standards evolve so slowly and lag behind the leading edge of development, many data communications users adopt what they need and let the standards follow.

In some environments, it is common to find data communications products like modems or multiplexers that have been tailored to resolve interface problems. It is a case of using the available technology to solve real problems that the standards do not even recognize. ●

Hensley is president of Data Race, Inc. in San Antonio, a developer of high-speed modems.



Error-Correcting
2400 bps Modems from
Multi-Tech Systems:
When it has
to be as good
as it is fast

● Dial-up 2400 bps modems have arrived. More datacomm users are upgrading from 1200 to 2400 than ever before. But there can be a flip side to increased speed: more transmission errors.

● That's why our MultiModem224E™ offers MNP™ error correction. Available in our 2400 bps desktop, internal and rack-mounted modems, MNP gives you 100% error-free transmissions, no matter how bad the phone line. MNP does it without the speed degradation of less efficient, soft[illegible]based protocols.

● Another important poin[illegible]s 3 has emerged as an industry st[illegible] now in the public domain, and has bee[illegible]anted in virtually all 2400 bps modems [illegible]ffer error-correction.

● So, why buy error-correcting modems from Multi-Tech? There are many good reasons, including:

1. Multi-Tech modems are 100% Hayes-compatible (more so than Hayes' own 2400 bps modems*), and our MultiModem224E with error-correction costs less than a Hayes Smartmodem 2400™ without this feature.
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4. Our two year warranty means something. Since Multi-Tech modems are designed and manufactured at our Minnesota headquarters (as they have been for the last sixteen years), you can be sure we'll be here when you need us.

● Please call us toll-free at 1-800-328-9717, for additional information…get a modem that's as good as it is fast!

*InfoWorld—8/5/85—reprints available

Trademarks: MultiModem and the Multi-Tech Systems logo: Multi-Tech Systems Inc. • MNP: Microcom Inc.
Smartmodem: Hayes Microcomputer Products, Inc.

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DIAL-ING READER SERVICE NUMBER 42

Multi-Tech Systems, Inc. • 82 Second Avenue S.E. • New Brighton, Minnesota 55112 U.S.A.
1-800-328-9717 • 612-631-3550 • TWX 910-563-3610 (Domestic) • Telex [illegible] MLTTC (International)

Digital modems

COMPANY	PRODUCT	SINGLE UNIT, DSU/CSU OR COMBINATION	SERIAL OR SYNCHRONOUS	COMMUNICATIONS MEDIUM	INTERFACES TO	TRANSMISSION RATES	PROTOCOLS SUPPORTED	CCITT STANDARD	NETWORK CONTROL	PERFORMANCE MEASUREMENT	SIDEBAND DIAGNOSTIC TESTING	ELECTRICAL POWER REQUIREMENTS	TEMPERATURE REQUIREMENTS	PRICE	DIAL-ING READER SERVICE NUMBER
Amdahl Communications Systems Division (408) 746-6000	DSU II 96	DSU with secondary channels	Synchronous	Any digital data system with secondary channels	RS-232	9.6 bit/sec. primary, up to 300 bit/sec. secondary	All	NA	No	No	Yes	115V, 12W	0-50 C	$1,050	825
	DSU II 56	DSU with secondary channels	Synchronous	Any digital data system with secondary channels	[illegible]	56K bit/sec. primary, 24K bit/sec. secondary	[illegible]	NA	No	No	Yes	115V, 12W	0°-50 C	$1,350	
Applied Spectrum Technologies, Inc. (612) 379-7114	DVM-400	NA	Synchronous, asynchronous	Two-wire, twisted-pair phone lines	RS-232, V.24, V.28	Up to 19.2K bit/sec.	All	V.24, V 28	Yes	No	Yes	115V ac, 48V dc	0-50 C	$270-$330	826
	ECON	NA	Synchronous, asynchronous	Two-wire, twisted-pair phone lines	RS-232, V.24, V.28	Up to 19 2K bit/sec	All	V.24, V 28	Yes	No	Yes	115V ac 48V dc	0-50 C	$176-$225	
Astrocom Corp. (612) 227-8651	[illegible]	NA	Synchronous	Short-haul, twisted-pair phone lines	Any synchronous device	Up to 19.2K bit/sec.	All	V.24	Yes	No	Yes	110V, 220V, 60Hz	0-50 C	$695	827
	[illegible] series	NA	NA	Short-haul, asynchronous	Any asynchronous device	Up to 19.2K [illegible]	All	V.24	No	No	No	110V, 220V, 60Hz	0°-50°C	$295	
AT&T Information Systems (201) 898-3278	Dataphone II 2500-series DSU	Combination	Synchronus	AT&T Dataphone Digital Service	RS-232C, local-area data set, point-to-point	Up to 56K bit/sec.	AT&T Dataphone Digital Service	V.35	Yes	—	Yes	105V, 129V 51Hz, 63Hz	150 F	Contact vendor	828
	Dataphone II 2600-series DSU	Combination	Synchronous	AT&T Dataphone Digital Service, DCD	RS-232C, local-area data set, multipoint	Up to 56K bit/sec.	AT&T Dataphone Digital Service, DCD	V.35	Yes	—	Yes	105V 129V 57Hz, 63Hz	150 F	Contact vendor	
	Dataphone II, 2700-series DSU	Combination	—	AT&T Dataphone Digital Service, DCD	Multipoint, point-to-point	Up to 56K bit/sec., except multipoint	AT&T Dataphone Digital Service, DCD	V 35	Yes	—	Yes	—	—	Contact vendor	
Avanti Communications Corp. (401) 849-[illegible]	Accugate-1.5	Combination (DFU/CFU)	Synchronous	T1	T1 ports	1.544M bit/sec.	All	T1	No	No	No	115V, 220V, 40W	0°-40°C	$3,995-$4,095	829
	[illegible]-1.5	Combination (DFU/CFU)	Synchronous	T1	T1 ports	1.544M bit/sec.	[illegible]	T1	Yes	Included in product	Yes	115V, 220V, 40W	0°-40°C	$8,400	
Burr-Brown Corp. (602) 746-1111	LDM70	NA	Serial	Hardwire	RS-232 serial CPU ports	57K bit/sec.	All	V 24	Yes	—	No	110V ac, 1 5W	0-70 C	$107	830
	LDM422	NA	Serial	Hardwire	RS-232, RS-422/485 multipoint	19.2K bit/sec	All	—	Yes	—	No	110V ac, 1 5W	0-70 C	$132	
	LDM35	NA	Serial	Hardwire	RS-232, RS-422/485 multipoint	19.2K bit/sec.	All	—	Yes	—	No	110V ac 1 5W	0-70 C	$83	
Case Communications, Inc. (301) 290-7710	Model 500A	Combination	Serial	AT&T Dataphone Digital Service	RS-232 synchronous	2,400, 4.8K, 9.6K bit/sec.	All synchronous	V.24	No	No	No	115V, 12W, 47Hz, 63Hz	0°-40°C	$700	831
	Model 500A/56	Combination	Serial	AT&T Dataphone Digital Service	RS-232 or V.35 synchronous units	Up to 56K bit/sec.	All synchronous	V.35	No	No	No	115V ac, 12W, 57Hz, 63Hz	0-40°C	$895	
C-Cor Electronics, Inc. (800) 233-2267	Model 7130	CSU	Serial	Broadband LAN	RS-232	Up to 19.2K bit/sec.	All	V.24	No	No	No	110V 240V	0-40 C	$750	832
	Model 7140	CSU	Serial	Broadband LAN	RS-232	Up to 9.6K bit/sec.	All	V.24	No	No	No	110V, 240V	0-40 C	$780	
Codex Corp. (617) 364-2000	Model 2131	Combination	Serial	AT&T Dataphone Digital Service	RS-232C	Up to 9.6K bit/sec.	All	NA	No	No	No	117V ac, 57Hz, 63Hz	0°-50°C	$100-$1,100	833
	Model 2130	Combination	Serial	AT&T Dataphone Digital Service	V.35	Up to 56K bit/sec.	All	V.35	No	No	No	117V ac, 57Hz, 63Hz	0°-50°C	$100-$1,100	
Data Race, Inc. (512) 692-3909	Race 1	NA	Serial	AT&T Dataphone Digital Service, public switched telephone network	Any asynchronous ASCII-based hardware	4.8K bit/sec.	Proprietary	V.27	No	—	No	120V ac, 30W	0-45 C	$1,495	834
	Race AF	NA	Serial	AT&T Dataphone Digital Service, public switched telephone network	Any asynchronous ASCII-based hardware	4.8K bit/sec.	AT&T 212A	V.22	No	—	No	120V ac, 30W	0-45 C	$1,695	
	Race BMX	NA	Serial	AT&T Dataphone Digital Service, public switched telephone network	Any asynchronous ASCII-based hardware	9 6K bit/sec., half-duplex	Proprietary	—	No	—	No	120V ac, 30W	0-45 C	$1 195	
Dataradio, Inc. (404) 726-0012	Asynchronous radio modem	NA	Serial	Radio	RS-232	4.8K, 9.6K bit/sec.	CSMA	X.3	NA	No	NA	110V, 220V	30-60 C	$3,000	835
	Synchronous radio modem	NA	Serial	Radio	RS-232	4.8K, 9.6K bit/sec.	CSMA	X.3	NA	No	NA	110V, 220V	30-60 C	$3,000	
Datatel, Inc. (609) 424-4451	DCP 3080 series	Combination	Synchronous	Point-to-point and multidrop AT&T Dataphone Digital Service	RS-232, RS-422	Up to 56K bit/sec.	AT&T	V.35	No	DCP 3800	Yes	110V	0-50 C	$735	836

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

COMPANY	PRODUCT	SINGLE UNIT, DSU/CSU OR COMBINATION	SERIAL OR SYNCHRONOUS	COMMUNICATIONS MEDIUM	INTERFACES TO	TRANSMISSION RATES	PROTOCOLS SUPPORTED	CCITT STANDARD	NETWORK CONTROL	PERFORMANCE MEASUREMENT	SIDEBAND DIAGNOSTIC TESTING	ELECTRICAL POWER REQUIREMENTS	TEMPERATURE REQUIREMENTS	PRICE	DIAL-IN READER SERVICE NUMBER
DEI-Teleproducts **(619) 743-8344**	[illegible]	Combination	[illegible]	AT&T Dataphone Digital Service	Any synchronous [illegible] equipment	2,400, 4.8K, 9.6K bit/sec.	All	—	No	No	No.	115V, 50Hz, 60Hz	30 -50 C	$675	837
Digital Communications Associates, Inc. (800) 241-IRMA	DSU-A	Combination	Serial	Four-wire AT&T Dataphone Digital Service	RS-232C RS-449, V.35, data terminal equipment	19.2K bit/sec. asynchronous, up to 56K bit/sec. synchronous	Asynchronous, synchronous	V.35	No	No	No	115V ac, 14.4W	0 -50 C	$875-$1,095	838
	T1 CSU	CSU	Synchronous	T1	T1 ports	1.544M bit/sec	T1	NA	No	No	No	-48V dc, +130V dc in-ground	0 -60 C	Contact vendor	
Fairchild Data Corp. [illegible]	SM 220	CSU	Serial	Satellite	Head-end office equipment	56K bit/sec., 2.048M bit/sec.	T1, MIL-188-144, TTL, CEPT	V.35	Yes	—	Yes	110V, 220V, -48V dc	To 40 C	$14,400	839
	[illegible]	DSU	[illegible]	[illegible]	Head-end office equipment	56K bit/sec.	RS-232 asynchronous	V.35	No	—	Yes	110V, 220V	To 40 C	$4,900	
	GB-200	NA	Synchronous	Microwave	Frequency [illegible] [illegible]	Up to 216K bit/sec.	V.35	V.35, V.36, V.37	No	—	Yes	115V, 2,309V ac, 24V, 48V dc	To 40°C	$14,400-$15,600	
	M 505	NA	[illegible]	Broadband, microwave	Frequency [illegible] multiplexer, broadband cable	[illegible] bit/sec.	All	V.35	NA	NA	NA	115V, 230V ac, 24V, 48V dc	To 40°C	$4,750-[illegible]	
	MAP-Link M0024	NA	[illegible]	Broadband	[illegible] modulator	10M bit/sec.	IEEE 802.4	—	Yes	—	Yes	—	0 -70°C	Contact vendor	
General Data Comm, Inc. (203) 574-1118	Datacomm 500A/SR	Combination	Serial	Synchronous AT&T Dataphone Digital Service	RS-232	2,400, 4.8K, 9.6K bit/sec.	All	V 24	Yes	—	No	117V, 10W	0 -50 C	$725	840
	Datacomm 500A/56K	Combination	Serial	AT&T Dataphone Digital Service	RS-422	56K bit/sec.	All	V.35	Yes	—	No	117V, 10W	0 -50 C	$825	
	Digi-Dial/56K	Combination (TID)	Synchronous	Accunet switched 56	Any V 35 terminal port	56K bit/sec.	All	V.35	No	—	No	117V, 10W	0 -50 C	$2,360	
	CSU 551A/S1	CSU	Synchronous	T1	Any DS1 interface	1.5M bit/sec.	DS1 transmission	NA	No	—	No	117V, 10W	0 -50 C	$1,995	
	Datacomm 2020/2030	NA	Synchronous	Short-haul	RS-232, RS-422, V.35	Up to 64K bit/sec.	All	V.35	Yes	—	Yes	117V, 10W	0 -50 C	$695-$850	
Infinet, Inc. **(617) [illegible]**	[illegible]	[illegible]	[illegible]	Point-to-point	Data terminal equipment	2,400, 4.8K, 9.6K bit/sec.	EBCDIC, ASCII, SDLC	V.24, V.28	Yes	EMS-2	Yes	110V ac, 60Hz	0 -50°C	$1,795-$1,895	841
	IDM 556	Combination	Both	Point-to-point	Data terminal equipment	56K bit/sec.	EBCDIC, ASCII, SDLC	V.35	Yes	[illegible]	Yes	110V ac, 60Hz	0°-50°C	$1,895-$1,995	
Infotron Systems Corp. (609) 424-9400	INM 50	Combination	Synchronous	AT&T Dataphone Digital Service, private four-wire lines	CPUs, front-end processors, cluster controllers	Up to 56K bit/sec	All	V 24, V 28	Yes	Yes	Yes	110V, 60Hz	0 -50 C	$1,895	842
	INM 56	Combination	Synchronous	AT&T Dataphone Digital Service, private four-wire lines	CPUs, front-end processors, cluster controllers	Up to 56K bit/sec	All	V.35	Yes	Yes	Yes	110V, 60Hz	0 -50 C	$1,995	
ITT Corp. [illegible]	DSU-A	DSU	Synchronous	AT&T Dataphone Digital Service	RS-232, RS-449	Up to 56K bit/sec., selectable rate	All	V.35	No	No	No	115V	0°-50 C	$695-$880	843
Kentrox Industries (800) 824-4510	T-Serv	CSU	NA	T1	T1 equipment at DSX-1	1.544M bit/sec	T1	NA	No	No	No	60 milliamps, 20V, 56V dc	0 -50 C	$1,350	844
Micom Systems, Inc. **(805) 583-8600**	M4950	[illegible]	—	Twisted-pair	AT&T Dataphone Digital Service	2,400, 4.8K, 9.6K bit/sec.	AT&T Dataphone Digital Service	NA	Yes	No	No	100V, 127V ac, 56Hz, 63Hz, 9W	0°-45°C	$725	845
	M4350	NA	—	Twisted-pair	AT&T Dataphone Digital Service	2,400, 4.8K, 9.6K bit/sec.	AT&T Dataphone Digital Service	NA	Yes	No	No	100V, 127V ac, 56Hz, [illegible]	0°-45°C	$675	
NEC America, Inc. (516) 753-7000	N500ADSV	Combination	Serial	AT&T Dataphone Digital Service, nonloaded copper lines	Synchronous data terminal equipment, multiplexers, asynchronous controllers protocol converters	Up to 56K bit/sec.	Isochronous BSC SDLC/HDLC	V 24, V 28, V.35	No	No	No	117V ac, 60Hz, 13W	—	$695-$795	846
Paradyne Corp. [illegible]	3056/BSU	Combination	[illegible]	AT&T Dataphone Digital Service, [illegible] manager, DDS/SC	RS-232C, V.24, V.28, V.35	Up to 56K bit/sec.	Synchronous	V.35	Yes	Analysis	Yes	98V, 127V ac, 47Hz, 63Hz, 18W [illegible]	0 -50 C	$1,195	[illegible]
Penril Datacomm (301) 921-8600	CSU/DSU 96	Combination	Synchronous	AT&T Dataphone Digital Service, metallic	RS-232	2,400, 4.8K, 9.6K bit/sec.	Synchronous	NA	No	No	No	110V, 60Hz	0 -50 C	$425	848
	CSU/DSU 56	Combination	Synchronous	AT&T Dataphone Digital Service, metallic	RS-232, V.35	Up to 56K bit/sec.	Synchronous	V 35	Yes	No	No	110V, 60Hz	0 -50 C	$795	
Racal-Milgo (305) 475-1601	CMS DSU 1500	DSU	Synchronous	DDS/SC	RS-232C	Up to 9.6K bit/sec.	RS-232	NA	Yes	CMS	Yes	105V, 129V ac, 12W max.	0°-50°C	$1,495-	849
Siemens Data Switching Systems (516) 435-4270	SA56K-U	Combination	Synchronous	AT&T Dataphone Digital Service	DSU, DSU/CSU, AT&T compatibles	Up to 56K bit/sec.	Synchronous, asynchronous	V 54	No	No	NA	5W dc power from system	0 -50 C	Contact vendor	850

COMPANY	PRODUCT	SINGLE UNIT, DSU/CSU OR COMBINATION	SERIAL OR SYNCHRONOUS	COMMUNICATIONS MEDIUM	INTERFACES TO	TRANSMISSION RATES	PROTOCOLS SUPPORTED	CCITT STANDARD	NETWORK CONTROL	PERFORMANCE MEASUREMENT	SIDEBAND DIAGNOSTIC TESTING	ELECTRICAL POWER REQUIREMENTS	TEMPERATURE REQUIREMENTS	PRICE	DIAL-ING READER SERVICE NUMBER
Siemens Data Switching Systems (516) 435-4270	SAS56K-A	Combination	Synchronous	AT&T Dataphone Digital Service	DSU, DSU/CSU, AT&T compatibles	56K bit/sec.	Synchronous, asynchronous	V.56 loop back	No	No	NA	5W dc power from system	0 -50 C	Contact vendor	850
Teleprocessing Products, Inc. (805) 522-8147	TP-557	Combination	Serial	AT&T Dataphone Digital Service	Data terminal equipment	19.2K, 56K bit/sec	Synchronous	V.35	Yes	Multidrop network management system	Yes	117V ac 51Hz, 63Hz	0 -50 C	$750	851
	TP-501	Combination	Serial	AT&T Dataphone Digital Service	RS-232	2,400, 4.8K, 9.6K bit/sec	Synchronous	V.35	Yes	Multidrop network management system	Yes	117V ac 51Hz, 63Hz	0 -50 C	$650	
Universal Data Systems, Inc. (205) 721-8000	D9.6	Combination	Serial	AT&T Dataphone Digital Service	PBX, data terminal equipment, RS-232, four-wire	2,400, 4.8K, 9.6K bit/sec.	All	—	No	No	Yes	115V ac, 60Hz, 4W	0 -50 C	$495-$595	852
	D56	Combination	Serial	AT&T Dataphone Digital Service	PBX, data terminal equipment, four-wire	56K bit/sec.	All	V.35	No	No	Yes	115V ac, 60Hz, 4W	0 -50 C	$795-$895	
	SW56, DSU/CSU/ACU	Combination	Serial	Accunet switched 56	PBX, data terminal equipment, RS-232, RS-366	56K bit/sec.	All	V.35	No	No	Yes	115V ac, 60Hz, 4W	0 -50 C	Contact vendor	
	DDS/MR	Combination	Serial	AT&T Dataphone Digital Service	PBX, data terminal equipment, RS-232C, RS-499, RS-530, four-wire	Up to 56K bit/sec.	All	V.35	No	No	Yes	115V ac, 60Hz, 4W	0 -50 C	Contact vendor	

PRODUCT FACE-OFF

Hayes vs. U.S. Robotics: Close match at 2,400 bit/sec.

Hayes Microcomputer Products, Inc. has earned a reputation as "the" modem maker for microcomputer users. The phrase "Hayes compatible" is a key specification for almost all microcomputer modem buyers, and the AT command set, pioneered by Hayes in its Smartmodem 300, is now a de facto standard in the modem industry.

By comparison, U.S. Robotics, Inc. has, until recently, been a dark horse in the market. Formed in 1976 to develop and sell acoustically coupled modems, the company made its name with the Password modem, one of the first inexpensive 1,200 bit/sec. modems to gain widespread acceptance.

Both Hayes and U.S. Robotics are selling well in the 2,400 bit/sec. arena — Hayes with its Smartmodem 2400 and U.S. Robotics with its Courier 2400 and 2400e.

The measure of a modem is how well it handles connections on standard telephone lines. Most of the time, users of both these modems find that the connections are acceptable, especially now that most long-distance phone companies are installing fiber-optic transmission systems. Satellite-based systems are almost ideal for data transmission, since full-duplex modems are affected far less by the half-second round-trip delay time than people trying to carry on a voice conversation.

The true test of a modem's mettle, however, is how well it works on a worse-than-average connection.

The Hayes Smartmodem 2400 is far more tolerant of impairments, once a connection is established, than the U.S. Robotics Courier 2400. But even that does not describe the entire story.

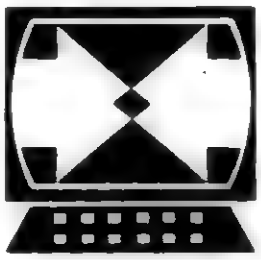
Modems that operate at 2,400 bit/sec. use adaptive equalization to compensate for defects in the transmission channel. When the connection is first established, each modem adjusts the equalizer to match the line conditions.

When the U.S. Robotics unit detects that line quality has dropped below a certain point, it will request the other modem to re-equalize, or retrain, while the connection is in progress. This disrupts the data flow.

In a live circuit, the modem's ability to adjust to changing circuit conditions is a plus, not a minus. So, although the Hayes modem is more adept at handling poor lines, the U.S. Robotics modem is more agile at 2,400 bit/sec., adapting to changing line conditions to achieve the best accuracy.

When line conditions are too adverse to use 2,400 bit/sec., the user must drop to 1,200 bit/sec. or even 300 bit/sec.

The Hayes modem is slightly better than U.S. Robotics' at communicating at 1,200 bit/sec. and significantly better at 300 bit/sec. The U.S. Robotics modem handles impairments better at 1,200 bit/sec. than it does at 300 bit/sec., making hash of the old communicator's proverb: "When in doubt, go 300." U.S. Robotics indicates it is working on improving the modem's performance at lower speeds.



Modem compatibility

Hayes excels in communications compatibility. Its modems can communicate with modems that adhere to CCITT recommendations. This includes the ability to connect at 600 bit/sec. Users in the U.S. do not need that capability, but companies with international connections will welcome the modem's ability to swing both ways.

The Courier 2400 is no slouch, however, when it comes to communicating with modems that follow the U.S. standards — Bell 103 and Bell 212A. In fact, users report that it was able to handle some marginally compatible 212A modems better than the Hayes Smartmodem 2400.

The Hayes 2,400 bit/sec. modems do not yet support any error-free transfer capability. U.S. Robotics offers Microcom Network Protocol (MNP) in its Courier 2400e product. MNP allows two modems supporting the protocol to recover automatically from errors that occur on the line.

Software compatibility

Hayes defined the standard command language with its Smartmodem 300. In the course of developing its 1,200 and 2,400 bit/sec. product lines, the company extended the language. Unfortunately, it also changed sections, prompting some users to chortle that the Hayes Smartmodem 2400 is not Hayes compatible. For most terminal emulation software running on micros and minis, however, the command set required to place and receive calls is identical across the product lines.

Hayes eliminated all but one jumper block and all DIP switches from the Hayes Smartmodem 2400. Instead, the default modem configuration is set using software, and the parameters are saved in nonvolatile memory within the modem. Since the software wields full control of all modem parameters, reconfiguration for a specific program can be completely hidden from a naive user.

U.S. Robotics uses DIP switches to set up the default modem configuration and adheres to the Smartmodem 1200 command set. Several extensions let the modem report full-call progress monitoring — voice answer and other-end ringing — to software in a standard way. U.S. Robotics' modem is superior for terminal use since the modem has Help information on the bottom of the unit and Help menus accessible while in command mode.

The U.S. Robotics modem offers only asynchronous communications. Hayes offers synchronous modes as well, a cost-effective means of implementing micro-to-mainframe applications using V.22bis communications technology. Most existing modems on mainframes tend to be AT&T 201C and 208A/B modems at 2,400 and 4.8K bit/sec. in half-duplex mode. The Hayes modem makes an excellent replacement for 201C-based systems, since it acts like a 201C leased-line modem in a four-wire arrangement.

Price

The Hayes modem carries a list price of $899, although some mail-order houses have recently been quoting prices around $550.

The "plain" U.S. Robotics Courier 2400 lists for $599 and can be found for $350. The Courier 2400e supporting the MNP costs $699.

Buying a Courier modem does mean foregoing international communications and synchronous capability, but in many applications these features are unnecessary, so the extra $200 would be wasted.

For computer room use, both U.S. Robotics and Hayes offer rack-mount versions of their products. This reduces the bulk in those situations in which a large number of modems are required to be in one place. The stand-alone modems work best for both terminal and microcomputer users. ●

STEPHEN SATCHELL

Fiber-optic modems

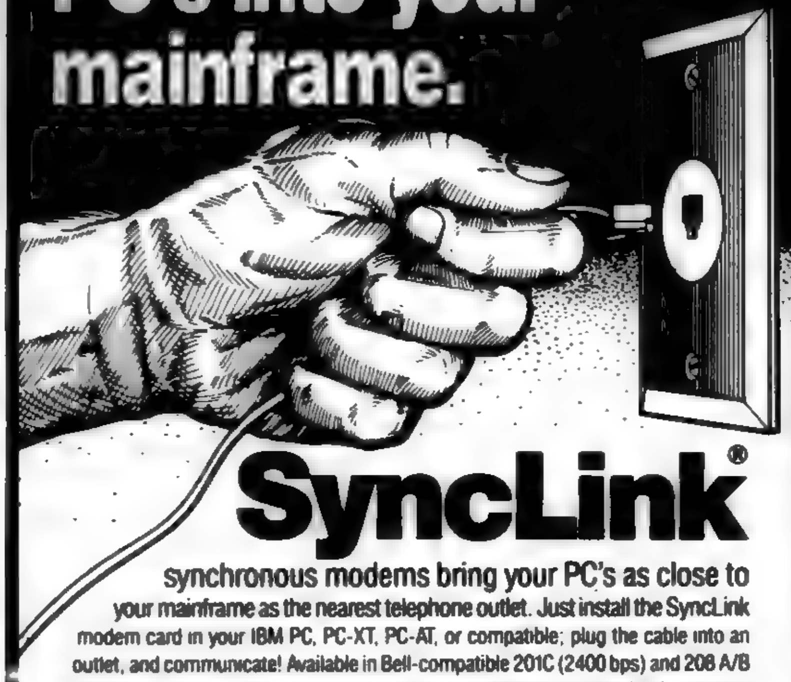
COMPANY	PRODUCT	INTERFACES TO	TRANSMISSION RATES	TRANSMISSION DISTANCE	PROTOCOLS SUPPORTED	CCITT STANDARDS	SELF-TESTING	LOOPBACK TESTING	PERFORMANCE MEASUREMENT	ORIGINATE OR RECEIVE	ELECTRICAL & POWER REQUIREMENTS	TEMPERATURE REQUIREMENT	PRICE	DIAL-ING READER SERVICE NUMBER
American Photonics, Inc. **(800) 626-5745**	**TR2000**	**RS-232 data terminal equipment**	**125K bit/sec.**	**1 km**	**All**	**NA**	**Yes**	**Yes**	**—**	**Both**	**15 V dc**	**0°-50°C**	**$125**	**853**
Artel Communications Corp. (617) 752 5690	LS-100	IBM 3250. 5080	Up to 2M bit/sec	3 miles	IBM 3250. 5080	NA	Yes	Yes	Netserver	Both	110V	0 -50 C	$1,500	854
Black Box Corp. **(412) 746-5566**	**Fiber-optic line-driver**	**Any serial RS-232 device**	**Up to 19.2K bit/sec.**	**1,100 to 13.120 ft**	**Asynchronous RS-232**	**V.24**	**No**	**Yes**	**No**	**Both**	**12V dc external, pin 9/RS-232**	**0°-45°C**	**$159-$199**	**855**
Burr-Brown Corp. (602) 746-1111	LDM 80	Any serial RS-232 port	19.2K bit/sec.	35 km	All	V 24	Yes	Yes	—	Both	± 6V	0 -70 C	$9.850	856
	LDM 85	RS-232 RS-422 RS-485. multipoint	5M bit/sec.	2 km	All	—	Yes	Yes	—	Both	110V. 3W	0 -70 C	$165	
Canoga-Perkins Corp. **(818) 888-2003**	**2290**	**RS-422. RS-232C. RS-423. T1. all interfaces field-inter-changeable**	**Up to 12M bit/sec.**	**6 km**	**All**	**V.35**	**Yes**	**Yes**	**No**	**Both**	**110V**	**0°-40°C**	**$480-$1,600**	**857**
	2280	**RS-422. RS-232C. RS-423. T1. all interfaces field-inter-changeable**	**Up to 12M bit/sec.**	**6 km**	**—**	**V.35**	**No**	**No**	**No**	**Both.**	**110V**	**0°-40°C**	**$1.250-$1,400**	
	2260	**T1 ports**	**Up to 2.048M bit/sec.**	**6 km**	**All**	**T1**	**Yes**	**No**	**No**	**Both**	**110V**	**0-40°C**	**$650-$800**	
	2250	**RS-422. RS-232C. RS-423 ports**	**Up to 200K bit/sec.**	**6 km**	**All**	**V.35**	**Yes**	**Yes**	**No**	**Both**	**110V**	**0°-40°C**	**$350-$450**	
	CDS-232	**RS-232**	**19.2K bit/sec.**	**1 km**	**All**	**NA**	**No**	**No**	**No**	**Both**	**12V dc**	**0°-40°C**	**$145**	
Codenoll Technology Corp. (914) 965-6300	Codenet-3030A	Ethernet	10M bit/sec.	4 km	802.3 Ethernet	8802	No	No	No	Both	5V	0 -50 C	$785	858
	3035	Data terminal equipment	200K to 5M bit/sec	10 km	Asynchronous, synchronous	V 35	No	Optional	No	Both	+ 5V, -5.2V	0 -50 C	$995	
	3422	Data terminal equipment	Up to 5M bit/sec	10 km	Asynchronous, synchronous	RS-422	No	Optional	No	Both	+ 5V, -5.2V	0 -50 C	$895	
	3001	T1. T1C ports	1.544M. 2 048M. 3 088M bit/sec	14 km	Synchronous	M1	No	Optional	No	Both	+ 5V, -5 2V	0 -50 C	$1.195	
Fibercom, Inc. **(703) 342-6700**	**Whisperlink/232**	**RS-232**	**Up to 19.2K bit/sec.**	**5 km**	**NA**	**NA**	**No**	**Yes**	**No**	**Both**	**115V, 6W**	**—**	**$495**	**859**
	Whisperlink/422	**RS-422 multidrop**	**2M bit/sec.**	**2 km**	**NA**	**NA**	**No**	**Yes**	**No**	**Originate**	**115V, 6W**	**—**	**$650**	
	Whisperlink/ SNA	**IBM 3274 controllers and IBM data terminal equipment, Type A**	**2.358M bit/sec.**	**1,500 ft**	**IBM SNA**	**NA**	**No**	**Yes**	**No**	**Originate**	**115V, 6W**	**—**	**$395**	
Fibronics International, Inc. (617) 778-0700	FM 1601	Coax, IBM 3270 5580	2M 10M bit/sec	3 km	All	NA	Yes	Yes	NMS	Both	110V. 220V	0 -50 C	$1.100	860
Focom Systems International Ltd. **(617) 626-8570**	**1519**	**RS-232**	**Up to 19.2K bit/sec.**	**5 km**	**All**	**V.24**	**Yes**	**Yes**	**No**	**Both**	**115V, 45Hz, 65 Hz**	**-10°-60°C**	**$800**	**861**
Gandalf Data, Inc. (312) 541 6060	PACX 2000	PACX components	9 28M bit/sec.	5 km	PACX	NA	Yes	No	Netscan 2000	Both	15V	0 -50 C	Contact vendor	862
Richard Hirschmann of America, Inc. **(800) 225-0524**	**OXDV series**	**RS-232**	**50K-100K bit/sec.**	**1 mile**	**RS-232C and compatibles**	**—**	**NA**	**NA**	**No**	**Both**	**Pins 18 and 25, ± 12V or externally powered**	**-20°-60°C**	**$150-$1,000**	**863**
	OXDV RS-422	**RS-422**	**5M-10M bit/sec.**	**1 mile**	**RS-422 and compatibles**	**—**	**NA**	**NA**	**No**	**Both**	**Pins 18 and 25 ± 12V or externally powered**	**-20°-60°C**	**$500**	
Honeywell Information Systems (800) FOROPTO	HFM 5200/5210	RS-232	dc to 19.2K bit/sec.	3.5 km	RS-232 asynchronous	V.24	No	No	No	Both	5V	0 -70 C	$96-$145	864
	HFM 5100	RS-232 VTE, Tempest applications	dc to 78K bit/sec	1 meter to 3 km	RS-232 asynchronous, synchronous	V 24	No	Yes	No	Both	+ 12, 300 mA; -12, 40 mA	0 -70 C	$400-$620	
	HFM 5120/5130	RS-232 ports	dc to 19 2K bit/sec.	3 5 km	RS-232 asynchronous, synchronous	V 24	No	Yes	No	Both	+ 12, 300 mA; -12, 40 mA	0 -70 C	$200-$300	
	HFM 5300/5305	IBM twinax and coax	Twinax, 1M-bit coax, 2.38M bit/sec	4 5 km	IBM	None	No	No	No	Both	10:5V, 500 mA	0 -70 C	$400-$1,000	
International Data Sciences, Inc. **(800) IDSDATA**	**ODS-106**	**RS-232 asynchronous data terminal equipment, data communi-cations equipment**	**19.2K bit/sec.**	**250 ft**	**All**	**NA**	**No**	**No**	**No**	**Both**	**± 12V**	**0°-50°C**	**$119**	**865**

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

COMPANY	PRODUCT	INTERFACES TO	TRANSMISSION RATES	TRANSMISSION DISTANCE	PROTOCOLS SUPPORTED	CCITT STANDARDS	SELF-TESTING	LOOPBACK TESTING	PERFORMANCE MEASUREMENT	ORIGINATE OR RECEIVE	ELECTRICAL & POWER REQUIREMENTS	TEMPERATURE REQUIREMENT	PRICE	DIAL-IN© READER SERVICE NUMBER
[illegible]	**ODS-107**	**RS-232 asynchronous data terminal equipment, data communications equipment**	**19.2K bit/sec.**	**[illegible]**	**All**	**NA**	**No**	**No**	**No**	**[illegible]**	**± 12V**	**0 -50 C**	**$160**	
Lightwave Communications, Inc. (203) 438-3591	FO-232	Data terminal equipment, data PBX	0-100K bit/sec.	2 km	All	V.24, V 28	No	Yes	No	Both	12V external, 12V internal, pin 9 RS-232	0 -50 C	$140	866
	FO-232 LD	Data terminal equipment, data PBX	0-100K bit/sec.	4 km	All	V 24, V.28	No	Yes	No	Both	12V external 12V internal pin 9 RS-232	0 -50 C	$190	
	FO-232H	Data terminal equipment, data PBX	0-100K bit/sec.	2 km	All	V 24, V 28	No	Yes	No	Both	6-15V, pins 9 or 19, RS-232	0 -50 C	$89	
	FO-422	Data terminal equipment, data PBX	10M bytes	2 km	All	NA	No	Yes	No	Both	12V external, 12V internal pins 9, 10, 11, 12	0 -50 C	$295	
Manage, Inc. (413) 598-8204	**FOM-1232**	**RS-232 asynchronous**	**0-56K bit/sec.**	**4,000 meters**	**RS-232 (all)**	**V.24, V.28**	**No**	**No**	**No**	**Both**	**110V ac**	**-25 -50 C**	**$390**	**867**
	FOM-232	**RS-232**	**56K bit/sec. asynchronous, 29K bit/sec. synchronous**	**6 km**	**RS-232 (all)**	**V.24, V.28**	**No**	**No**	**No**	**[illegible]**	**110V ac**	**-25 -50 C**	**$475**	
	FM-DTX200	**T1 ports**	**6.5M bit/sec.**	**[illegible]**	**All**	**T1**	**No**	**No**	**No**	**Both**	**105V-140V ac, 60Hz**	**0 -50 C**	**$850**	
	FM-DRX 210	**T1 ports**	**6.5M bit/sec.**	**4 km**	**All**	**T1**	**No**	**No**	**No**	**[illegible]**	**105V-140V ac, [illegible]**	**0 -50 C**	**$925**	
Math Associates, Inc. (516) 334-6800	XR 1000	RS-232C	100K bit/sec.	2,000 + meters	RS-232 asynchronous	RS-232	Yes	Yes	Yes	Both	115V ac 50Hz-60Hz	0 -50 C	$500	868
	XR-1100	RS-232C	100K bit/sec	2,000 + meters	RS-232 asynchronous	RS-232	No	No	Yes	Both	6.3V-18V ac, 50Hz-60Hz	0 -50 C	$235	
	XR-1150/55	RS-232C data terminal equipment, data communications equipment	100K bit/sec	2,000 + meters	RS-232 asynchronous	RS-232	Yes	Yes	Yes	Both	—	0 -50 C	$155	
	XR-1160	RS-232C data terminal equipment, data communications equipment	100K bit/sec	1,000 + bit/sec.	RS-232 asynchronous	RS-232	Yes	Yes	Yes	Both	+ 8V, 10 mA max	0 -50 C	$155	
Optelecom, Inc. (301) 840-2121	**MD-4121**	**RS-232**	**100K bit/sec.**	**1 km**	**Asynchronous**	**V.24, V.21**	**No**	**No**	**No**	**[illegible]**	**ac power adapter or host power on pin 9**	**-20 -50 C**	**$150**	**869**
	MD-4131	**RS-232**	**19.2K bit/sec.**	**2 km**	**Asynchronous**	**NA**	**No**	**No**	**No**	**[illegible]**	**EIA**	**-20 -50 C**	**[illegible]**	
	MD-4133	**[illegible] optical ports**	**19.2K bit/sec.**	**200 meters**	**RS-232**	**NA**	**No**	**No**	**[illegible]**	**Both**	**Data power from RS-232**	**-20 -50 C**	**$100**	
	MD-4141	**SMA optical ports**	**19.2K bit/sec.**	**[illegible]**	**[illegible]**	**NA**	**No**	**No**	**No**	**Both**	**ac power adapter**	**-20 -50 C**	**$115**	
Optical Data Systems (214) 234-6400	ODS 107	RS-232	56K bit/sec.	2 miles	Asynchronous	—	No	No	No	Both	6 mA	—	$160	870
	ODS 219	RS-449	4.8K - 2.048M bit/sec.	2 miles	Asynchronous, synchronous	—	Yes	Yes	Yes	Both	110V	—	$995	
	ODS 100	RS-232	64K bit/sec	2 miles	Asynchronous, Synchronous	—	Yes	Yes	Yes	Both	110V	—	$400	
	ODS 115	RS-232	150K bit/sec.	2 miles	Asynchronous, Synchronous	—	Yes	Yes	Yes	Both	110V	—	$1 195	
	ODS 400	IBM	2.35M bit/sec.	2 miles	3.274	—	Yes	NA	Yes	Both	110V	—	$445	
	ODS 700	DSX-1	1 544M bit/sec.	2 miles	T1	—	Yes	Yes	Yes	Both	110V	—	$895	
	ODS 234	Ethernet	10M bit/sec	Network dependent	Ethernet (all)	—	Yes	Yes	Yes	Both	Interface	—	$695	
	ODS 218	V.35	4.8M -2.048M bit/sec	2 miles	Asynchronous, Synchronous	—	Yes	Yes	Yes	Both	110V	—	$995	
[illegible] Systems, Inc. [illegible]	**[illegible]**	**RS-232, RS-449**	**1,200K-256K bit/sec.**	**3 km**	**[illegible]**	**V.35**	**No**	**Yes**	**No**	**[illegible]**	**115 or 230 half A**	**0 -40 C**	**$695**	**871**
	306	**RS-422**	**19.2K -2.2M bit/sec.**	**4 km**	**[illegible]**	**V.35**	**No**	**Yes**	**No**	**Both**	**115 or 230 half A**	**0 -40 C**	**$1 095**	
	401	**T1, AT&T public, 41451**	**1.544M bit/sec**	**5 km**	**All**	**G703**	**No**	**Yes**	**No**	**Both**	**115 or 230 half A**	**0 -40 C**	**$1,295**	
	105	**RS-232, RS-449, TTL**	**Up to 5M bit/sec.**	**2 km**	**All**	**None**	**No**	**No**	**No**	**NA**	**12V dc, 0.2A**	**0 -40 C**	**$200**	
Quanta Communications Systems, Inc. (714) 970-2966	QCS 6200DS	Data terminal equipment, data communications equipment, asynchronous	Up to 19.2K bit/sec.	200 ft	RS-232 asynchronous	V.24	No	No	No	Both	Data terminal equipment data communications equipment supported	0 -50 C	Contact vendor	872
	QCS 6100DS	Data terminal equipment, data communications equipment, asynchronous	Up to 19.2K bit/sec.	1 km	RS-232 asynchronous	V.24	No	No	No	Both	Data terminal equipment data communications equipment supported	0 -50 C	Contact vendor	
	QCS 1100 DS	T1 ports	1.544M bit/sec.	3 km	T1	NA	Yes	Yes	No	Both	89V-127V ac 60Hz	0 -40 C	Contact vendor	
	QCS 1200DS	G703 equipment	2.048M bit/sec	Up to 3 km	G703	G703	Yes	Yes	No	Both	110V 220V	0 -40 C	Contact vendor	
Racal-Milgo (305) 475-1601	**Fibermode 1100 T1**	**T1 ports**	**1.5M bit/sec.**	**1.8 miles**	**[illegible]**	**NA**	**No**	**Yes**	**—**	**[illegible]**	**89V-127V ac 60Hz**	**0 -50 C**	**$1,200**	**873**

COMPANY	PRODUCT	INTERFACES TO	TRANSMISSION RATES	TRANSMISSION DISTANCE	PROTOCOLS SUPPORTED	CCITT STANDARDS	SELF-TESTING	LOOPBACK TESTING	PERFORMANCE MEASUREMENT	ORIGINATE OR RECEIVE	ELECTRICAL & POWER REQUIREMENTS	TEMPERATURE REQUIREMENT	PRICE	DIAL-INQ READER SERVICE NUMBER
Racal-Milgo (305) 475-1601	Fibermode 6100	Asynchronous data terminal equipment	19.2K bit/sec.	1.62 miles	All	NA	No	Yes	—	Both	Data terminal equipment, data communications equipment dependent	0 -50°C	$176	873
Raycom Systems, Inc. (303) 530-1620	2100	Asynchronous RS-232	Up to 100K bit/sec.	4.000 ft	RS-232C	RS-232C	No	No	No	Both	± 8V, internal external	0 -50 C	$195	874
	2500	Asynchronous RS-422	5M bits	4 000 ft	RS-422	RS-422	No	No	No	Both	± 8V, internal, external	0 -50 C	$295	
	2300/2302	Centronics printer	Up to 3.000 line/min	3.000 ft	Centronics	NA	No	No	No	Both	9V, external	0 -55 C	$695	
	2600	T1 ports	1.544M bits	4-20 km	NA	NA	No	Yes	No	Both	120V	0 -50 C	$900-$4.800	
S.I. Tech, Inc. (312) 232-8640	Bitdriver 2005	Asynchronous RS-232	Up to 56K bit/sec	2-5 km	All	V.24, V.28	Yes	Yes	No	Both	110V ac	0 -70 C	$220	875
	Minibitdriver 2505	Asynchronous RS-232 data link	Up to 56K bit/sec.	2-5 km	All	V.24, V 28	No	No	No	Both	CPU-powered	0 -50 C	$120	
	Arcnet 2853	Arcnet	2.5M bits	2-5 km	Arcnet	NA	Yes	Yes	No	Both	930 HM coax, 110V ac	0 -70 C	$450	
	Omninet 2852	Omninet and RS-485	1M bit	2-5 km	Omninet	NA	Yes	Yes	No	Both	110V ac	0 -70 C	$450	
Versitron (202) 722-8600	Micro 232	RS-232	0-76K bit/sec	1 3 km	—	NA	No	Yes	No	Both	120V ac, 9W	0 -50 C	$195	876
	FOM 907A	RS-232, MIL-188	0-38.4K bit/sec	2 km	—	NA	No	Yes	No	Both	120V ac, 9W	0 -50 C	$862.50	
	FOM 9207	RS-232 MIL-188	0-76.2K bit/sec	2 km	—	NA	No	Yes	No	Both	120V ac, 9W	0 -50 C	$1,328	
	F9205	TTL RS-232, RS-422, RS-423, MIL-188	76.8K bit/sec	2 km	—	V.35	No	Yes	No	Both	120V ac, 9W	0 -50 C	$1.475	

How to plug remote PC's into your mainframe.



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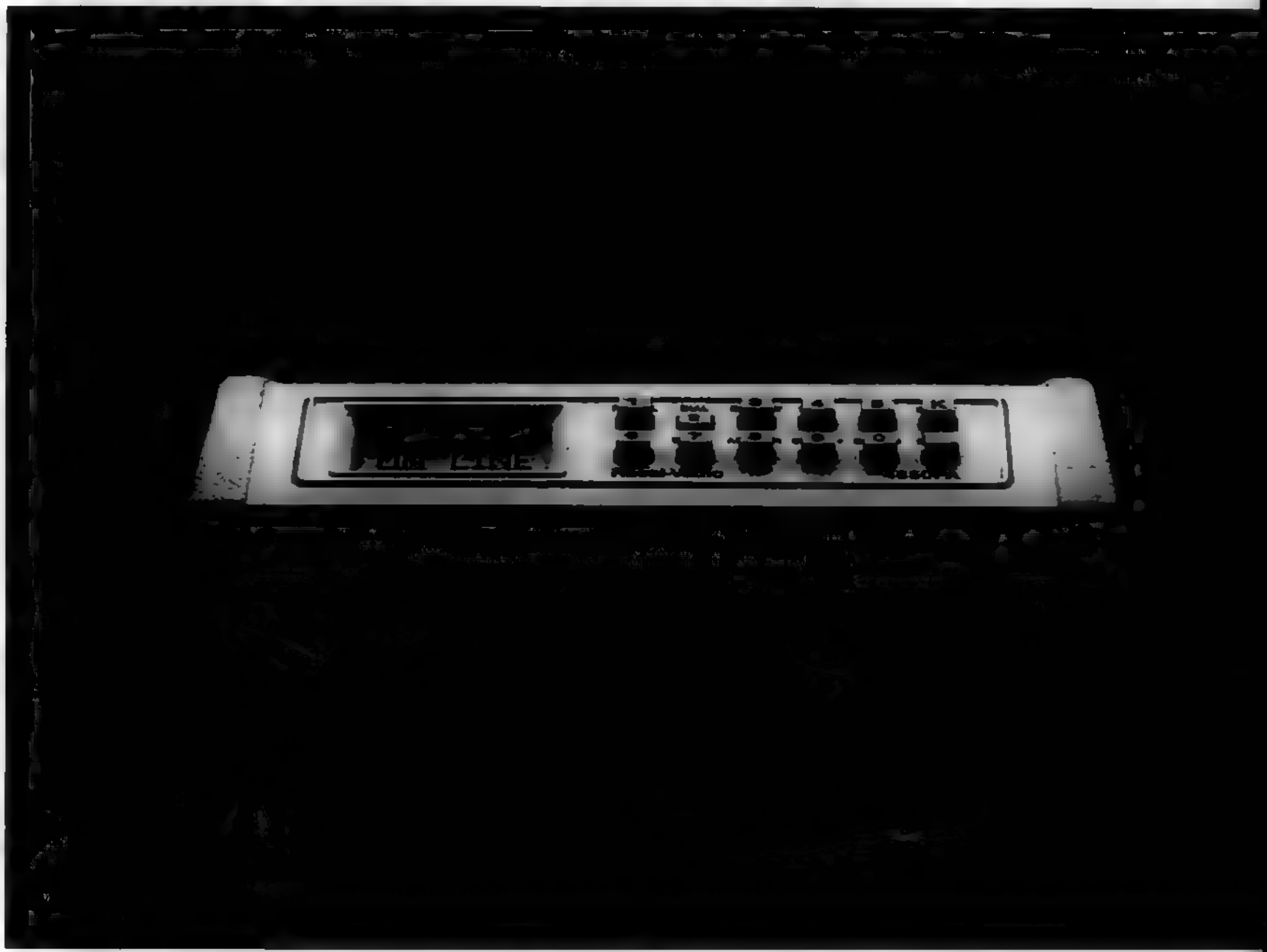

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2400 bps	25 min.	$ 8.33
9600 bps	**6 min., 15 sec.**	**$ 2.08**
19,200 bps	**3 min., 7 sec.**	**$ 1.04**

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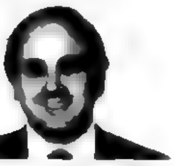

James Connolly

Goodbye, paper chase

Estimating industry growth can be frustrating if the industry is undefined. So, people involved with industries in the formative years must determine which technologies fit into their markets before they determine where the markets are heading.

One trade and professional organization recently took that step and discovered its market — information and image management — had the potential to more than double by 1996. What the Association for Information and Image Management (AIIM) says it expects is a massive user shift to conversion of paper documents to electronic documents.

AIIM, which expects 15,000 people at its 1987 AIIM Show in New York next month, commissioned a study by Coopers & Lybrand. The study shows the U.S. information and image management market growing from $2.5 billion in 1986 to $6.5 billion by 1996.

The report also calls for greater professionalism — more sophisticated marketing and

Continued on page 57

Bank regroups MIS, cuts costs

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — First National Bank of Chicago, one of the nation's largest banks, has made distributed processing an art during the last 10 years.

The bank's individual business units have been encouraged to choose the software applications that best suit their business needs, and the job of data processing managers is to support those applications with hardware.

But recently, the trend toward decentralization was partially reversed, at least in the systems area. That is because the bank's MIS and Systems organization and the Systems Steering Committee, chaired by the bank's president and other top managers, concluded that they could gain greater efficiencies from restructuring the location and management of computer resources.

Since the late 1970s, First Chicago's 150 Strategic Business Units have shopped independently for systems to support their activities, which resulted in the scattering of significant computer resources in multiple sites. Today, the bank supports 10 different operating environments on machines from four primary vendors — IBM, Tandem Computers, Inc., Wang Laboratories, Inc. and AT&T. The resources are spread among 56 First Chicago computing centers around the world.

"We've wrestled with centralization and decentralization for many years," says Robert Hokom, vice-president of MIS and Systems. Even with greater centralization, none of the hardware systems have been dropped. But steps are being taken to regroup like computer systems in the same data center. Hokom says the move is intended to improve worker productivity by creating centralized data centers that bring the bank's systems operators and programmers closer to the hardware they maintain.

A prime example of this policy is a plan that was devised to consolidate the seven computer rooms housing Tandem computer systems in the Chicago area into just two. That way, Hokom explains, economies in power, shared resources and lower operating costs could be realized.

"What you get with centralization is efficiency," Hokom says. "You can put all the equipment into one place and service it with one staff." But, he cautions, one central MIS site is not favored, even for the bank's IBM 3090 mainframes, which are dispersed in three data centers in Illinois.

"We have two strategic objectives at First Chicago," explains Salvatore Campagna, vice-president in charge of the bank's Remittance Banking lockbox group, which runs Digital Equipment Corp. computers (see story page 54). "We want to be the premier commercial bank in the Midwest and the premier consumer bank. To do that, we've broken the business into distinct product and business areas, so that each area has all the authority it needs to carry out its task."

But there is centralized coordination of the systems groups' activities. The MIS and Systems organization, which has 35 managers, oversees an annual budget of about $130 million and is

Continued on page 54

At a glance

FIRST CHICAGO
The First National Bank of Chicago

Assets: [illegible] billion.
1986 net income: $276.2 million.
Rank: 11th largest bank holding company in U.S.
Employees: 13,200 worldwide.
MIS employees: [illegible].
VP MIS: Robert Hokom.
MIS budget: $130 million.
Principal systems: IBM 3090 mainframes, Tandem Computers, Inc. Nonstop transaction processors, Wang Laboratories, Inc. VS 300 office systems, AT&T 3B2 minicomputers, Digital Equipment Corp. VAX and PDP-11 minicomputers for lockbox and international trading.

INFORMATION PROVIDED BY FIRST CHICAGO

Subsystem targets DEC minis

MILPITAS, Calif. — System Industries, Inc., a maker of Digital Equipment Corp.-compatible peripherals, has announced a tape subsystem designed for use with most DEC minicomputers.

The SI 9625 Tape Subsystem is a dual-density backup product featuring an enhanced 100 in./sec. streaming capability and a 50 in./sec. start-and-stop mode. It also features automated tape loading and a 256K-byte cache buffer to improve streaming performance, according to System Industries.

The product was designed to be compatible with DEC's TE16, TU45 and TU77 formats. System Industries officials claimed that a special capstan drive-tension arm buffering allows eight times faster buffering than typical streamers.

System Industries said the subsystem carries a one-year, on-site warranty and ranges in price from $19,000 to $25,000 depending upon the processor attached.

Inside

- Minis fit in with bank's mainframe-based strategy. Page 54.
- Early '88 release predicted for System/36, 38 heir. Page 56.
- Mupac rolls out line of VME backplanes. Page 58.

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Bank employs alternative solutions for lockbox operation

Even in a computer environment dominated by IBM and Tandem Computers, Inc., the opportunity to go with alternate vendors is supported by the First National Bank of Chicago's centralization policy.

A case in point is the Remittance Banking Division's lockbox operation. This strategic business unit is responsible for collecting and processing checks that have been sent to 2,400 corporate clients' lockboxes for payment. It supports that function with two Digital Equipment Corp. VAX 8200s, three PDP-11/44s and a Microvax II, which is linked to the data base that schedules work loads. Only one other bank strategic business unit is based on DEC hardware systems — a set of VAX-11/785s. The two business units are discussing combining their DEC systems into a single operation, furthering the bank's consolidation strategy.

The lockbox operation has autonomy in making systems decisions, says Salvatore Campagna, vice-president in charge of lockbox systems. "If I think I'm running out of capacity, I can ask that the MIS and Systems group buy more DEC equipment for me," Campagna explains. The lockbox systems support offices in New Jersey, North Carolina, Texas and California. Each remote site is connected by leased lines to the Chicago processing center.

In Campagna's area, the purchase of a custom $50,000 workstation prompted the DEC system support. More than 20 special workstations optically and magnetically read the checks. After an operator enters the dollar figures through a keyboard, the workstations sort the checks for delivery.

The table-size workstations are driven by PDP-11s. Because of the system's specific requirements, the lockbox system is a set of three DEC PDP-11/44s, a VAX 8200 and four high-capacity RA-81 456M-byte disk drives.

To each strategic business unit, Campagna explains, the MIS and Systems group is really a financial and administrative resource. "They do all the coordination, and they handle all the systems procurement," Campagna says.

JEAN S. BOZMAN

Bank regroups

CONTINUED FROM PAGE 53

responsible for the hiring and placement of data processing personnel — 825 worldwide and 780 in the Chicago area. MIS and Systems also procures all systems equipment, in part to allow for savings from volume purchases.

While there is great variety in the systems supported, Hokom says systems support is more coherent than it was. "We're more centralized than we were a year ago. We've created larger systems organizations. But that's not to say we're moving toward one central MIS site."

Instead, DP professionals will work with the bank's business managers to determine whether a given system is to be moved, upgraded or retained. "We give our systems managers charters to go out and make a business case to all of the distributed business centers for providing a new utility," Hokom adds.

In some cases, he says, the sales pitch did not work, and some of the businesses have decided to keep their Tandem or Wang systems closer to the end-user sites. "We'll try to achieve some of the efficiencies of centralization where possible," he says. "But it's difficult to support all the elements of a given business with one system. We have to make sure that each business has the ability to select the application they think is most appropriate to their needs."

The consolidation of Tandem systems, expected to be completed by the end of this year, reflects the strategic importance of the Tandem computers, which are tied to other Tandems in 20 major sites around the world.

Linked through Tandem's Expand Network, the processors direct the transfer of money from New York and Chicago to points such as London; Paris; Dubai, United Arab Emirates; Tokyo; Seoul, S. Korea; Singapore; and Sydney, Australia.

The eight Chicago Tandem systems — containing three to 15 processors each — are being upgraded to the new VLX design. Older units, including Nonstop IIs and Tandem TXPs, will be upgraded by the end of this year, according to Peter Miller, senior vice-president of DP for the bank.

"The upgraded machines will be put in one of the existing computer rooms, and some of the older systems will go back to Tandem," he says. New VLX systems will go into a new computer room.

The upgrade in Tandem computers followed a year-earlier upgrade of the bank's three major IBM DP centers. A

Continued on page 57

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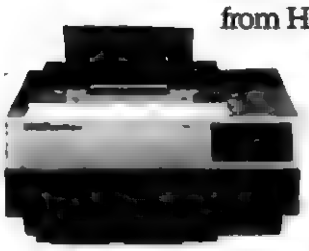
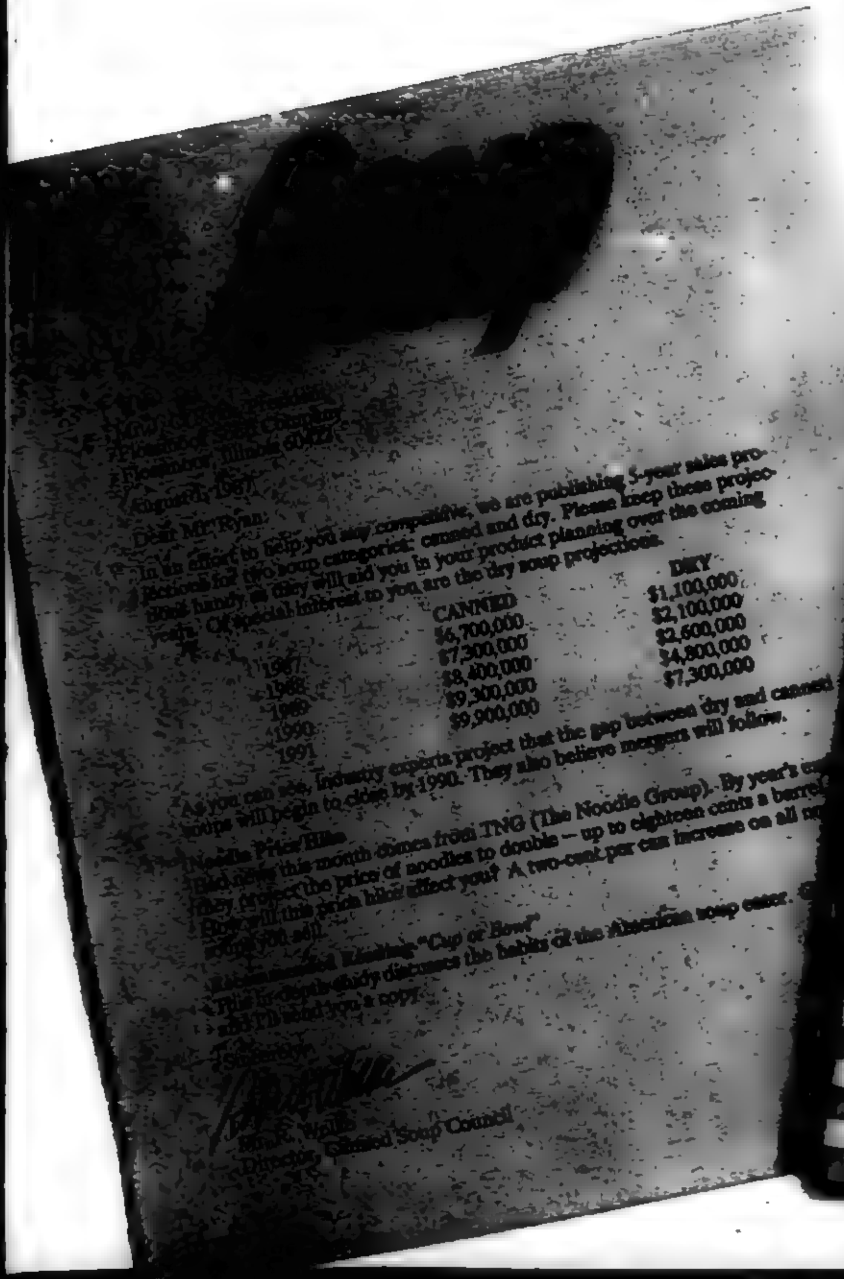




[illegible]
[illegible] Soup Company
Flossmoor, Illinois 60422
August [illegible], 1987

Dear Mr. Ryan:

In an effort to help you stay competitive, we are publishing 5-year sales projections for two soup categories: canned and dry. Please keep these projections handy as they will aid you in your product planning over the coming years. Of special interest to you are the dry soup projections.

	CANNED	DRY
1987	$6,700,000	$1,100,000
1988	$7,300,000	$2,100,000
1989	$8,400,000	$2,600,000
1990	$9,300,000	$4,800,000
1991	$9,900,000	$7,300,000

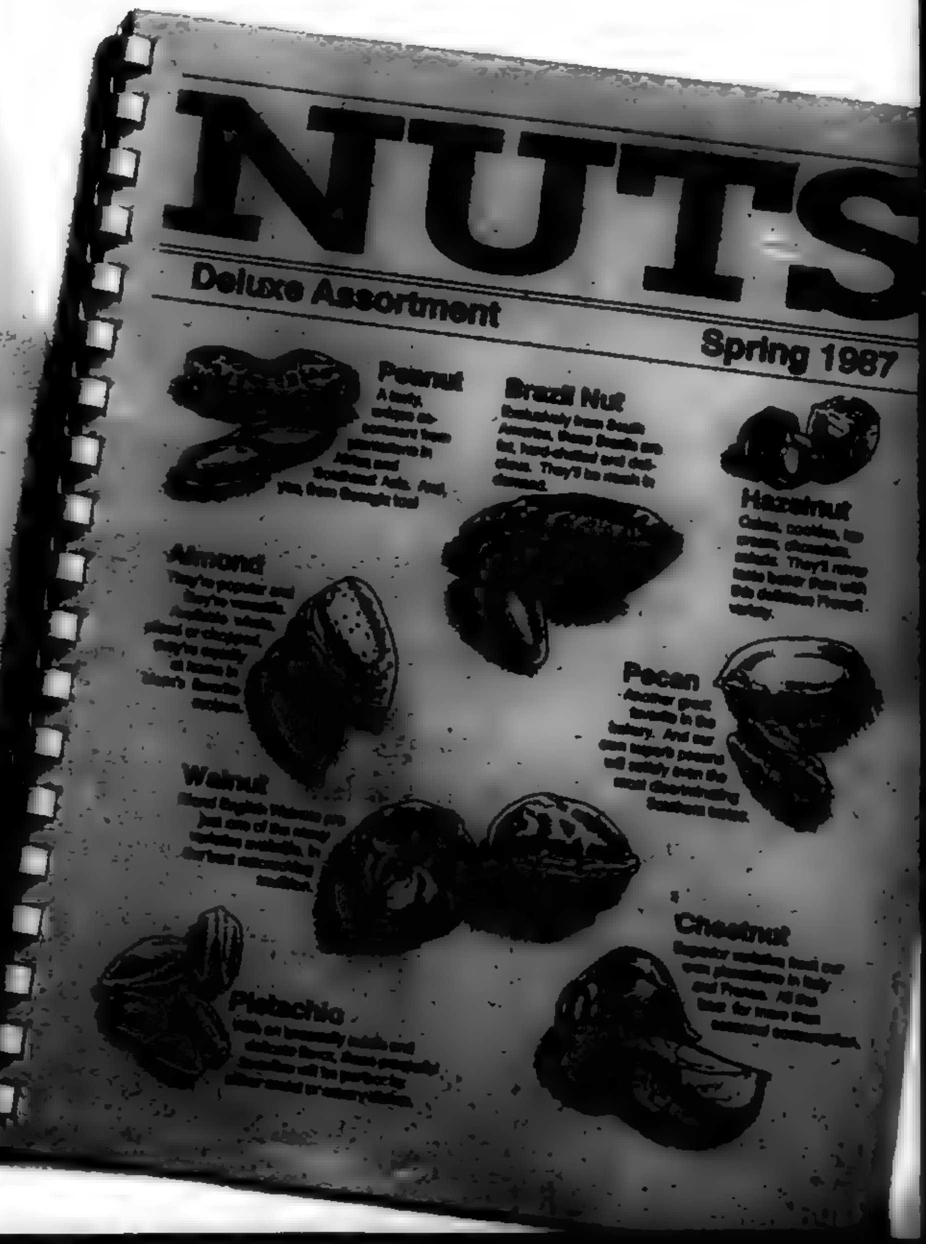
As you can see, industry experts project that the gap between dry and canned soups will begin to close by 1990. They also believe mergers will follow.

Noodle Price Hike
Bad news this month comes from TNG (The Noodle Group). By year's
they project the price of noodles to double – up to eighteen cents a barrel
How will this price hike affect you? A two-cent per can increase on all
soups you sell.

Recommended Reading: "Cup or Bowl"
This in-depth study discusses the habits of the American soup eater.
and I'll send you a copy.

Sincerely,

[illegible]
Director, Canned Soup Council



NUTS
Deluxe Assortment
Spring 1987

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Brazil Nut
Hazelnut
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Walnut
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System/38 kicker expected this year

BY STANLEY GIBSON
CW STAFF

CHESHIRE, Conn. — IBM's successor to its System/38 and 36 minicomputers, reportedly code-named "Silverlake," will arrive in early 1988, although pieces will appear this year, according to a consultant specializing in the System/38.

David Andrews, president of ADM, Inc., a Cheshire-based consulting firm, recently published his observations and predictions in a study entitled, "Toward Three Architectures: IBM's Mid-Range Strategy." The three architectures outlined in the study are those of the IBM Personal Computer, the System/36 and 38 and IBM 370-based machines.

"Silverlake won't happen all at once," Andrews says, adding that he expects several System/38 enhancements before the Silverlake debut, some of which could appear within the next few months. The consultant says a larger System/38 memory capacity, growing from 32M bytes to 64M bytes, is likely and technically easy to accomplish. He adds that he anticipates a new release of CPF, the System/38 operating system. Other enhancements could include speeding up the System/38 microprocessors, adding ASCII terminals or repackaging and cutting prices.

Foreshadowing

Andrews also says a key to Silverlake — the ability to run the System/36 operating system, SSP — will probably be announced for the System/38 prior to Silverlake itself. According to Andrews, that will come after the buying market has taken into account the inevitability of Silverlake and the inevitable demise of the System/36.

Andrews notes that sources at IBM indicate SSP can already run under CPF. The timing of the announcement of the capability, he says, will depend on marketing considerations, not technological feasibility.

Once Silverlake does appear, "It will become functionally compatible with DB2, although underneath, it will be different," Andrews says. In addition to compatibility with IBM's DB2 data base management system, Silverlake features will include a direct channel interface to IBM's 9370 departmental processor.

Other predictions Andrews makes in his report are that IBM's Solutionpac series of office automation software is essentially a "Band-Aid" to tide IBM over until it can design a new office automation series that will make both Professional Office System and Solutionpacs obsolete.

Andrews stresses that repeated consultations with IBM have shown him the firm is committed to the System/38. "There is no reason people should stop buying the System/36 and 38. Investments in disks, terminals and software will be protected," Andrews says, though he cautions, "IBM always keeps its options open until the last minute, however."

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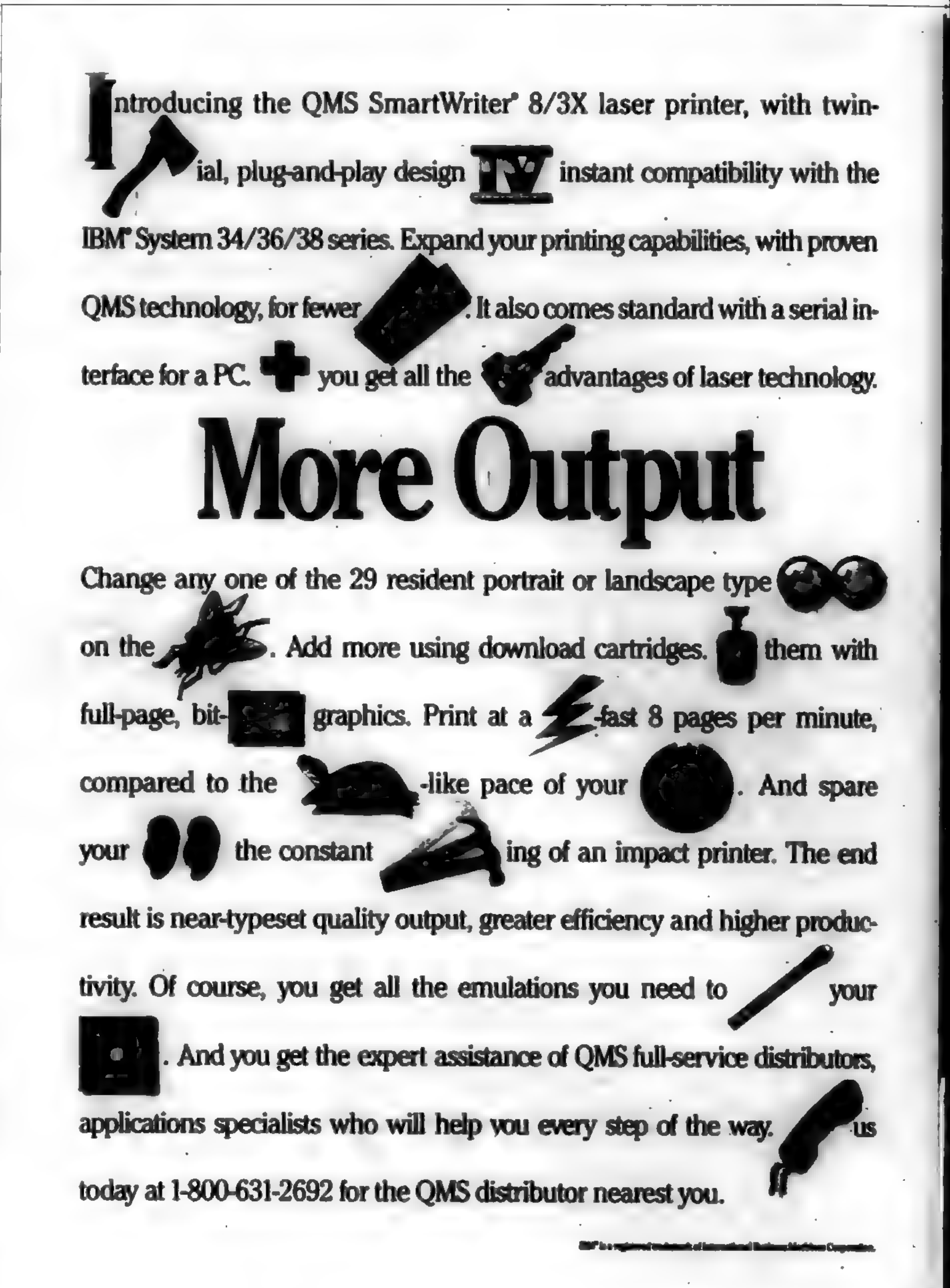

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Bank regroups

FROM PAGE 54

thorough rearrangement of the IBM mainframes has yielded annual savings of $1 million or more, Miller says. Savings came from the need to run fewer copies of the operating systems and from grouping the mainframe resources near high-capacity disk drives.

One IBM center handles all consumer credit card transactions with an IBM 3090 Model 200. A second IBM shop tracks corporate accounts of mid-size businesses with a 3090 Model 180 and an older IBM 3083.

A third IBM center serves the bank's top corporate clients — many of them Fortune 1,000 businesses — as well as the thousands of local consumer checking and savings accounts. This banking center recently updated from an IBM 3084, a multiprocessor IBM 3033, an Amdahl Corp. V8 and an IBM 3081. The new grouping consists of two 3090 Model 400s running IBM's MVS and a single 3090 Model 200 runnning IBM VM interactive applications.

The bank also hosts Wang VS 300 minicomputers at three different Chicago locations to support both office automation and electronic-mail functions. These computers were recently upgraded to the point at which a single VS processor replaced three older Wang minicomputers. About 60% of the Wang processing power is now located in a single computer room, Hokom says.

A fourth vendor, AT&T, is responsible for telephone and data switches as well as several 3B2 departmental processors. AT&T's System 85 private branch exchange and Information Systems Network switch move voice and data signals around eight sets of corporate offices in Chicago's downtown Loop area, Hokom says.

All of these sites are linked by fiber-optic cables, while coaxial cable and twisted-pair wiring are used within the buildings.

Goodbye

FROM PAGE 53

customer support — on the part of old-line suppliers such as those that provide paper-to-micrographics conversions and computer output microfilm systems.

For the vendors, the key to the information and image management market is tying together several technologies, such as optical storage, high-speed communications, image scanning and high-speed CPUs.

Those technologies must combine to let users electronically store and retrieve vital documents and sometimes merge those images with text.

AIIM cites the need for a bank to store the image of a check and have it readily accessible to users in several bank departments.

Slaying sacred cows

However, no matter how well vendors merge technologies, the growth of information and image management is equally dependent upon how user organizations implement those technologies. That means plenty of sacred cows must be slain and plenty of domains — where bureaucrats control information because they control the key to the filing cabinet — must be opened to each corporation's computing public.

To accomplish that, technologies such as optical storage and image scanning must be promoted not only at the level of the MIS director or chief information officer but also at that sometimes-bureaucratic departmental level.

Departments are the place where pilot programs succeed and where department heads can realize the benefits of automation.

If vendors try to force technologies on those managers only through MIS, rather than making departments want automation, electronic information and image management may find itself hamstrung by the old bureaucratic response, "We can't do it that way because we've always done it this way."

Connolly is *Computerworld*'s senior editor, systems & peripherals.

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The new SmartWriter 8/3X laser printer

QMS

NEW PRODUCTS

Turnkey systems

Summit Software Corp. has announced its **Summit Laser-Base Filing System**, a laser disk-based document storage system.

The system is said to integrate optical-laser technology, a super-microcomputer, high-resolution monitor, desktop scanner and laser printer to store and retrieve pictures and text.

The system can file and catalog up to one billion pages of pictures and text, access any document in 30 seconds or less and store the contents of 500,000 file cabinet drawers in the space equivalent to one secretarial workstation, the vendor said.

The Summit Laser-Base Filing System is priced at $39,500.

Summit Software, Suite N-202, 430 Tenth St. N.W., Atlanta, Ga. 30318.

Processors

Mupac Corp. has introduced the **CE series** and **CG series** of VME backplanes as well as a series of **Multibus II ILBX II** backplanes.

The CE series of on-board termination backplanes and the CG series of off-board termination backplanes are said to combine both the J-1 and the J-2 functions into a single 6U-height multilayer backplane. Prices start at $498.

The Multibus II ILBX II backplanes offer a six-layer design. They are available in two, three, four, five and six positions. Prices start at $145.

Mupac, 10 Mupac Drive, Brockton, Mass. 02401.

Scientific Calculations, Inc. has introduced the **ARX20**, a super-minicomputer for the 100% routing of printed circuit boards.

The ARX20 is said to be a peripheral processor configuration employing multiple dedicated algorithms for the total routing of a range of boards. As a network server, it can queue and route designs from many workstations. Dynamic monitoring of electrical and mechanical design rules provides multilayer routing of analog and digital or mixed boards. Spacing flexibility allows the definition of traces, clearances and vias of any size, the vendor said.

The ARX20 is priced at $75,000.

Scientific Calculations, 7635 Main St., Fishers, N.Y. 14453.

Micro Memory, Inc. has introduced the **MM-6240D** high-speed error detection and correction memory module for VMEbus systems.

The MM-6240D comes in capacities of 4M, 8M, 12M and 16M bytes. It detects and corrects all single-bit errors and detects and reports multiple-bit errors. It features a long-word 32-bit cache along with bank-interleave and block-mode transfer.

Other features include module selection on 64K-byte boundaries with switch-selectable starting and ending addresses in any 16M-byte bank. Also, address modifiers are decoded to allow 16- and 32-bit masters to access the memory.

Prices range from $1,995 to $6,795.

Micro Memory, 9540 Vassar Ave., Chatsworth, Calif. 91311.

Graphics systems

Tektronix, Inc. has announced the **4126 graphics workstation** said to feature three-dimensional stereoscopic viewing.

The 4126 incorporates a field-sequential stereoscopic viewing system with a liquid-crystal shutter display. The workstation consists of a 19-in. display with 1,280- by 1,024-pixel resolution and 2M bytes of memory. Users can choose up to 16 displayable colors from a palette of 16 million shades. Up to 256 colors can be added optionally.

The 4126 3-D stereoscopic graphics workstation is priced at $29,950.

Tektronix, P.O. Box 500, Beaverton, Ore. 97077.

Terminals

Esprit Systems, Inc. has announced a price reduction for its **Opus2** ASCII terminal.

The Opus2 offers Wyse Technology's Wyse 50 compatibility, video, pop-up calculator and enhanced keyboard features such as a separate cursor and numeric pad clusters. Other emulations include Televideo Systems, Inc. Televideo 910, 920 and 925.

The Opus2 is priced at $499.

Esprit Systems, 100 Marcus Drive, Melville, N.Y. 11747.

Wyse Technology has announced an **amber screen option** for its WY-30 and WY-50 ASCII terminals and WY-85 ANSI terminal.

The WY-30 is reportedly an entry-level terminal. The WY-50 is said to be a full-function terminal, and the WY-85 is a Digital Equipment Corp. VT220-compatible terminal.

The amber screen option is included in the list prices of all three of the Wyse terminals.

The WY-30 costs $399, the WY-50 costs $499 and the WY-85 is priced at $599.

Wyse Technology, 3571 N. First St., San Jose, Calif. 95134.

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IN DEPTH

Building malleable systems from software 'chips'

Object-oriented programming may do for code what Ford's assembly line did for cars

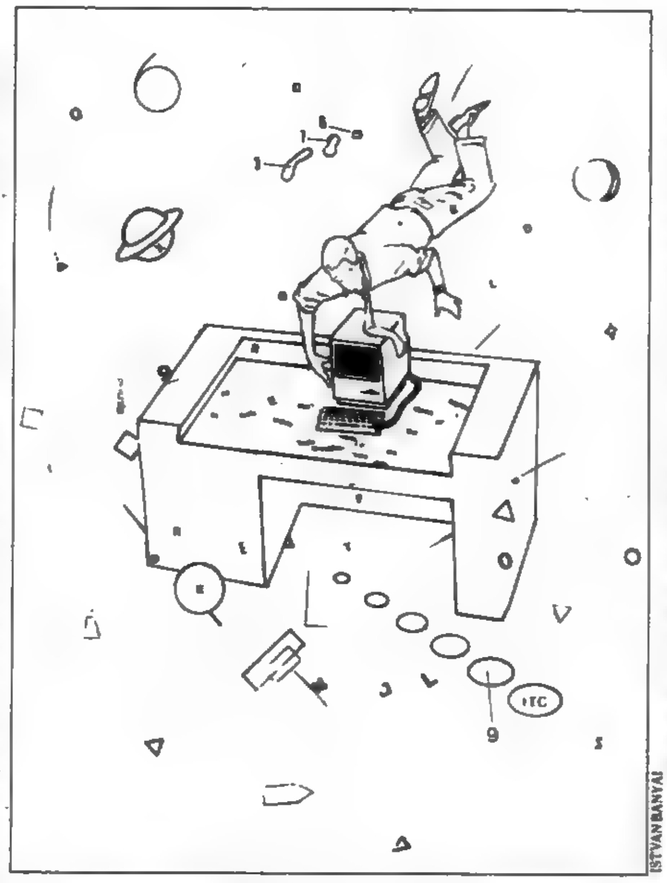
BY BRAD COX

Computers keep getting smarter, faster, cheaper. Every month we hear about the latest miracles in computers, satellites and communications. And we dream, as did the president of NEC Corp. in his Institute of Electrical and Electronics Engineers keynote speech, of what the total integration of computers, communications and mankind might mean to us all.

Twenty years ago, a single IBM 7094 served the entire University of Chicago campus. Today, I have more computing horsepower and memory on my own desktop. In 1970, it was newsworthy to link this IBM with minicomputers in laboratories across the street. Today, transcontinental electronic mail deserves only passing comment.

In only two decades, hardware engineers have undergone fundamental revolutions that have repeatedly changed their entire way of working. The first engineers developed computers by hand, using tubes and, later, discrete transistors, resistors and capacitors.

These were quickly replaced by board-level integration and then, in rapid succession, integrated circuits (IC), large-scale integration, very large-scale integration. Now they talk about wafer-scale integration. The cumulative effect? An exponential improvement in hardware capability during the past 20 years.



ISTVAN BANYAI

Can you identify a comparable revolution in the way software is produced? I cannot. Twenty years ago I learned to program in assembly language and then spent 20 years learning how to do the very same thing in Fortran, Pascal, C and LISP. While hardware engineers were learning to think in terms of modules whose size and power were increasing exponentially, software engineers continued to build programs as always: by choosing programming language statements one by one, putting them side by side to make a program.

Hardware engineers have discovered how to resuce each other's efforts — to stand on the shoulders of giants, instead of their toes. We have barely begun, and we really can't wait any longer.

We're already face-to-face with the software crisis — the awareness that ambitious software systems are too expensive, of insufficient quality, hard to schedule reliably and nearly impossible to manage. It is time for a revolution in how we build software comparable to the ones that hardware engineers now expect about every five years.

The revolution is object-oriented programming.

Software-ICs

Program-building tools (tools for programming in the small) emphasize the relationship between a programmer and the machine, and system-building tools (tools for programming in the large) emphasize the relationship between suppliers and consumers of code. Object-oriented programming is primarily a system-building tool because it puts reusability at the center of the software development process, making reusability the usual way that new components are built, instead of occasionally calling a function from some library, as programmers do now.

These reusable components are called software-ICs to emphasize the parallel to the way hardware engineers build circuits from a stockroom of generic, reusable silicon chips. A software-IC implements a class of objects, such as a class of envelopes or a class of file folders. It is a package of programming effort that is independent of the specific job at hand and highly reusable in future jobs.

Better yet, programmers seldom create new software-ICs

Cox is a founder and vice-president of Productivity Products International, Inc., a Sandy Hook, Conn., developer of tools and courses to make object-oriented programming an everyday tool in production programming. This article is excerpted from *Object Oriented Programming* by Brad Cox, © 1986 Productivity Products International, Inc. Reprinted with permission from Addison-Wesley Publishing Co.

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- **These program 'chips' can be interchanged**
- **Happy ending to the software crisis?**
- **Don't fend off change — run circles around it**

from first principles. They develop new, specialized integrated circuits by describing only how they differ from older, generic ones from the stockroom.

Evolution, not revolution

Although the result may be revolutionary, the emphasis here is on change through evolution, not revolution. Object-oriented programming can be added to nearly any conventional programming language by grafting a small number of new syntactic features alongside the existing capabilities of the base language, but it provides the reusability and productivity of an object-oriented programming language. The hybrid retains both programming styles as tools to be picked up or laid aside according to the problem at hand.

Paradoxically, the oldest and most intractable program-building tools (such as Fortran and Cobol) are often used to build the largest and most complex systems. New systems are built when old ones become senile, and the new one must somehow be compatible with old code accumulated throughout the decades. These system builders need the machine efficiency and compatibility with existing code that traditional languages provide. But they also need help and need it now to cope with the complexity of the systems that are being built today.

Two hundred years ago, Connecticut was famous for its firearms and textiles industries. Many of the firearms companies are still there today; but the textile industry long ago moved elsewhere, and the old mill buildings have been renovated. In 1798, near the mill where this article was written, Eli Whitney introduced the cotton gin, an innovation that revolutionized manufacturing forever. Today, a similar innovation is under way that promises to do much the same thing for software.

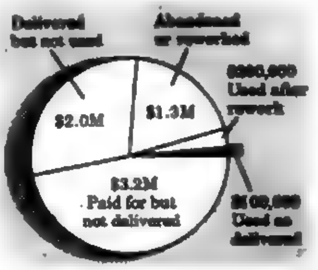
Before the industrial revolution, the firearms industry was not really an industry at all but rather a loose coalition of individual craftsmen. Each firearm was crafted by an individual gunsmith who built each part from raw materials. Firearms produced in this way were expensive, and each was the distinctive product of a gunsmith's personal inspiration. The revolution was sparked when Eli Whitney received a large manufacturing contract to build muskets for the government.

Whitney's innovation was to divide the work so that each part was produced by a specialist to meet a specified standard. Each gunsmith focused on a single part, using sophisticated tools to optimize that task. This produced economies of scale that drove down manufacturing costs, and best of all, Whitney's customer — the government — quickly realized that the standards would allow parts to be interchanged, greatly simplifying its firearm repair problems.

The importance of object-oriented programming is comparable to that of Whitney's interchangeable-part innovations for many of the same reasons. Both redefine the unit of modularity so that workers produce subcomponents instead of complete solutions. The subcomponents are controlled by standards and can be interchanged across different products. Programmers no longer build entire programs from the bare statements and expressions of a programming language. Instead, they produce software-ICs.

Software costs vs. results

The U.S. Government Accounting office 1979 report, (FGMSD-80-4) which breaks down results from $6.8 million in nine federal software projects, shows that only 2% of the software was used as delivered.



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CW CHART: SUSAN ALDAM

Of course, the industrial revolution was not a true revolution at all, except for those who paid no notice, until Whitney cornered the firearms market. For the winners, it was not a revolution but simply the culmination of a gradual process of evolutionary change. This same evolutionary process can produce a similar revolution in the software industry.

What is system building?

Harvey is the systems architect for Objective Solutions International, a well-funded start-up software company that hopes to win its fortune by making the electronic office a reality for large, paper-intensive customers like insurance companies, banks and government offices.

He is responsible for Objective Solutions' new office automation product, a state-of-the-art system that will apply distributed workstation and high-resolution raster graphics technology to handling

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arbitrary office forms such as while-you-were-out notices, office memos, price lists, insurance claim forms, loan request forms, driver's license applications and so forth, ad infinitum, because the set of data types that insurance offices handle are constantly changing.

Objective Solutions' customers are willing to pay for workable solutions to their paper-handling problems. But because of low computer skill level and rapid turnover, they insist that any computer-based solution emulate their existing paper systems as closely as possible, improving on it in speed and reliability. Computer-based forms must look and behave like existing paper forms, with preprinted text and rules that cannot be erased.

For example, conventional electronic mail systems are unacceptable because it would be too difficult to train workers to manage important forms with standard text editors. Besides, some customers are looking forward to enhancements that support integrated text, voice and even video annotations.

The firm plans to build a prototype system capable of demonstrating the concept for a few common office forms and to demonstrate this prototype to its customers. It would then contract to extend the prototype to support forms required by each individual customer and to keep the system up to date with the changing needs of its customers. The initial prototype would support a few forms chosen by Objective Solutions. Most of the development effort would be downstream, as additional forms are added over time.

Harvey is responsible for selecting, verifying and recommending a software architecture that would allow this ambitious system to be built and then extended without crippling losses to ripple effects as this complex system evolves over time.

A terrific plan, isn't it? It has something for everyone. Customers will like it because it directly addresses paper-handling costs and the difficulty of acquiring trained personnel. They could use this system to automate not only the forms but also the office procedures by which the forms are managed.

It could be extremely lucrative for Objective Solutions and its stockholders. The prototype would attract new customers, and it can expect a long-term repeat business extending to older installations as well. Change is eternal, and this firm is positioned for a long-term, highly profitable market.

Dream system

It is certainly an exciting opportunity for Harvey. Harvey has the lead responsibility right at the cutting edge of technology. This system has it all! It is highly distributed, uses high-resolution raster graphics workstations and provides an iconic user interface, each exciting in its own right. The forms will probably be produced using special-purpose forms-generation languages, and the automatic handling of office procedures will probably involve rule-based artificial intelligence technology, too. The development methodology will probably encourage rapid prototyping, probably mixed judiciously with a more formal, structured methodology. This system is a programmer's dream.

This system, of course, is possible. But unfortunately, it is not probable. The programming industry has a remarkably bad record of delivering systems less ambitious than even this one.

> THE REAL problem is that his project is beyond the state of the art. The software industry has not discovered how to produce systems that can survive the kinds of design changes this company must expect.

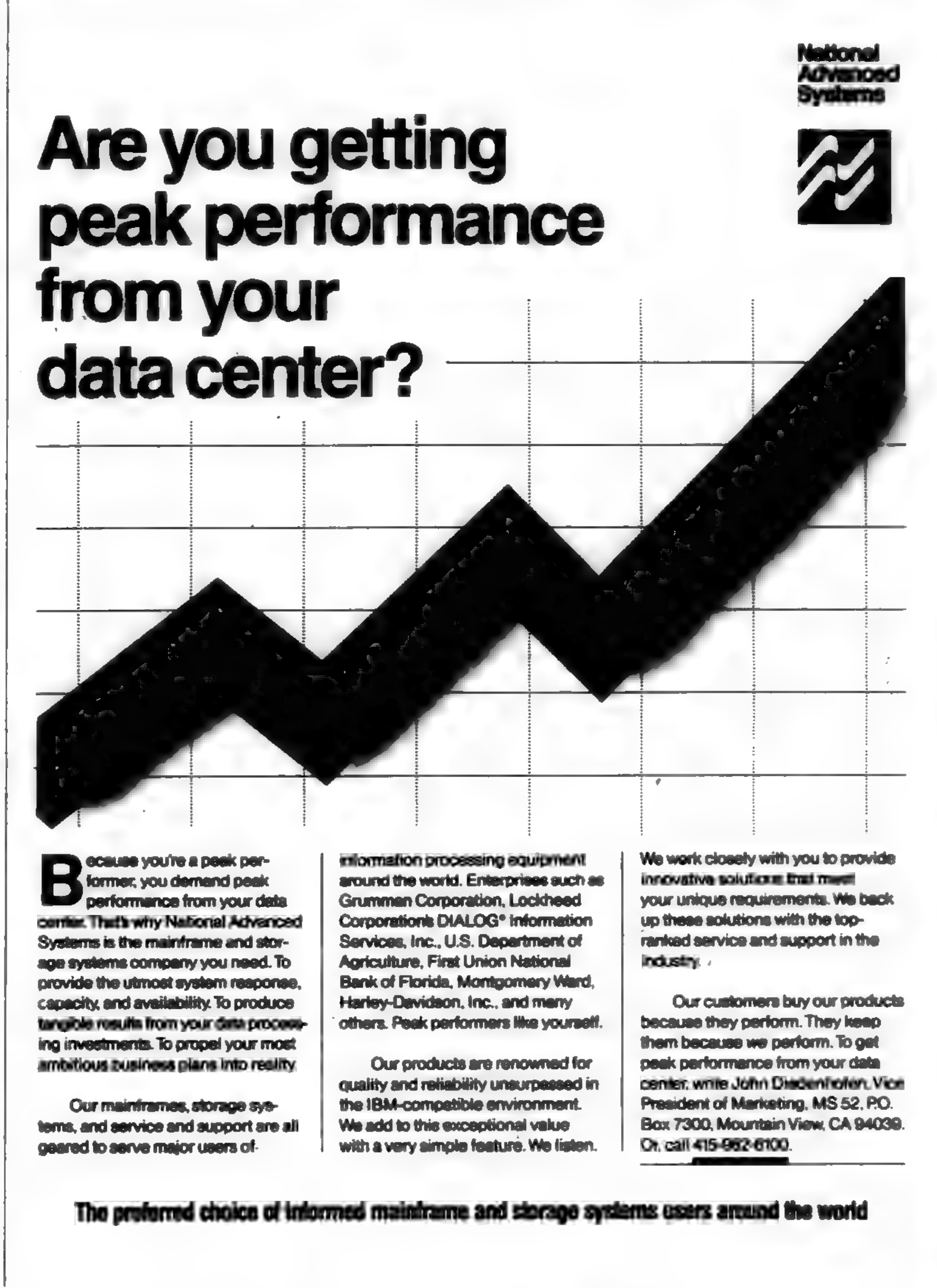
The probable outcome is that Objective Solutions' project will be canceled before delivering a single line of code, bringing disappointment to the customers, financial ruin to the firm and personal disgrace to Harvey. The fatal symptoms are uncomfortably familiar: over budget, behind schedule, out of control, low in quality, leading eventually to cancellation.

What makes Objective Solutions' system so ambitious? Hardware is certainly not the problem, because today's hardware is capable of supporting systems of this sort and more. Distributed systems are nothing new, nor are forms-oriented user interfaces, friendly or not. Nor are electronic mail systems, archival systems and workstations. Granted, these technologies have usually been exploited in isolation, not in combination, and combining them can certainly cause trouble.

The real problem is that this system involves an attitude toward change that is not provided for by our programming tools, methodologies and concepts. The firm's system is beyond the state of the art because the software industry has not discovered how to produce systems that can survive the kinds of design changes that this company must expect.

Change: The enemy

Harvey, as system architect, is responsible for defining the architecture of Objective Solutions' new system. But what does this mean? What should Harvey concern himself with, and what should be left to other team members? Certainly, architecture does not include coding. But does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it include design?

Many architects would argue that Harvey should begin by selecting the hardware and software components of the system and deciding how they interrelate. They would have Harvey refine the hardware makeup of the system (workstations here, minicomputers there, mainframe over yonder), define which software components go where (forms editing here, departmental files there, archival and backup services over yonder) and choose a networking strategy for tying these pieces together. Refining this architecture into a detailed design would be done by others, with Harvey's advice and assistance.

But is this architecture or is it merely an early phase of design? Harvey is probably the first to look at this project with an eye to its technical feasibility, and his first responsibility should be to avoid the statistically likely danger. Of course, he cannot shirk the traditional concerns of the architect, because the project could certainly die from a slipshod, poorly documented architectural specification. But a brilliant decomposition into hardware, software and network components will do little toward improving the prognosis for this project. On a safari, it is usually appropriate to kill mosquitoes, since malaria is a valid concern. But is it inappropriate when the problem is stopping a charging elephant? Harvey is facing an attack by change, the largest and meanest antagonist any large software project can face, and his first efforts should be to defend this project from destruction by change.

There was a time when the virtue of software over physical media like paper and pencil was in its very responsiveness. Software was exciting because it was so malleable. The computer was a medium for creative inspiration, infinitely moldable to the programmer's desire. Nearly anything could be done with this wonderful stuff.

Although this may be to some extent true for small projects (program building), it is not and has never been true for ambitious undertakings (system building). In fact, software systems are usually the least responsive element in many organizations today. The organization as a whole is able to adapt more fluidly than the software upon which it has grown dependent.

The primary difference between programs and systems is in the ability of each to adapt to change. Programs are small, lightweight targets, and they can be relatively nimble and adapt as fast as conditions change. But large software systems are anything but responsive. They are large, complex and brittle, easily disrupted by the slightest impact from outside.

There are several schools of thought on what to do about this, the first firmly entrenched as the current dogma of software design; the others clamoring for attention from the sidelines.

Object-oriented programming languages

These languages have points in common, but their differences are dramatic. Binding is done entirely at runtime in Smalltalk, entirely at compile-time in Ada and can be done either way in Objective-C and C++. Inheritance is central to many of these languages but is missing in Ada.

[illegible]	Smalltalk-80	Ada	C++	Objective-C
Binding time	late	early	either	either
Operator overloading	yes	yes	yes	no
Garbage collection	yes	no	no	possible (under development)
Inheritance	yes	no	yes	yes
Activation/passivation	yes	no	no	yes
Multiple inheritance	yes	no	impossible	possible
Commercial availability	yes	yes	yes	yes
Software-IC libraries	yes	no	no	yes

CW CHART

The conventional strategy for dealing with change is to build elaborate defensive structures to prevent change altogether. Every software manager knows this one, chapter and verse. Software, especially large software systems, should be developed by first determining and documenting the system's requirements. The requirements are turned into specifications, and these are discussed with and ultimately approved and signed by the customer before further work is done.

Once the requirements have been frozen, a succession of designs are developed, reviewed and exhaustively documented as formal design specifications. Ultimately, the designs are transformed into code, a step that should be routine, assuming a sufficiently rigorous design process has been followed. Finally, the code is tested (in case a bug has crept in somehow) and ultimately delivered to the customer.

Maginot Line defense

Work must, of course, be scheduled carefully. Assuming this, the customer has to be happy with the result, since the delivered system will be precisely the system on which he signed off originally.

"Change the requirements? Preposterous! Look at these documents, with your signature at the bottom! The design will have to be redone! You'll disrupt the schedule! It will cost you extra!" The defenders lay down a withering fire from behind the barricades, and the forces of change crumple and fall. Heigh ho!

The glory is on the front lines. What remains is maintenance, a grubby activity that goes on out of sight in the back room, well outside the mainstream of exciting new development to which the really talented programmers gravitate.

Software is not at all like wood or steel. Its paint does not chip, and it does not rust or rot. Software does not need dusting, waxing or cleaning. It often has faults that need attention, but this is not maintenance, it is repair. Repair is fixing something that has been broken by tinkering with it or something that has been broken all along.

Conversely, as the environment around software changes, energy must be expended to keep it current. Holding steady to prevent decline is not maintenance. Evolution is changing in order to move ahead.

Harvey should probably ignore maintenance as a murky nonissue, but he cannot ignore repair and certainly not evolution. His competitive edge depends on being able to evolve that product to meet the changing needs of his customers. But precisely what should he do?

He could make sure that the code has lots of comments. He could make sure that the programming language is readable (whatever that is). He could outlaw GOTOs (for whatever good that is supposed to do). He could write lots of internal documentation and try to keep that up to date with code that is changing all the while. But would doing these things really affect the technical feasibility of this system?

Probably not, because these nostrums do not address the root problem: that the real world actually does change, and the Maginot Line defense tries to deny it. The Maginot Line attitude permeates nearly all of the programming industry's tools, methodologies and concepts. Programming languages make the programmer responsible for building source files that reflect the intended situation, while the compiler is responsible only for turning source files into hard code. The generated code can be extremely efficient because it is not responsible for anything more than the situation described by the programmer. But this code is brittle and unmalleable, efficient but unable to withstand impact from outside. The Maginot Line attitude makes malleability the responsibility of the programmer, not his tools.

Swiss defense

The Maginot Line mentality manages change by trying to prevent it. When that fails — and it nearly always does fail eventually — the task of repairing the damage is passed off to the back room — to the maintenance team. The rest of the team moves on to the next project, while everyone tries to ignore the clamor as the maintenance team struggles to keep a ravening horde of changes from devouring these brittle and nearly unchangeable software systems.

Objective Solutions' business plan amounts to an explicit rejection of the Maginot Line defense. It plans to build a prototype product and to use that to attract customers who will pay it to change the prototype to suit needs. The firm cannot outlaw change or shove it off on a maintenance group. Its plan requires a radically different view of the software development process, one that addresses change as a vital and integral part of the overall software development process. Objective Solutions might plan to use something similar to Switzerland's defense strategy, a strategy dating historically from about the same time period as the Maginot Line. Rather than investing in expensive (and given their neighbors, unreliable) border defenses,

Continued on page 64

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Making engineering easy

BY JEFF WEINER

The premise of object-oriented technology is that software can be constructed from reusable components. In other words, software can now be engineered. This solves many of the problems that developers have faced for years, such as system maintenance, increasing development costs and system extendability. Four technical concepts form the basis of object-oriented languages and real software engineering: messaging, encapsulation, dynamic binding and inheritance.

Messaging. Traditional programming languages like C support the data/procedure paradigm. Data and procedures are represented as two independent components, and the programmer is required to manage their interaction. Active procedures act on passive data that the programmer passes to them.

As Kurt Schmucker points out in his book, *Object Oriented Programming for the Macintosh* (Productivity Products International, Inc., 1986), object-oriented technology combines data and the specific procedures that operate on that data into one entity called the "object." Rather than pass data to procedures, programs request an object to perform a procedure by sending the object a message. In object-oriented languages, procedures are referred to as "methods." Many different kinds of objects may recognize the same message but they may each implement that message in a different way.

Encapsulation. Encapsulation is like driving a car: To start, all the driver must do is turn the ignition key.

An object's data is hidden from other parts of the program and is visible only from inside that object. Only that object's methods directly manipulate the object's data. Method names and how to call them are visible to the user, but the implementations are not. Therefore, a method's implementation can change internally without affecting other parts of a program. Since data is encapsulated, programmers need only be concerned with what they want an object to do; the object can decide how to do it.

Encapsulation ensures an object's integrity. It shields data from other parts of the system, making each object an independent software machine that can be used in many different systems without changing working code. One object cannot know how information is organized within other objects; it can only request that another object perform some predefined action.

Many procedural languages support information hiding by providing a way to declare static variables within a procedure. Information hiding is similar to encapsulation, but in procedural languages the programmer must enforce it.

Dynamic binding. Message expressions are similar to function calls except that the decision about which method should be used to implement each message is made by the objects at runtime rather than by the compiler at compile time. This is called dynamic binding. It allows software systems to adapt easily to changing requirements.

Traditional function calls specify how a desired operation will be implemented statically at compile time. This means that each routine must know everything there is to know about all the arguments or files it will ever have to deal with during execution — a nearly impossible burden.

Objects decide at runtime which routine to run. For example, an arbitrary collection of objects might be sent a message to display themselves on the screen. Each object is sent the message display, but objects of different classes will run entirely different methods to accomplish that result. Since messages specify only what is desired, type dependencies cannot spread through a system because they become permanently encapsulated within classes. Therefore, programmers can install new data types in working systems, often without changing the rest of the system.

Inheritance. Inheritance is the technique that allows programmers to extend and modify existing code. Code is not written separately for every object; instead, programmers write code for classes of objects. Classes are created by inheriting all the variables and behaviors of a more general class, then adding specialized variables and behaviors. Inheritance allows programmers to create new classes of objects by choosing an existing class and specifying how the new class differs from that one, instead of starting from scratch each time.

Classes are organized hierarchically. Subclasses inherit the structures and behaviors of their superclasses. A "car" class might have a "vehicle" class as its superclass, meaning that all the methods and data previously defined for "vehicle" would be inherited by "car." The designer of the car class only has to describe how cars differ from vehicles. Generic functionality is developed once and used repeatedly throughout a system.

Some developers assume that object-oriented programming is complex. Actually, object-oriented programming is simpler than the procedural style of programming. It is such a natural style of software engineering; what a pity that the industry has waited so long to use it. •

Weiner is marketing communications specialist for Productivity Products International, Inc. in Sandy Hook, Conn.

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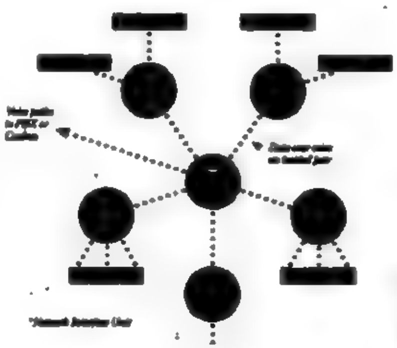

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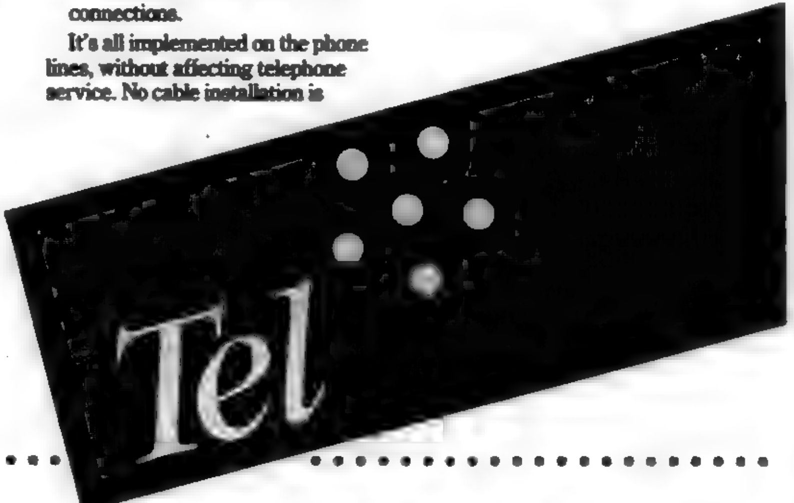

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Software 'chips'

CONTINUED FROM PAGE 62

Switzerland declared itself an open country and welcomed visitors from any country, race or religion. This policy allowed them to weather the world-shaking consequences of Word War II while collecting a tidy profit from all sides, simply by adapting to events responsively.

Can this defense work with software? Probably yes, because it has already been applied in several specialized, exceedingly complicated systems. Smalltalk-80, developed by the Software Concepts Group at Xerox Corp.'s Palo Alto Research Center in California, is one of the purest examples of this strategy, although in other domains, such as knowledge engineering, examples abound in which the Maginot Line defense is not tenable.

Smalltalk-80's designers produced a system that is capable of being bent in nearly any direction. The entire system, down to the hardware level, is compartmentalized into armor-plated objects that communicate by sending messages. There is no protected (and therefore unchangeable) operating system. The source for the whole system is immediately available on-line to any programmer, and that programmer's entire programming environment can be immediately changed in almost any manner just by changing a few lines of code.

Smalltalk-80 uses several tactics, particularly object-oriented programming, that provide new leverage for building malleable systems. But I do not advocate the Swiss Defense as a way of building large systems. Although the concepts of objects, messages, classes and inheritance provide great potential for building large yet malleable systems of the size that Objective Solutions is considering, there are several reasons why other parts of the Smalltalk-80 philosophy are almost certainly inappropriate for projects of this scale.

Machine efficiency is one rather obvious reason. Smalltalk-80 is hard on machine resources, spending computational power lavishly to provide productivity features such as automatic garbage collection, a highly graphic user interface and a uniform environment based on objects. Hardware cost is not the compelling objection it once was because costs are dropping so quickly. Nonetheless, Objective Solutions' customers can probably find other ways to use almost any amount of hardware power and are predictably reluctant to spend much of it on a comprehensive environment for the programmers.

Control is a more fundamental reason. Objective Solutions' system will involve large numbers of programmers who must work together as a coordinated organization if a system of this complexity is ever to be delivered. The ability for any programmer to change anything he likes is not a benefit for this kind of work, although the potential liability could be managed via Smalltalk's powerful set of change management tools.

Hybrid defense

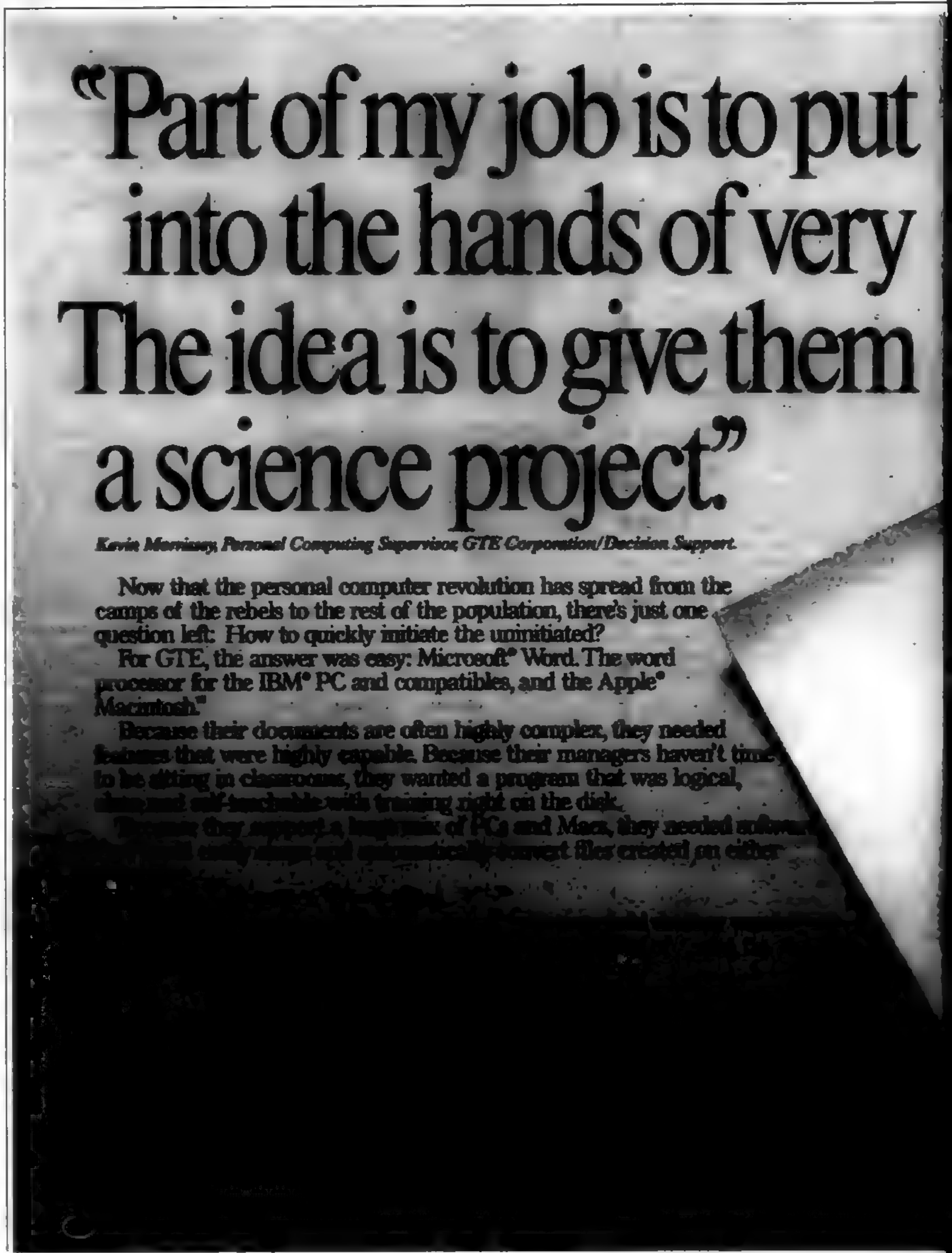
Compatibility is the most fundamental, and nearly unfixable, reason. Nearly all modern organizations maintain at least some prior investment in software developed in older languages, and Objective Solutions' customers will insist that it continue to be viable. Short of providing separate hardware for these applications (possibly using Smalltalk-80 as a front end), there seems to be no way around the fact that Smalltalk-80 needs a complete, stand-alone environment unto itself.

> THE MAGINOT LINE mentality manages change by trying to prevent it. When that fails, the task of repairing the damage is passed off to the back room — to the maintenance team.

The hybrid defense is like the one preferred by a competent combat commander using every possible strategy in active combination. Defensive breastworks are used to defend important structures against frontal assaults; dispersed commando units are used to provide reconnaissance; maneuverability is used to avoid attack, if possible; and diplomacy and other peacetime tactics are used to avoid shooting in the first place.

Conventional software engineering dogma is to build efficient but brittle software systems surrounded by static defensive structures that protect them from change. The value of this is undisputed, since uncontrolled change, like hacking, is no way to build complex software systems. But even more can be done:

- Systems can be made malleable by retaining some elasticity into runtime. This involves relaxing the usual demand that everything be accomplished at compile time. Dynamic binding is a move in this direction (see story page 63).
- Systems can be made more changeable by making them smaller and lighter, thus transforming system-like functionality into program-like size. The encapsulation and inheritance techniques described later do this by integrating reusability into the mainstream of the software development process.
- Systems can be encapsulated more



"Part of my job is to put into the hands of very
The idea is to give them a science project."

Kevin Morrissey, Personal Computing Supervisor, GTE Corporation/Decision Support.

Now that the personal computer revolution has spread from the camps of the rebels to the rest of the population, there's just one question left: How to quickly initiate the uninitiated?

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Because they support a large mix of PCs and Macs, they needed software that could easily share and automatically convert files created on either

tightly with objects that behave as armor-plated black boxes to limit the ripple effect when a penetration of the static defenses does happen. A change to one part of the system need not affect the rest of the system, but can be dealt with inside the part directly affected.

Object-oriented programming

This article offers no panacea that will magically eliminate problems of this magnitude. But it does propose several new tools and concepts that can help to produce software far more tolerant of change.

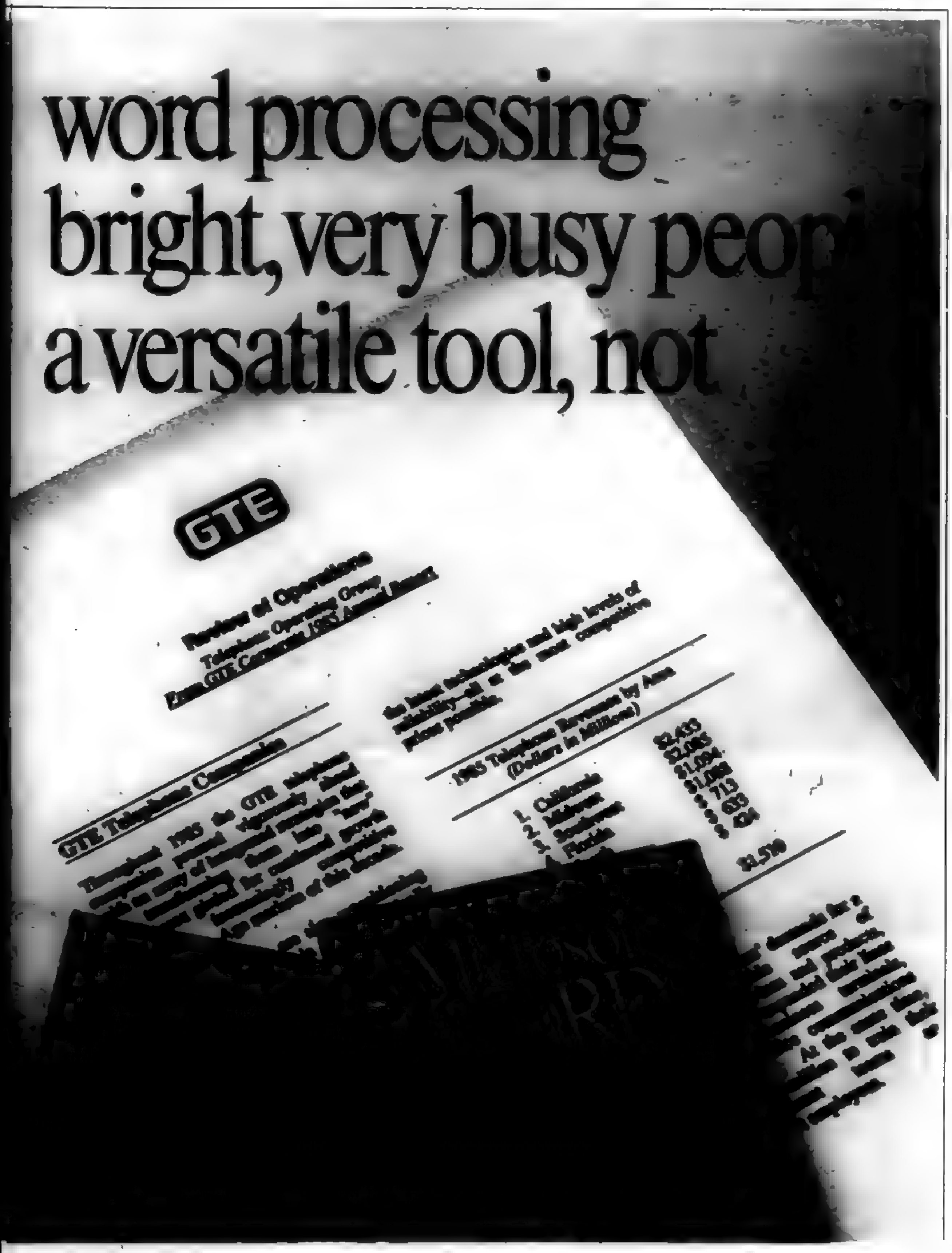
Encapsulation is the foundation of the whole approach. Its contribution is restricting the effects of change by placing a wall of code around each piece of data. All access to the data is handled by procedures that were put there to mediate access to the data. By contrast, conventional programming makes the consumer of each operand (defined by one of many suppliers) responsible for choosing operators (again, defined by one of many suppliers) that are type-compatible with the operand on hand.

Object-oriented programming moves this responsibility from the consumer to the operand and its supplier. These encapsulated operands are called objects. Whereas consumers once specified how each operation should be performed by naming a specific piece of code, they now specify only what should be done, leaving it to the object to choose code that is appropriate to its type or class.

Inheritance is the more innovative part of the approach because it is not provided by conventional languages. It is a tool for automatically broadcasting code to classes developed by different members of a team. Programmers no longer start each module with a blank page, but instead write a single statement that references some class that is already in the library. Each subsequent statement describes how the new class differs from the one in the library.

To see how these techniques apply to Harvey's problem, take a closer look at the capabilities of the prototype system and how they must change over time. The initial system will support a number of generic office objects. The prototype must demonstrate that Harvey's design meets the objectives described earlier. For example, it must demonstrate that these electronic objects can emulate the way familiar office objects behave and that the system can be extended with new office objects over time, as in the following examples:

- Container objects must hold arbitrary kinds of things, just as a physical office desktop does. For example, if I decide to mail a file folder instead of the usual memos, the system should not forbid it on the grounds that the mailbox designer intended mailboxes to hold only memos.
- Container objects must be able to contain arbitrary numbers of items, subject only to physical limitations of the machine. For example, workers who work best with cluttered desktops, even with hundreds of open items, should not be prevented from doing so.



Desktops, envelopes, mailboxes and file folders are loosely coupled collections, in which coupling refers to the degree to which the design of the collection depends on the design of its contents. Obviously, an electronic desktop cannot be redesigned and recompiled whenever a new kind of electronic object is added to it, since the user makes this decision at run-time. Furthermore, the repertoire of items that the desktop must hold will change over time as the system is extended with new kinds of office forms. However, some amount of coupling must occur, since an electronic desktop needs to interact with its contents.

INHERITANCE is a tool for automatically broadcasting code to classes developed by different members of a team.

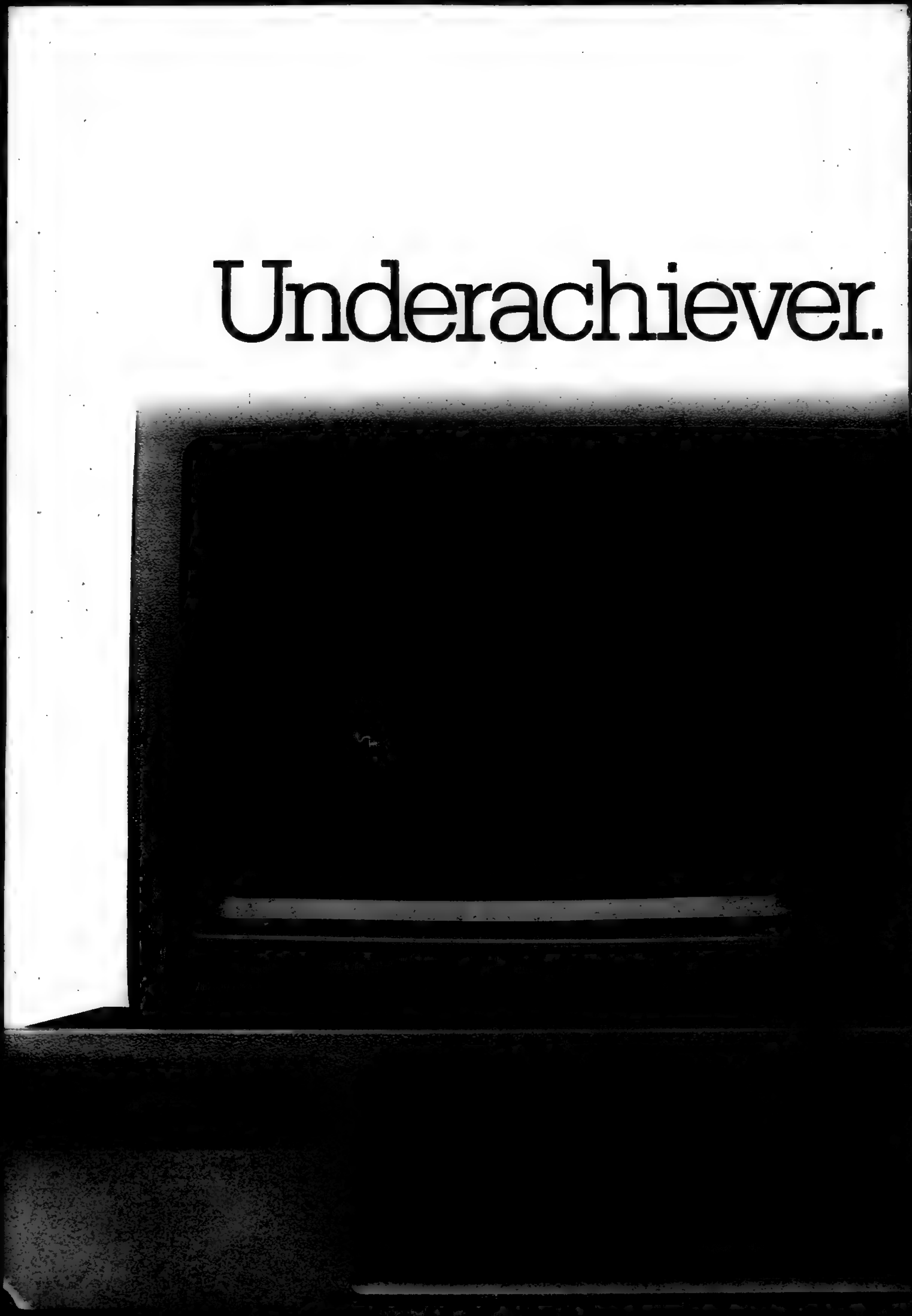
For example, suppose that the mailbox offers an option that displays a menu of current contents that help the user choose the next item for detailed reading. To implement this option, there must be a way to obtain summary information about any item that might appear in the mailbox, and this amounts to an operation that the mailbox must apply to its contents.

This class of problem is not easy to solve with conventional programming languages because conventional programming makes the consumer of an operand responsible for choosing the correct operator for the kind of operand on hand. In this case, the mailbox developer is the consumer for the items to be mailed. To get summary information from these items correctly, he must choose operators (functions) that extract the needed information from the various items somehow. The usual solution is to store the type inside each item in a standard place, like this:

```
struct item {int typeCode; ...}
```

and to test the type in a Switch statement. Based on the type of item, the mailbox can call the correct function for that type:

```
displaySummaryOf(next item)
    struct item *nextItem;
{
    switch (nextItem->typeCode) {
    case MEMO: displayMemo
        Summary(nextItem); break;
    case FILEFOLDER: displayFolder
        Summary (nextItem); break;
    case WHILEYOUWEREOUT
```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HEWLETT PACKARD
Business Computing Systems

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> SINCE generic functionality can be developed once and used many times, inheritance provides a powerful boost to productivity. It quickly becomes unthinkable to develop code from scratch.

```
  NOTICE: displayOutNotice
     Summary (nextItem); break;
  case ENVELOPE: displayEnvelope
     Summary (nextItem); break;
  }
  —
}
```

Notice what happens if Harvey actually tries to build a system like this. The mailbox code is now explicitly dependent on the kinds of items that were known when the mailbox was written; the case labels explicitly state that this mailbox will not work for contents other than

MEMO, FILEFOLDER, WHILEYOU WEREOUTNOTICE and ENVELOPE.

Something has crossed the boundary that should have separated what the mailbox developer is doing and what his suppliers are doing. Every time a new kind of data is added to this system, the mailbox code must be changed and recompiled.

Furthermore, these Switch statements are not localized in any way. They reflect the consumer's responsibility for choosing operators that are compatible with operand types, so they appear throughout the system.

Every time a new data type is added, every single Switch statement must be changed to add a case for the new type. The ripple effect of even simple changes cannot be bounded; it spreads throughout the system.

Notice what happens when the responsibility for choosing how to implement each command is moved to the objects' supplier instead of their consumer:

```
displaySummaryOf(nextItem)
[
   [nextItem displaySummary];
   ...
}
```

This commands the object named nextItem to perform the command named displaySummary. The consumer doesn't know or care how nextItem performs displaySummary because that is the job of nextItem's supplier.

Shaping systems

Although different kinds of objects such as file folders, memos and envelopes may displaySummary in very different ways, the consumer's code need not care. When the system is extended with a new kind of item, the change does not spread beyond the code written by the supplier of that item. This encapsulation makes systems more malleable by restricting the amount of damage a change can cause.

Inheritance, by contrast, serves to broadcast useful effects throughout a system. Although desktops, file folders, envelopes and mailboxes are, on the face of it, different kinds of objects, they do share many things. They are, after all, just different kinds of containers. Inheritance allows their similarities to be described in one central place (a Container class) and broadcast to all the classes that behave like containers.

The desktop developer need not build these common properties. Instead, he describes how desktops are different from plain-vanilla containers. Envelopes, file folders and mailboxes are described in the same way.

Since generic functionality can be developed once and used many times, inheritance provides a powerful boost to productivity. It quickly becomes unthinkable to develop code from scratch because it is nearly always easier to inherit powerful, well-tested capabilities from a library of earlier work.

Into the mainstream

Eli Whitney is not remembered as the inventor of a better gunsmithing tool but for inventing a new way for gunsmiths to work together. The result was a revolution in firearms manufacturing that eventually spread to all of manufacturing.

Object-oriented programming is revolutionary in exactly the same way. Its primary new features can be summarized in two key words: encapsulation and inheritance.

Encapsulation means that the consumer no longer applies operators to operands while taking care that the two are type-compatible. Instead, the consumer tells the object what needs to be done, and the object chooses the correct operator from a table of things that the object knows how to do. The result is that the effect of adding a new kind of object does not spread beyond the place in which the new type is defined.

By contrast, inheritance is a way of defining some useful construct in a central place and then automatically broadcasting that construct to all the places where it could help. New functionality is no longer developed by coding each line from scratch but by inheriting some useful class and describing only how the new one differs.

The effect is to put reusability squarely in the mainstream of the software development process. ●

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William R. Synnott

Fielding a triple threat

The evolution of systems during the past three decades has resulted in three distinct types of systems that can serve as a foundation for the creation of competitive information systems in support of corporate objectives.

The first generation of systems concentrated on automating the internal operations of a company. I call these operating support systems. The second generation was aimed at supporting management information needs — management support systems. The current generation focuses on customers. These are customer support systems.

These classifications reflect not only three different functions, but the need for different planning processes, development tools, staff support resources and methodologies. Operating support systems tend to be large, structured, third-generation language systems. Management systems may be small, unstructured, fourth-generation language prototypes. Customer systems could be either or both.

These three types of systems help achieve competitive advantage in different ways. Operating support systems are

Continued on page 72

Insurer seeks strategic DP

BY DAVID A. LUDLUM
CW STAFF

Ronald C. Glidden

The creation of a higher level chief information officer reflects an upgrading of information systems from a service function to a strategic asset at Colonial Penn Group, Inc., according to Ronald C. Glidden, who has joined the insuror as executive vice-president.

Other reflections of the shift at the Philadelphia-based company include expansion of the information systems department, construction of an attractively situated facility for the department, a migration from a Honeywell, Inc. system to become an all-IBM shop and greater use of microcomputers.

"Colonial Penn recognizes the need to move systems from a service context to a major strategic asset. I was brought in by the president to head up a major strategic thrust to use data processing technology to gain a

Continued on page 72

UPDATE

Kid gloves ease MIS merges

JAMES ENDCOTT

BY EDDY GOLDBERG
SPECIAL TO CW

On Feb. 7, 1986, Wells Fargo Bank, NA announced its acquisition of Midland Bank PLC's Crocker National Bank. On May 30 of that year, the two banks merged. James Kridel was fired, he remembers, at 10:32 a.m. on May 30. But he is far from bitter.

"It was a tremendous learning experience," says Kridel, who was Crocker's executive vice-president at the time of the acquisition. "Wells Fargo did a professional job and it was good to have a quick [transition] time. It was initially supposed to end in 18 months. They did it in three."

For Kridel, now executive vice-president of Glendale Federal Savings & Loan Association in Burbank, Calif., it was clear early on

Continued on page 70

Scholar says 'Don't await leading edge'

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — MCI Communications Corp. is financing a new center for researching MIS strategies that is headed by a management scholar who questions the need to use leading-edge technology to gain competitive advantage.

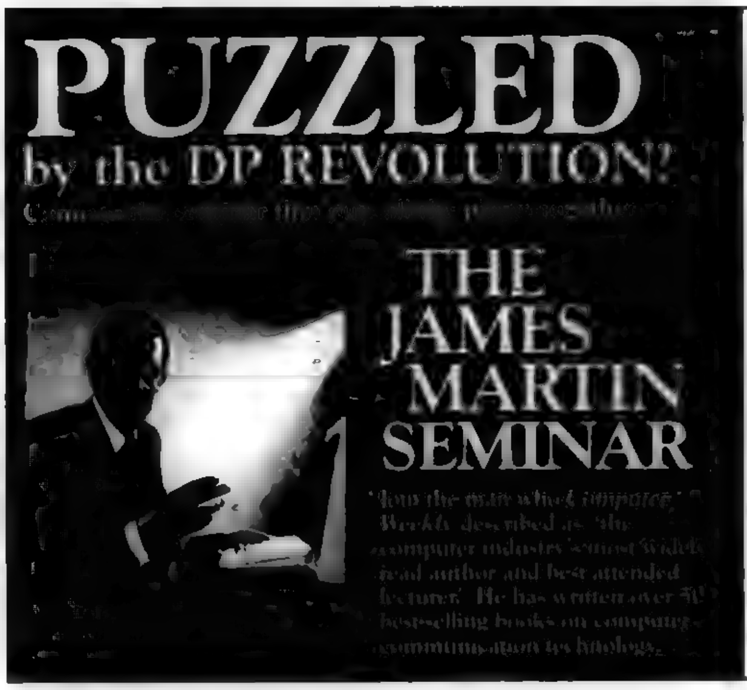
MCI has provided initial financing for the International Center for Information Technologies (ICIT), a for-profit organization founded last November and based here.

With a staff of 25 in Washington and six in London, the center is intended to sponsor original research, hold conferences and publish briefing papers designed to help MIS managers plan, manage and use information systems, according to Peter G. W. Keen, the center's executive director, in a recent interview.

Keen has been a management consultant to governments and corporations and served on the faculties of MIT as well as the Harvard and Stanford University schools of business. He graduated from Oxford University and earned advanced degrees at Harvard.

"Everything we'll do is research-flavored. Our goal is to make certain that the research is translated into something usable," Keen says of the center.

Continued on page 71



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Kid gloves

FROM PAGE 69

that 80% to 90% of Crocker's data processing personnel were likely to be laid off. The acquiring bank had announced that it "would continue with the Wells Fargo culture in all departments," explains Wells Fargo spokeswoman Betty Lattie. Yet that corporate culture was significantly different from Crocker's. "It was a meeting of unlike species," Kridel recalls. Where Crocker had a centralized DP operation employing about 2,000 people working on complex systems, Wells Fargo had a decoupled operation with a relatively small DP function.

James Kridel

"While every Crocker employee was originally assigned to a Wells Fargo department, often the organizations were not parallel," Lattie explains. Layoffs were thus unavoidable, but Wells Fargo was determined to provide a thorough, helpful separation plan, she adds.

The story behind Wells Fargo's acquisition of Crocker highlights the difficulties that MIS managers caught in the throes of a merger or acquisition must face, namely: How do you resolve the differences between incompatible MIS cultures? How long should a transition take? How do you keep your work force productive when you face possible layoffs? How do you help your employees find new positions within or outside the company if it looks like layoffs are imminent?

Clash of cultures

In Kridel's case, two incompatible corporate cultures met, resulting in the disbandment of one, yet the process was handled professionally and with compassion for the well-being of those who were laid off. Preemptive moves such as publishing a newsletter and hiring a psychologist helped smooth the transition. Not all mergers and acquisitions, however, go smoothly.

One of the reasons is that not all firms have a clear transition strategy, and those that do do not always communicate effectively with the employees who fear that their lives are about to be disrupted.

If you face an acquisition, you can take several steps to prepare your staff for the months ahead. First, learn as much as you can from other firms that have been through the process. And second, remember that responsible management policies and a sense of cooperation will go a long way in smoothing the panic and uncertainty that accompany any merger.

General Electric buys RCA

DP breakup was the final decision for Crocker, but when one company acquires another it does not always mean the acquired firm's data center will be phased out. The opposite is happening with General Electric Co.'s acquisition of RCA Corp., which, at $6 billion, is the largest non-oil company merger in history.

At the time of the acquisition, which began in July 1986 and was completed in November, RCA was an experienced IBM shop while GE had a mix of Honeywell, Inc. and IBM data centers. To develop a strategy, Ed Skiko, then chief information officer at GE, met with Mike Cofone, his counterpart at RCA, to evaluate the strengths and weaknesses of the two operations.

When Skiko and Cofone completed their assessments, GE personnel were impressed enough by RCA's IBM data center that they decided to move GE's corporate information systems to RCA's center.

Cofone, who is now staff vice-president for RCA corporate systems and manager of corporate information systems and services for the combined company, says they realized that it made sense to take advantage of the impressive RCA center. "You can't look at [an acquisition] as who took over whom," he says. "That's why I think we were successful. It was a case of being able to combine our resources, and if you've got good resources you take advantage of them."

Ed Skiko

Skiko, now vice-president of corporate systems at GE, says the merger went exceptionally smoothly. He attributes the ease of transition to some fairly simple procedures.

"The plan was to make sure everybody was treated equitably, independent of which corporation they had started with," he explains. Skiko says this meant that when it came to allocating key jobs and deciding who was going to be displaced, "we didn't just take all the people from the new company and throw them away."

State acquires American

Merging two shops was not as simple when the American Savings & Loan Association in Irvine, Calif., was acquired by the State Savings & Loan Association in Stockton, Calif., in 1984. In fact, there was downright animosity as well as a slew of management problems to overcome, according to Tom Holm, who was senior vice-president at American's West Lake, Calif., data center at the time of the acquisition.

Now a managing principal at the JIA Management Group in Santa Monica, Calif., Holm looks back on the merger as a case in which two cultures clashed in the merger process with unfortunate results.

"The two associations were culturally quite a bit different," he says. State's culture was aggressive and entrepreneurial; American's was more conservative, he explains.

Each bank ran its own data center and each exerted tremendous resistance when it came to cooperating with the other shop. "It grew into an us-and-them situation — an antagonistic environment," Holm recalls.

To bring the two data centers together, State and American tried several approaches. One early approach was to determine the strengths of each center and divide the tasks accordingly, but problems arose as projects increasingly began to overlap. The second approach was to target specific assignments and write detailed goals for each center, but that did not work out very well either.

The animosity dissolved between the two groups only after each realized it had to work with the other and that the only way they could meet company goals was through a team effort. "We had to have joint projects," Holm explains. "As soon as we recognized this, it began to work." In retrospect, he says, what helped more than anything else was the pride in accomplishment that both sides felt when they participated in solving the problem.

Pride all around

For Crocker DP employees, pride was also a key factor. "We had put together some very exciting systems," Kridel says. But Wells Fargo had determined that everything from Crocker would have to fit in or go.

"All my operations were superfluous," he says, recalling a shared point-of-sale network that took more than two years to create. Wells Fargo had no need for the network and essentially threw it away. "When you match cultures, even good ideas are not necessary," Kridel admits.

Despite their near-certain layoffs, Kridel says his people kept coming to work each day, and their performance reached an all-time high during the acquisition process. "My whole management team was laid off, but they never let up," he says.

Why? Kridel thinks it was individual pride in something they identified with. "They didn't jump ship. They went down like professionals," he says.

Mike Cofone

There was also pride in the operation itself during the transition, despite the uncertainty and resentment of impending job loss. Kridel had to keep his department running smoothly. His operation accounted for $7 trillion a year in transactions and included such functions as electronic banking, automated tellers and check-processing software as well as what he says was the most sophisticated international payment system in the banking industry at the time.

The human factors

Kridel says his immediate concerns during the transition were not only keeping a high level of professionalism and performance, but also attending to the welfare and future of his personnel. Early in the acquisition process, he traveled with managers from Wells Fargo to other merged or acquired banks to see what they had learned.

"We came back with lots of experience in major consolidations," he explains. But the group could not agree on exactly what to do, other than to make the transition a fast one.

A number of steps were taken that Kridel says worked out extremely well in minimizing the negative effects of job loss, uncertainty and disruption.

For instance, the newsletter/memo system that he set up

Merger tips from the top

During interviews with systems personnel involved in mergers, *Computerworld* gathered the following list of MIS managers' tips on actions to take — and not to take — when companies are merged or acquired.

- Take a proactive stance. If top management does not involve MIS, it is up to MIS to get involved.
- Examine the strengths and weaknesses of each company's data center with an eye toward the combined corporations' long-range strategic direction.
- Avoid haste in the early stages. Software conversions, especially, should be approached with patience and caution. There is no dictum that says the two shops should be combined, nor is there one that says they should not.
- Factor in each shop's hardware and software applications. Aim to keep services to customers and employees running at previous levels.
- Pay attention to the corporate cultures of the two companies. The business management styles of a New York-based old-line financial firm may differ radically from the go-go style of a Silicon Valley start-up. Imposing an inappropriate management philosophy may kill the competitiveness of the firm being acquired or result in the desertion of key personnel.
- Try to retain employees who understand both the technical and business sides of the company's operations. Assign staff evaluations to the employees' managers who best know what goes on in their departments. Meet with managers and employees, both separately and together, to hear issues from all sides.
- Hold meetings often. Send out frequent memos detailing any changes in policies, procedures and plans. Allocate time for one-on-one sessions and, above all, keep on top of rumor control.
- Involve the human resources department, perhaps by setting up a supportive outplacement center. Encourage the use of the company's word processing and telephone equipment for those seeking new employment.
- Provide personal counseling in the form of industrial psychologists, financial advisers and simple hand-holding. This can go a long way in keeping morale up during difficult times.
- Encourage voluntary retirement, if possible. Transfers within the company are also a good option.

EDDY GOLDBERG

served as a central, authoritative source of information and rumor control. The additions of industrial psychologists, outplacement services and a crisis hot line for employees who were taking the acquisition and their imminent lay offs badly also helped.

Group sessions held for Crocker employees let them realize that others had the same survival worries. The sessions gave employees a forum for questions about benefits, pensions, salary grades and years of service — as well as personal survival questions, such as how to meet loan, mortgage and car payments.

In the end, Wells Fargo personnel had planned to do the actual layoffs, but Kridel insisted his people should do it. "I strongly recommend that people's current managers do the layoff," he says. "It's very important to go out with respect and dignity." He insists that only the managers who had been there could remember the long hours and dedication their staff members put in. Acknowledging their accomplishments in the exit process boosted their spirits, he says, and went a long way in helping the job-seeking process that followed.

At American and State, Holm says the greatest difficulty for the people caught in the merger wringer was not dealing with the facts, but with their perceptions.

> "THE MERGER plan was to make sure everybody was treated equitably. . . . We didn't just take all the people from the new company and throw them away."
>
> ED SKIKO
> GENERAL ELECTRIC CO.

"Most of the time those perceptions were wrong," he says.

"The only way to overcome a negative perception is to have very open and flowing communications. As we got smarter, we brought all the parties together and listened. Communication is the key."

The importance of communication was also important during the restructuring of the GE/RCA MIS organization. Concerning layoffs, in raw numbers, many will go: When the companies merged, GE had about 200 people in the production side of its corporate data center and RCA had about 275. By the time the two centers are consolidated, Cofone estimates that about 325 will remain.

Jay Hayner, manager of GE's Schenectady, N.Y., information processing center, stresses the importance of straightforward, open communications in helping to minimize the hardship of layoffs. "People would rather be given bad news than live with uncertainty," he says.

After 20 years at GE, Hayner says he has established long-term relationships with many of the people who will lose their jobs. Most have a long service record with GE, and while some are opting for early retirement, not everyone has that choice or wants it.

How is Hayner handling the process? "Most people feel sorry for me," he says. "There's no way they'd want my job."

Goldberg is a free-lance writer based in Framingham, Mass.

Scholar says

CONTINUED FROM PAGE 69

The research reports will be available to the public, he says.

The financing from MCI, which is expected to amount to several million dollars, will not bias the research, Keen asserts. "For years, [MCI Chairman] Bill McGowan has been trying to create something like this, almost as his legacy to the Information Age," Keen says.

Keen, author of the book *Competing in Time*, published last year, said in the interview that MIS managers need to accept today's imperfect technology and get on with the job of helping their firms become more competitive.

Quick action is crucial, he says. It typically takes five to seven years to build a data network capable of providing a competitive advantage, so it is already too late to affect competition in 1990, he notes.

Peter G. W. Keen

Keen suggests a business planning horizon of three to five years and says the effort requires a new type of MIS manager; one who has the proper mix of technical and business skills.

More important than obtaining perfect technology or connectivity standards, Keen emphasizes, is the development of a competitive business strategy that exploits existing information technology.

Organizations famous for using data networks for competitive advantage — such as Citibank NA, American Airlines and American Hospital Supply Corp. — have used relatively old-fashioned technology, not leading-edge technology, he [illegible].

"At this point, there is more than enough good technology around . . . so that if you've got your business act together, you can get going. If you hope that technology is going to solve your lack of business strategy, you're asking for a fiasco," Keen explains.

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Insurer

FROM PAGE 69

competitive advantage," said Glidden, who joined Colonial Penn in November 1986 from Life Insurance Co. of Virginia, where he was senior vice-president.

"With that, there's a lot of changes going on within data processing at Colonial Penn and our future looks both exciting and bright," Gliden said.

One change is the creation of his position, which consolidates the roles of the senior vice-president who previously was the top information systems officer and the executive vice-president to whom he had reported. According to Glidden, the senior vice-president, Bill Houspon, left the company. Another change is the expansion and reorganization of the data processing department. This will place more emphasis on applications software as opposed to hardware capacity, Glidden pointed out.

The expansion requires construction of a new facility, which will be located about five miles from the present one in Wayne, Pa., on a site at the edge of Valley Forge National Park, Glidden noted. "That's consistent with our strategy to elevate the position of data processing," he said. The building is to be completed by October 1988.

The replacement of a Honeywell 9092 system with an as yet undetermined IBM mainframe will allow greater use of standard application packages, freeing more resources for development, as well as cut costs, Glidden explained. Currently the company also runs IBM 3083 and 4341 processors.

Fielding

FROM PAGE 69

aimed at reducing costs, saving jobs or increasing quality.

In other words, they focus on improving productivity. The chief information officer can use such productivity-driven systems to drive down costs and give the company a competitive edge as a low-cost producer. An operating support system supports, therefore, a productivity strategy.

Management support systems are developed in order to give managers faster access to better information for decision-making, business control, competitive and risk analyses, performance measurement and so forth. The information officer can support these important management information needs with support systems that provide highly responsive and flexible data base systems — usually through information centers — using fourth-generation languages and tools. But information can also add value to customers. Thus, it has a double-edged potential, depending on whether it is directed inwardly to the firm, or outwardly to customers.

A management support system, therefore, reflects an information services strategy.

Customer support systems are technology-driven products and services aimed at increasing market share and revenue. A customer support system reflects, thus, a strategy of technology innovation.

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By focusing on the three types of systems that have evolved over time, the information officer can draw on these three parallel strategies to achieve competitive advantage: productivity, information and innovation.

Although each system type uses a different strategy, all hold the promise of creating value for customers and thus providing a competitive advantage. An efficient internal operating system can be extremely valuable to a business with a low-cost producer strategy.

A management system can provide valuable marketing and management information to both management and customers. And a customer-focused system can create product differentiation through technology innovation. Moreover, they are not mutually exclusive. Some systems projects present opportunities to achieve all three simultaneously.

Each can often be added on top of another — achieving cumulative benefits as competitive information weapons. In other words, not all systems fall neatly into one category. However, one is usually primary.

In my definition, if the target is information for competitive advantage, then it is a customer support system. If it is to support internal operations, it is an operating support system.

An airline reservation system serving customers is primarily a customer support system, even though it also automates record keeping operations and provides marketing and management information. An in-house information center is a management support system, even though it may provide customer information.

Opens opportunities

By applying the different types of systems to different types of computers, a variety of competitive opportunities open up.

For example, a management support system on a mainframe becomes an information center. On a minicomputer, it can take the form of a management decision support system. On a microcomputer it might be a spreadsheet application.

Different strategic planning methodologies are more effective than others with the different systems types. For instance, Business Systems Planning, the process developed and used extensively by IBM, best fits an operating support system because of its focus on identifying internal systems projects.

The Critical Success Factors method developed by John F. Rockart at MIT probably best fits a management support system, because it zeros in on management information needs.

Analysis methodologies such as those developed by the Boston Consulting Group, the GE/McKinsey model and the model developed by Michael Porter at the Harvard Business School best match a customer support system because of their market-driven competitive focuses.

In summary, the natural evolution of systems provides today's chief information officer with three important information weapon strategies to help his company achieve competitive advantage in the marketplace.

It only remains to exploit them, finding the right system strategy and system to best accomplish the business objective at hand. Winning companies today focus their competitive planning on all three strategies — increased productivity, new information services and technological innovation — in their quest for the leading edge.

Synnott is director of Information Systems and Services at Bank of Boston. This column is adapted from his book, *The Information Weapon: Winning Customers and Markets with Technology* (John Wiley & Sons, N.Y., 1987).

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IBM steps up run toward AI

IBM is moving rapidly toward becoming a major force in the emerging knowledge-based systems industry.

It is positioning its new Expert Systems Environment (ESE) as a strategic system designed to play a role in the integration of its major hardware and software product lines during the next few years.

At a special three-day consultants' seminar in New York recently, IBM executives discussed in detail the characteristics of current ESE program offerings and outlined their strategy to enhance the ESE product line in the immediate future.

At present, ESE is an expert system shell that runs on general-purpose IBM mainframes under the MVS and VM operating systems.

AI targets

It was designed to compete with major artificial intelligence tool vendors such as The Carnegie Group, Inc., Inference Corp. and Intellicorp, whose expert system shells were originally written in LISP and required specialized AI workstations to operate.

IBM executives asserted that IBM's Corporate New Business Development Group considered the development of a specialized IBM AI workstation but eventually dropped that approach in 1985.

Considerations

Ease of use, ability to run on general-purpose computers and good potential for integration with mainstream software and data bases were the overriding factors in the executives' decision.

The resulting ESE products consist of two complementary programs written in Pascal.

The Expert System Development Environment is used to build knowledge bases, while the Expert System Consultation Environment is used for consultations.

The ESE system runs on most IBM mainframes, including the 9370 family of computers. ESE can access external data bases by executing custom-

Continued on page 80

ADR battles IBM, slow market

BY ALAN ALPER
CW STAFF

PRINCETON, N.J. — In the 14 months since Applied Data Research, Inc. (ADR) was acquired by Ameritech, life at the IBM-compatible systems software house has been eventful, to say the least.

ADR, like other mainframe data base management concerns, is coming off a year that was not overly hospitable. Budget cutting at many corporations forced MIS executives to be extremely prudent in big-ticket software purchases, a situation that has made life difficult for ADR and its brethren.

At the same time, slackening sales of IBM hardware caused Big Blue to become more aggressive in the software arena. During 1986, IBM declared that DB2, its relational data base management system, was a strategic product. That pronouncement threw the data base market into disarray as users scurried to analyze the virtues of DB2 vs. IBM's IMS and competing products from ADR, Cullinet Software, Inc. and other vendors.

Redoubled efforts

But under former Ameritech executive Dennis Strigl, ADR has redoubled its efforts to remain the No. 1 alternative to IBM systems software. "We're taking IBM on head-on," Strigl said in an interview at ADR headquarters last week. "Some of our competitors, like Cullinet, have a different strategy — diversification — but we've chosen to stand and fight."

Despite publicly professing a hands-off approach to running ADR, Ameritech is said to be exerting more influence on the 27-year-old firm. Strigl, former president of Ameritech's celluar phone subsidiary, took over as ADR's president last fall. He replaced ADR co-founder Martin Goetz, who returned to the development lab by his own choice and remains senior vice-president and chief technology officer.

Although Chicago-based Ameritech does not break out the performance of its individual subsidiaries, ADR's sales were up 5% in 1986 from 1985's $150 million total, even after the effects of an accounting change and the impact of a new lease program were taken into account, company officials said. ADR, which was in the red for the nine-month period prior to the Ameritech acquisition, reportedly continued to lose money last year, although the situation is said to be improving.

Dennis F. Strigl

As part of Ameritech, the regional Bell holding company that reported more than $9 billion in revenue and $1 billion in income last year, ADR said it feels it has access to the resources that will enable it to succeed. Most important, ADR now has access to the deep pockets of its parent without investment community pressure to show increasing quarterly profits. This has enabled ADR to maintain heavy research and development investments.

Investments to increase

These investments, as a percentage of revenue, will increase from 19% to 20% this year, Strigl said. Robust R&D investment, he added, is paramount in the software business, since success usually correlates with technological innovation.

Much of ADR's effort is aimed at enhancing Datacom/DB, its relational DBMS. The firm said it intends to bring out new releases of Datacom/DB and Data Dictionary next month that will provide increased performance, security and ease of use for its relational DBMS customers.

The Ameritech connection has also enabled ADR to acquire technology to bolster its position in the data base race. The firm recently acquired relational data base management software from Software Systems Technology, Inc. in College Park, Md. The software gives ADR users access to SQL, a tool quickly becoming the standard means of defining and manipulating data within relational DBMSs, for the first time.

IBM's DB2 push has put pressure on competitors like ADR to devote more development and marketing resources to the rela-

Continued on page 78

Rodime continues drive suits

BY CLINTON WILDER
CW STAFF

SAN FRANCISCO — Rodime PLC recently filed its second lawsuit against a 3½-in. disk drive competitor, alleging that Conner Peripherals, Inc. is infringing on Rodime's disk drive patents.

The charges are almost identical to those in Rodime's current suit against 3½-in. disk drive market leader Miniscribe Corp. [CW, March 2].

Scotland-based Rodime said its attorneys have contacted more than 20 U.S. disk drive vendors using 3½-in. disk technology to inform them that Rodime believes they are infringing on Rodime's proprietary technology. Rodime said it is seeking to sell 3½-in. disk technology licenses to those vendors.

Rodime's finance director, Bill Batchelor, said several vendors that were contacted have expressed interest in licensing from Rodime, but no agreements have been announced.

A spokeswoman for San Jose, Calif.-based Conner Peripherals declined to comment on the suit.

Inside

- **NAS's quarterly loss hurts parent company National Semiconductor. Page 79.**
- **NCR shifts focus from mainframes to modular systems. Page 81.**

Wang signs deals with Diebold, Answer Systems

BY CLINTON WILDER
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc., continuing to expand its marketing beyond its own products, recently announced separate agreements with Diebold, Inc. and Sterling Software, Inc.

Under the development and marketing pact with Sterling's Answer Systems, Inc. division, Wang said, it will integrate its Professional Application Creation Environment (PACE) for VS computers with Answer/DB, a popular access tool for IBM data bases originally developed by Informatics General Corp. If the integration is successful, VS users will be able to access DB2, IMS and VSAM files on IBM mainframes, according to Wang.

DB2 is the second IBM-resident data base management system targeted by Wang for access by VS users. Last fall, Wang announced the integration of PACE and Cullinet Software, Inc.'s IDMS/R through a product called the PACE/Cullinet Connection [CW, Sept. 29, 1986].

"We recognize that many customers have made major investments in data and applications on IBM and IBM-compatible mainframes," said Jeanne Friedman, Wang's senior product manager for data base and decision-support products. "We want to allow our customers to leverage these investments within the framework of Wang's data management and information processing solutions."

Wang did not specify a target release date for integration products developed with Answer Systems.

Separately, Wang inked a private-label OEM agreement with Diebold, the Canton, Ohio-based vendor of automated teller machines (ATM) and other funds-transfer products. Wang will sell Diebold ATMs, point-of-sale terminals and other related products under the Wang label in the U.S. and selected overseas markets. Financial terms of the agreement were not disclosed.

Wang will become the first OEM to resell Diebold ATMs under its name, according to a Diebold spokesman.

Wang, trying to climb back from the worst slump in its history during the past two years, has recently been aligning with vendors in markets other than its traditional markets of office automation and minicomputers. Under an agreement signed last fall, Wang is currently developing software to link VS systems to workstations from Apollo Computer, Inc. and Sun Microsystems, Inc. [CW, Oct. 6].

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Oracle reports earnings boom

BY ALAN J. RYAN
CW STAFF

BELMONT, Calif. — Oracle Corp. reported a 118% increase in sales and a 136% rise in earnings for its third quarter of fiscal 1987, which ended Feb. 28.

Sales for the period were $34.9 million, with income reaching $4.8 million, or 16 cents per share.

For the like quarter in fiscal 1986, the company posted sales of $16 million and income of $2.1 million, or 8 cents per share.

The earnings per share were adjusted for the company's recent two-for-one stock split. Pre-stock split earnings increased 31 cents from 15 cents for the quarter.

Oracle President and Chief Executive Officer Lawrence Ellison said that, including third-quarter earnings, the company has had sales in excess of $100 million for its last four quarters.

Recognize the value of SQL

Ellison said the strong quarter indicates that customers recognize the value of SQL as an industry standard and the strong worldwide demand for the company's relational data base software on mainframes, minicomputers and personal computers.

Nine-month sales increased 134% to $80.9 million, compared with sales of $34.5 million in the first nine months of fiscal 1986.

Earnings for the three quarters were up 142% to $8 million, compared with $3.31 million in the like period last year.

Rabbit plans CTI merger

BY CLINTON WILDER
CW STAFF

MALVERN, Pa. — In its second acquisition in as many weeks, Rabbit Software Corp. last week announced plans to merge with CTI Data Corp., a Raleigh, N.C.-based vendor of micro-to-mainframe gateway products.

The firms said the acquisition will broaden Rabbit's array of communication products that link smaller computers to IBM mainframes using IBM communications protocols.

CTI's products allow non-IBM-compatible micros, coaxial controllers and ASCII terminals and peripherals to interface with IBM mainframes.

Two weeks ago, Rabbit acquired Micro Plus II, Inc., a Boca Raton, Fla.-based vendor of communications products for IBM Personal Computers.

Rabbit said that like Micro Plus II, CTI will operate as a subsidiary of Rabbit. CTI President and Chief Executive Officer Richard O'Bey will continue to head the business, the company added.

Rabbit said it will issue CTI shareholders 200,000 shares of Rabbit common stock. Rabbit will purchase Micro Plus II for about 2 million Rabbit shares.

ADR battles IBM

CONTINUED FROM PAGE 75

tional data base management market. "DB2 has sure made life difficult for all of the independents," said Ellen Staelin, an analyst at International Data Corp. (IDC), a market research firm in Framingham, Mass.

Strigl called DB2 an "inferior product," and suggested that if customers benchmark it against Datacom/DB, ADR wins hands down. "If customers don't take the time to analyze our product, then we have an uphill battle," Strigl confessed. "But if they look at Datacom/DB with development tools like ADR/Ideal on top of it, then there's no problem."

"Clearly, DB2 is strategic to IBM," added William Clifford, executive vice-president. "But we say, 'Is it strategic for the customer?' "

Although the industrywide slowdown shows little sign of abating, ADR officials said business conditions are improving. The firm pointed to a recent $7 million contract signed with 3M Corp. and a deal potentially valued at $850,000 with Volvo AB SWE as positive signs.

"Compared with Cullinet, ADR has done reasonably well," IDC's Staelin noted.

The advent of the IBM 9370 — a mid-range computer running applications developed for Big Blue's 370 mainframe architecture — is expected to be a boon to software houses like ADR. The firm recently agreed to supply Triad System Corp., a turnkey systems vendor serving the automotive aftermarket, with data base management software and development tools for the 9370.

"We have a program focusing on the the value-added reseller market," Strigl said. "We intend to play a meaningful role in serving niche markets, and the 9370 will help make that possible."

Such is ADR's love/hate relationship with IBM, Clifford said. A healthy IBM is important to ADR so it can sell more software. Yet a dominant IBM prevents independent software houses like ADR from thriving.

"One has to remember that IBM is a powerful company, but they're not invincible," Strigl concluded.

How to take the high risk

SAN FRANCISCO, CALIFORNIA • 8:15 A.M.

An in-depth cover story by Jim Connolly, in International Data Group's weekly, **Computerworld**, immediately arouses the apprehension of the Chief Information Officer (CIO) of an international company headquartered in California. The new minicomputer system his Information Services Team plans to purchase for their international offices is reported to be experiencing an alarming rise in downtime.

A multi-million dollar decision hangs in the balance.

FRAMINGHAM, MASSACHUSETTS • 11:20 A.M.

The CIO calls International Data Corporation (IDC) Vice President Frank Gens, who sets in motion an international study of the operating record of the minicomputer at its user sites, worldwide.

FRAMINGHAM, MASSACHUSETTS • 12:30 P.M.

Rebecca Segal, director of **IDC's Customer Service Program**, quickly assembles a task force which combines the talents of IDC researchers and analysts, and CW Communications, Inc. editors and reporters.

Computerworld Editor Bill Laberis and industry specialist Pete Bartolik, begin scrutinizing **CW Communications' News Network** database to retrieve pertinent information about the computer system in question from IDG's 85 publications around the world.

EUROPE, ASIA, SOUTH AMERICA • 2:00 P.M.

IDC field researchers in 12 countries interview the users of the minicomputer, review their usage patterns, examine work loads and determine levels of support available from local service personnel.

NAS loss burdens parent

BY ALAN J. RYAN
CW STAFF

SANTA CLARA, Calif. — Analysts last week said losses posted by National Semiconductor Corp. for its third quarter, which ended March 8, stemmed mainly from the company's National Advanced Systems Corp. (NAS) group.

"NAS is where all the revenue decrease came from," said analyst Paul Johnson of L. F. Rothschild, Unterberg Towbin. "The company assures me that that's all due to the seasonal factor, and related to some new product introductions from IBM."

"I thought they would overcome the seasonality, but they didn't," said James Barlage, an analyst at Smith Barney, Harris Upham & Co. "The problem was that in late December or January, their order rate at NAS was impacted by impending IBM product announcements. It hurt orders and shipments for the quarter."

Barlage said that after the IBM product announcements, shipments snapped back and hit near-record levels heading out of the quarter. "It looks like the momentum has been re-established."

National Semiconductor reported a loss of $25.6 million, or 31 cents per share, for its third quarter. That compares with a loss of $39.4 million, or 47 cents per share, in the like quarter of 1986. It was the company's eighth consecutive losing quarter.

Sales for the period were $398.1 million, compared with sales of $322.3 million in the year-earlier period.

The results include a charge of $15 million related to the restructuring of the company's Datachecker Systems and Semiconductor Group manufacturing operations announced in January.

Barlage said he expects "pretty good recovery in the current fourth fiscal quarter, due in part to the company's year-end tendency to ship more products and because of improvements in the industry."

3Com just gets stronger

BY ALAN J. RYAN
CW STAFF

SANTA CLARA, Calif. — Analysts last week credited 3Com Corp.'s 78% earnings increase for its third quarter to generally strong industry conditions, the demand for its local-area network and increased orders from retailer Businessland, Inc.

Paul Sherer, an analyst with Robertson, Colman & Stephens in San Francisco, said he thinks 3Com's growth will continue in upcoming quarters. His forecast for 3Com's fourth quarter is "a little under 10% sequential revenue growth to $32 million, with earnings staying relatively flat due to new product introduction costs," he said.

A second analyst said that because Businessland is placing many orders through 3Com, business will continue to grow in upcoming quarters.

For the most recent period ended Feb. 28, the company recorded sales of $30.4 million, an 81% increase from sales of $16.9 million reported in the same quarter of 1986.

Earnings for the period were $3.2 million, or 22 cents per share, compared with earnings of $1.8 million, or 13 cents per share, in the 1986 third quarter.

3Com's recent public offering to sell 1.2 million shares of its common stock was completed at $23.50 per share, Sherer said.

European chip firms to unite

BY AMIEL KORNEL
SPECIAL TO CW

CATANIA, Italy — Pasquale Pistorio, president of Italian semiconductor maker SGS SpA, has confirmed that the Italian government is negotiating the firm's merger with the chip division of France's state-owned electronics conglomerate Thomson-CSF, S.A.

IRI-Stet, the state-controlled industrial holding company that owns SGS, acknowledged that negotiations were under way to create what would be Europe's second largest chip maker.

SGS officials, who were in Catania inaugurating a $77 million research center for advanced semiconductors, seemed surprised at the timing of the announcement. They maintained that negotiations were in the hands of the government.

SGS recently revealed that it more than doubled its losses in 1986 to $50 million on sales of $375 million. Thomson's semiconductor division expects to post 1986 losses of $33 million, on sales of $436 million.

In 1985, Thomson purchased the assets of troubled U.S. chip maker Mostek Corp. from United Technologies Corp. for $17 million.

Kornel is European bureau chief of the CW Communications International News Service.

out of high tech decisions.

SYDNEY, AUSTRALIA • 9:55 A.M.

Len Rust, managing director of IDC Australia, and the CEOs at 11 other IDC international research offices evaluate the field researchers' findings and compare them to the current minicomputer maintenance and support experience for various brands in their markets.

FRAMINGHAM, MASSACHUSETTS • 4:00 P.M.

The preliminary findings arrive via fax, telex and E-mail to be analyzed by IDG's project task force. IDC Senior Analyst Tim Caffrey writes the final report which points out that the minicomputer in question is experiencing a high failure rate, and the supplier's maintenance teams in seven key countries are not adequately trained to keep it up and running.

SAN FRANCISCO, CALIFORNIA • 5:45 P.M.

Based on the study's findings, the CIO decides to cancel the previous purchase order, and asks that his Information Services Team make an alternative purchase based on IDC's maintenance assessments and recommendations.

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IBM steps

CONTINUED FROM PAGE 75

ized Pascal routines developed by the knowledge-base builder.

IBM also developed a high-performance expert system shell called Hiper at the AI Technology Center of its Federal Systems Division. It is a high-performance expert system operating at speeds a magnitude faster than the commercial ESE products.

The Hiper shell can be used as an embedded system in applications for satellites, the Strategic Defense Initiative, the National Aeronautics and Space Administration, large data base transfers and various intelligence agencies.

The Hiper system is not available as a separate product for sale to individual customers, but there is little doubt that lessons learned in deployment of such systems may eventually be put to good use in further enhancements of the ESE product line.

IBM is on the verge of announcing the upgrading of ESE to a program product from its current program offering status. Big Blue's immediate priority is to convince its mainframe users that IBM is committed to support and enhance AI products such as ESE for the long run across the spectrum of its hardware and software products.

High on the list of priorities is the development of better interfaces for ESE to connect with corporate data bases. Before the end of this year, IBM hopes to announce direct ESE links with Structured Query Language and DB2 products.

Further down the line — but expected before the end of 1988 — are ESE links with IMS DB/DC data base products, which account for more than 40% of all mainframe data bases in existence today.

> BIG BLUE'S immediate priority is to convince its mainframe users that IBM is committed to support and enhance AI products for the long run.

Another priority of the ESE product cycle is to bring expert system capabilities to all IBM intelligent workstation levels. At present, ESE uses the 3270 series of terminals.

The IBM Personal Computer with appropriate emulation cards is not ideal, because the ESE system relies heavily on use of 3270 terminal function keys that are not available on PC keyboards. During 1988, however, IBM intends to have a complete ESE version for the IBM PC, PC XT and AT models.

The IBM RT PC workstation has not been forgotten. This year, the company plans to announce a LISP language that will make the RT PC directly competitive with other AI workstations on the market.

A full version of ESE for the RT PC is also expected to be available in 1988. In addition, ESE versions are also planned that year for IBM's midrange computers of the System/34, 36 and 38 series.

IBM revealed that "several score" of ESE systems have already been deployed, primarily among its Fortune 500 mainframe end users. Some that have been identified include such companies as Chase Manhattan Bank N.A., Citicorp, Du Pont Co., McDonnell Douglas Corp., Timeplex, Inc. and Travelers Insurance Co. IBM also developed close to 100 in-house applications of its ESE system, some of which, involving graphic end-user interfaces, were demonstrated at the seminar on-line.

Seuprowicz is president of 21st Century Research in North Bergen, N.J.

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NCR's mainframe-to-modular move

BY JAMES CONNOLLY
CW STAFF

DAYTON, Ohio — Year by year, NCR Corp. drifts farther behind IBM and the other makers of what NCR Chairman Charles E. Exley Jr. calls "monolithic mainframes" in the race to provide raw CPU power.

For about five years, NCR has forsaken the large-scale mainframe for smaller, more modular systems. It also shifted its emphasis from the more traditional batch orientation to emphasize on-line transaction processing (OLTP). In connection with that, NCR has revamped its processor product line during the past year by introducing a new primary host, the modular 9800 family, and by boosting the Unix-based Tower's performance more than threefold.

But large-scale processors and multiuser systems represent a relatively small portion — 34% — of NCR's business. The company that built its name on cash register sales before branching into computers draws 46% of its revenue from industry-specific workstations such as automated teller machines and point-of-sale terminals.

Those specialized workstations represent the largest part of NCR's business and what Exley says could be the most promising area for NCR growth. He says, for example, that 1986 saw strong growth in the financial terminals business.

But those workstations also are in a market in which NCR faces stiff competition from a variety of vendors, many of which are smaller and more narrowly focused. "The challenge is that while maintaining our advantage of being a broad product area company, we have to be as fast on our feet as a more narrowly focused company," Exley says.

NCR's special-purpose terminals, based on platforms using other vendors' technology and NCR products such as the Tower and NCR Personal Computer, include cash registers, ATMs, point-of-sale terminals, bank teller stations, information terminals and self-service gasoline station systems. Industry-standard platforms also are factors in the Tower family, which NCR markets to OEMs and large-user companies that do their own system integration.

NCR Chairman Lynch

The Tower, based on Motorola, Inc. 68000 microprocessors, is a family that has grown to range from a 4-year-old, eight-user supermicrocomputer to a superminicomputer introduced in February with support for 128 connections.

NCR Vice-President for General Purpose Systems Development and Production Hugh J. Lynch calls the Tower family "the most open system on the market." He claims it has more open interfaces than its competitors in the 68000-based Unix system marketplace and notes that NCR has helped to set standards. He says NCR and Shugart Corp. cooperated in developing the small computer systems interface, which has become a standard for tying peripherals to multiuser systems.

Exley says he sees the Tower as an office server or networked processor.

"The biggest growth opportunities really are in the departmental systems area. That is the biggest single unsold market," Exley says. But, Lynch adds, NCR's value-added resellers (VAR) are finding new markets for the Tower, for example in technical computing.

Lynch says users can expect low- and high-end additions, such as the Tower 32/800, every 18 months.

One consultant reports that the Tower has driven NCR into a commanding position in the Unix market. "Surprisingly enough, NCR, I believe, is now the leading supplier of Unix engines in the world. They have about 20,000 units installed with about 12,000 shipped over the last year. I believe with that volume they are way ahead of anyone else in this game," says Omri Serlin, principal of Itom International Co., a Los Altos, Calif.-based consulting firm.

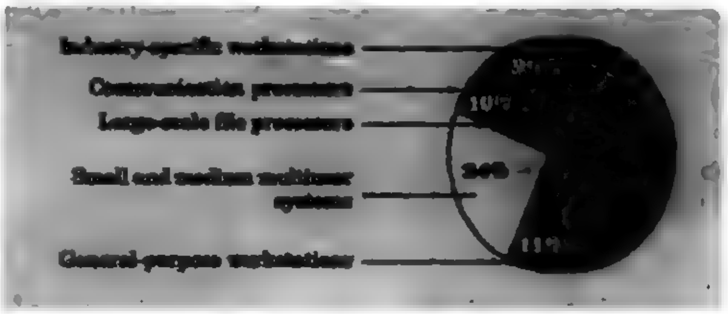
Serlin notes that the 68000-based Tower was poorly received by the OEM community four years ago. But NCR persisted by adding systems based on the Motorola 68010 and 68020 chips and found success in volume end-user sales to its customer base. Once those users bought it, OEM customers became more interested, Serlin adds.

Another analyst, Thomas Henkel of Boston's The Yankee Group market research firm, says the Tower also fits into NCR's plans as an applications

Continued on page 85

NCR product split

Percent of NCR revenue by product line



INFORMATION PROVIDED BY NCR CORP.
CW CHART: MITCHELL J. HAYES

NCR marches

CONTINUED FROM PAGE 1

"We're really marching to our own drummer," says Charles E. Exley Jr., NCR's nononsense chairman and president, who enjoys his day's first cigar before 10 a.m. "I think that five years from today, we will be widely recognized as a top-quality organization. In the past, we've had the recognition we've deserved — good in some respects and not so good in others."

Exley and his management team have generally earned high marks for steering NCR smoothly through a treacherous time in the industry. But the company now faces an even bigger challenge: how to translate its new product strategies (see story above) into growth rates more typical of a high-tech boom company than a Midwestern manufacturer.

'High-growth flyer?'

"It's like there are two NCRs, the old and the new," says Donald Young, who follows the company for Sanford C. Bernstein & Co., a New York-based investment banking firm. "In the new product areas — the Tower, Unix, fault-tolerant systems, semiconductors and micros — the annual growth is around 26%. That's pretty exciting, but the old products — point-of-sale and teller terminals, document processors and the proprietary-architecture V series — are still the lion's share of NCR today. The big question is whether the new products are enough to turn NCR into a high-growth flyer."

That, clearly, is what NCR intends to do. Exley says NCR's 13% sales growth in 1986 — its first double-digit year since 1980 — was second only to Digital Equipment Corp.'s among the major computer vendors, and he would like to stay near the top of the heap.

By most observers' accounts, Exley has done a crackerjack job of overhauling and rejuvenating NCR since he was named chief executive officer four years ago. Between 1980 and 1982, NCR's previously strong profit growth stalled, and in 1981 earnings dropped 18%.

To make matters worse, NCR's flagship product lines of the late 1970s were beset by reported software bugs and resulting user lawsuits, including an industry-record $3.2 million awarded to Oakland, Calif., dry cleaning firm Glovatorium in a highly publicized 1982 case. Some users of 9000 series minicomputers are still experiencing system crashes, according to Norman Cohen, an Atlanta-based consultant to several plaintiffs in user suits.

Slow but steady

But with a renewed emphasis on fiscal controls and asset management, Exley has turned NCR into the large system industry's most consistent performer. While competitors both large and small have experienced steep profit declines or losses during the industry slump of the past two years, NCR has maintained its forward momentum, albeit at a modest pace. Among the six largest mainframe vendors, NCR's gross margins and return on equity are second only to IBM's.

NCR President Exley

"They may be the kind of company that does better when the environment is weak," says hardware industry analyst Steven Milunovich of First Boston Corp. "When everyone else was booming, they didn't have the double-digit growth, so they had less inventory pileup when demand dropped. And their primary markets, retail and financial, have been doing reasonably well."

"We aim to be one of the industry's fastest growing companies," Exley says. "But to do that, we're going to have to be good in all parts of our business; being good in one or two parts won't do it."

On the product side, NCR has charted its course on what it believes are or will be industry standards, such as Unix and the Motorola, Inc. 68000 series microprocessor. That puts pressure on NCR developers to turn out products, because a slew of competitors can use the same basic platforms in the race to market.

"We are going to need a new top and bottom of our product line every 18 to 24 months," says Hugh J. Lynch, NCR's vice-president of general-purpose systems development and production. "If you're open, you have to do that or you're going to die."

To meet the demands of both development and manufacturing, Exley insists on a highly decentralized management style. "I get carried away a little bit with my own conviction about delegating decision making," he says. "To me, decision making at the lowest possible suitable level will result in lower cost and higher quality. And that doesn't mean just vice-presidents and general managers; I'm talking about everybody, including assembly labor."

In manufacturing, most NCR plants use elements of the Japanese *kanban* system, in which production is more directly linked to demand, to keep its inventories among the lowest in the industry. "There is really a new zeal for manufacturing technology in the company today," Exley says.

Few observers dispute the fact that NCR is a well-run company. But NCR admits that the jury is still out on how well the 103-year-old firm can leverage management strength into the double-digit annual sales growth that eluded it during the computer industry boom of the early 1980s.

NCR is staking its prospects

Continued on page 86

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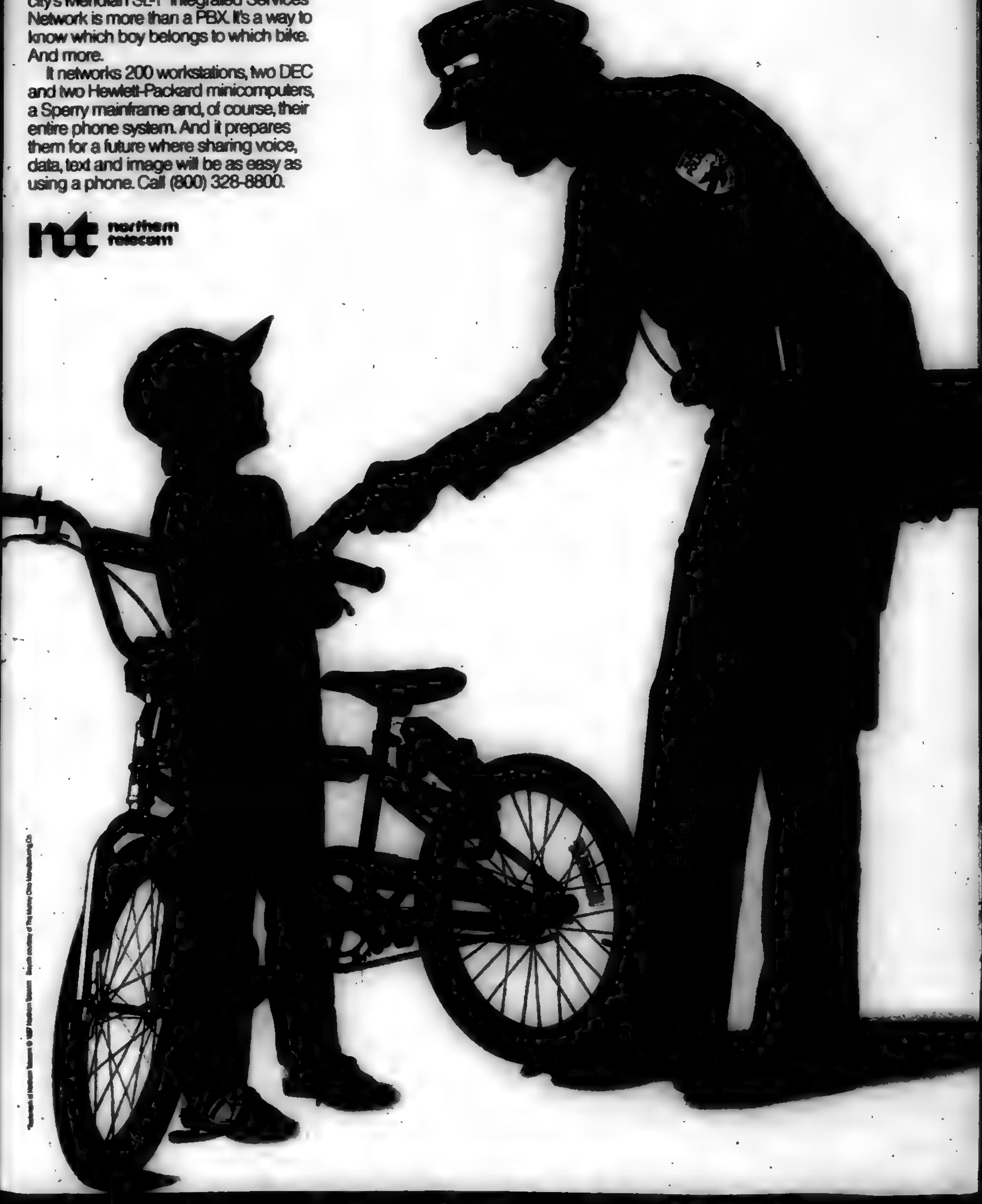

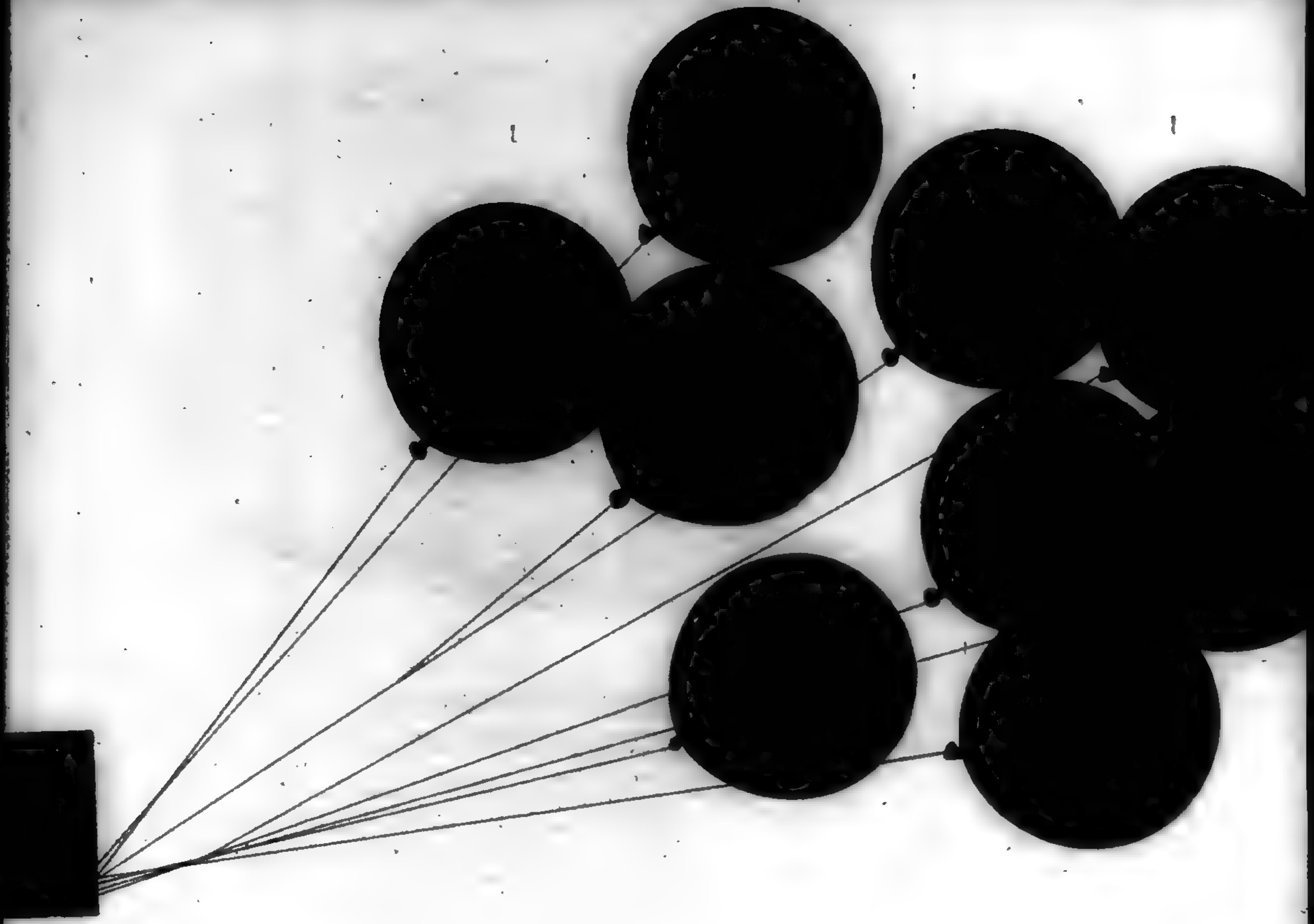

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NCR's move

CONTINUED FROM PAGE 81

development node tied to 9800s. He reports NCR is working on a 9800-based C compiler that could let Unix-based applications be moved to 9800 hosts.

The Tower's new performance range of 0.5 million to 8 million instructions per second (MIPS) pits it against competing vendors' systems such as the IBM 9370s and Digital Equipment Corp. VAXs and moves it into the range of NCR's own 9800 family. And, while the 9800 runs NCR's VRX-E operating system and the Tower runs Unix, comparisons between the Tower and the 9800 also can be drawn in how power is added.

Have a slice of power

NCR emphasizes its ability to add power in slices. The company introduced the concept in some models of its 8000-series mainframes but did not concentrate on the power slices approach until the 9800 debuted in April 1986.

Rather than keep all processing power in a single cabinet or in a few loosely coupled cabinets, NCR splits processing among multiple processors in up to 12 cabinets that can be stacked two-high, like building blocks. The cabinets contain application processors that handle instructions and I/O operations. They also contain data storage processors that are the data file controllers for system memory and disk storage.

NCR officials stress that the slice approach lets them offer common processors in configurations that can grow from a 9811, which has one application processor and one data storage processor, to a 9884 with eight application processors and four data storage processors.

Lynch notes that the architecture allows a customer to modify its configuration not only by installing more processors but by activating and deactivating application processors as needed throughout a work day. He cites the example of a bank that needs two application processors to support its ATM network for most of the day but may need six application processors at peak periods such as lunch hours.

NCR implemented a similar strategy on the Tower 32/800. In that architecture, segments of the Unix operating system are distributed to specific plug-in processors designed to handle application processing, file storage, terminals and printers, wide-area communications and local-area networks.

A fully configured Tower 32/800 provides three times the power of the previous high-end Tower 32/600. In CPU horsepower, an 8-MIPS rating drives the Tower past the 4 MIPS of the high-end 9884 and the largest members of the 11-year-old 8000 family.

But it is the 9800 family that NCR says it sees as a replacement for the current 8500 and 8600 models. The 9800 was designed to allow customers to migrate from 8000s, which run NCR's VRX operating system, to the 9800 and VRX/E.

The 9800 is being offered as a host machine and is the key element in NCR's OLTP strategy. Under that strategy, the 9800 is being offered as a transaction processor with general-purpose capabilities, allowing it to run as a stand-alone host or as a front-end for an IBM or other mainframe in a transaction-oriented network.

The positioning of the 9800 leaves it matched not only against IBM mainframes with transaction processing features but against a growing number of superminicomputers, including the fault-tolerant, OLTP-oriented offerings of Tandem Computers, Inc. and Stratus Computer, Inc.

Batch-processing asset

"One of the things that differentiates the 9800 from other transaction processors is that the 9800 has very good batch processing capabilities. You can't just do transaction processing and have that be the end of it," Lynch says. He claims the 9800 offers the advantage of being able to do batch-oriented tasks such as file maintenance without having to rely on a host.

But NCR still faces roadblocks as it expands its OLTP market presence.

"The hardware is there, but the software is noticeably lacking. NCR is still scratching around trying to find good, quality software developers to write for their products," Yankee Group's Henkel says. He maintains that NCR is six to eight months away from offering needed OLTP software, which provides IBM, Tandem and Stratus with headstarts. He notes that the delay leaves room for DEC to hurt NCR with an OLTP product expected by the end of this year.

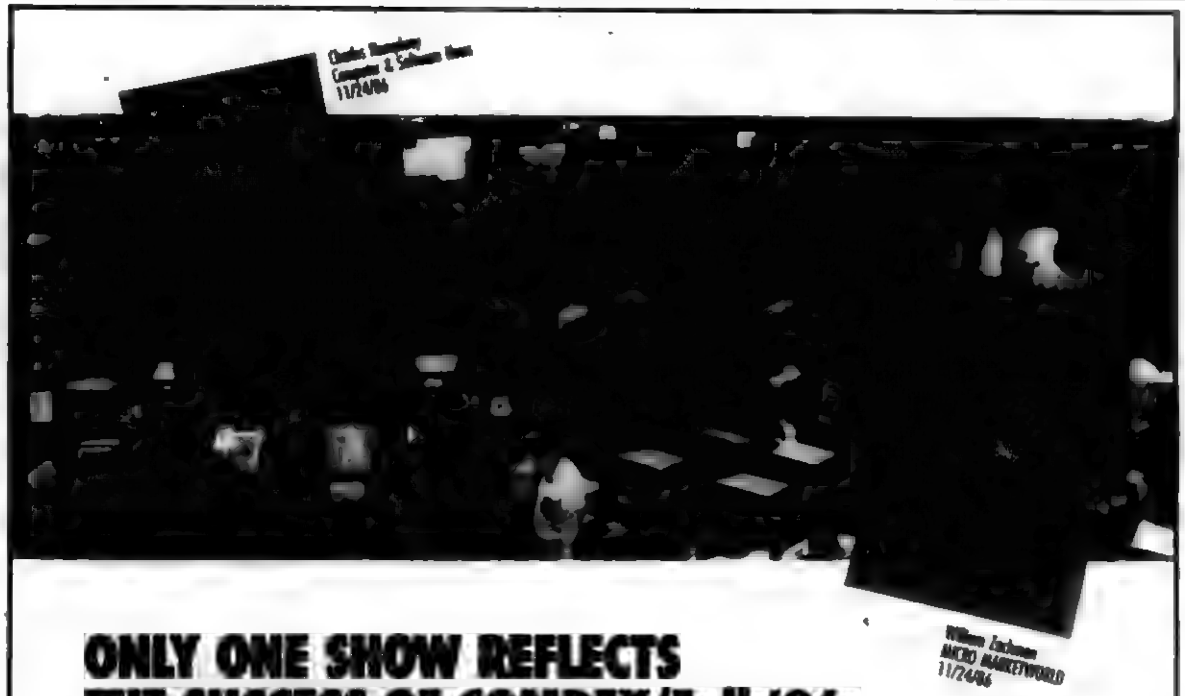
However, Henkel notes, NCR — with a background in retail and financial applications — is in the right market to take advantage of the expected growth in the OLTP demand.

Itom's Serlin adds, "The 9800 was intended to create a momentum for NCR. That thrust has been going a lot slower than they would like. Basically, that is because a lot of the key hardware and software was slow in coming out and in some cases is still missing."

Lynch says NCR recognises that the software was somewhat behind the hardware in the 9800 offerings.

He says NCR is moving its implementation of Cincom Systems, Inc.'s Mantis fourth-generation language product and NCR's Multi-Tran transaction processing software into 9800 control sites. Another key component in the software strategy is to build on the 9800's relational data base capabilities, which Lynch says are important, both in making the 9800 incremen-

Continued on page 86



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NCR marches

CONTINUED FROM PAGE 81

on the traditional "product sell" approach, maintaining that strong systems based on industry-standard platforms will sell into many different markets. Ironically, NCR's shift away from the vertical marketing approach came about because it found itself too focused on the retail and financial markets.

"The root of it was we got into a weak competitive position with our products," Exley says. "When you hear a company talking about solutions and verticals, it usually means its product prospects have gotten a bit weak."

In addition to direct sales, NCR's strategy is to leave it up to its value-added resellers to customize its products for specific niches. NCR has set a goal of $400 million in sales through indirect channels this year, up from just $50 million four years ago.

"We have done a mammoth amount of research into every vendor's value-added reseller program, and satisfaction among the value-added resellers is not necessarily high across the board," says Gilbert P. Williamson Jr., NCR's executive vice-president with primary responsibility for U.S. and international marketing.

Although NCR is committed to its value-added reseller partners, it seriously frowns upon a major corporate marriage on the scale of that of Burroughs Corp. and Sperry Corp. or IBM and Rolm Corp.

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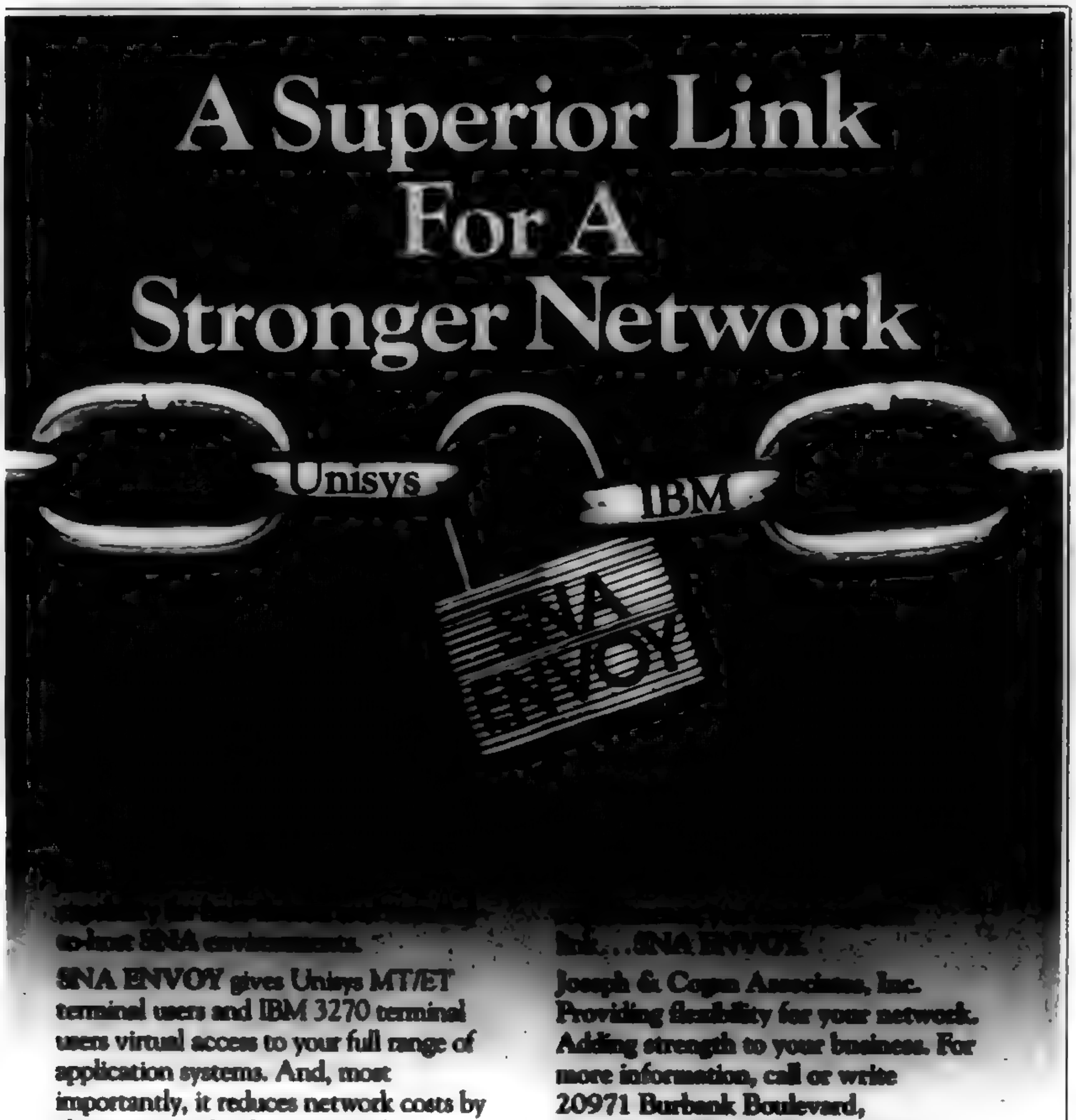
NCR's headquarters *in Dayton, Ohio.*

Despite NCR's brief flirtation with Sperry last year (on which Exley declines to comment) when the latter searched for a "white knight" to fend off the Burroughs bid, Exley, a 22-year Burroughs veteran, is adamant on the subject of acquisitions.

"In my personal experience, they have been a waste of time and money," he says. "Our responsibility is creating value, and that says to me that we should build the business from within. Going out and buying companies is not the way to create wealth."

NCR is confident that its revamped product line, based on relatively open architectures and exciting new technologies, will translate into market success. As the company reaches the $5 billion revenue milestone this year, it still believes — in a reduced-demand era of niche marketing and vertical solutions — that superior products alone can make the firm a winner.

"In our industry, as a general statement, the thing that makes for a growing martketplace are exciting and innovative products," Exley says. "We can make our own boom if we do everything right."



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NCR's move

CONTINUED FROM PAGE 85

tal and capable of automatic mirroring.

Exley says he expects the 9800 to continue growing with power boosts every 18 months to two years until it eventually outpowers the 8000 family.

"We can have an exciting mainframe business, although I don't think the overall mainframe business is growing very fast," Exley says. He adds he does not see 9800s replacing IBM mainframes. "There is a tremendous inertia in replacing a host. I don't see a lot of cases where we are replacing IBM hosts or IBM systems are replacing our hosts," he says.

While NCR is promoting its VRX/E-based 9800s, the company has been enhancing a second large-systems line with its 9300, 9400 and 9500 processors running the firm's ITX operating system.

NCR officials differentiate the ITX and VRX/E families by noting that the VRX/E models tend to be sold into mainframe-oriented sites with high levels of MIS resources and support. They say the ITX models are easier to use and are aimed at companies with more limited DP staffs and hard-wired terminals.

NCR also draws about 11% of its revenue from general-purpose workstations, including terminals and an IBM-compatible personal computer line, which the company markets to its installed base and through retail outlets.

Another 9% of NCR's sales involves its Comten communications processors, which in large part are targeted as front-end processors in IBM data centers.

EMPLOYMENT TODAY

Professional groups, agencies help employees bounce back from layoffs

BY NANCY BLUMENSTALK MINGUS
SPECIAL TO CW

Economic upheavals in the last few years have caused financial institutions on the West Coast to merge, oil companies in the Southwest to close and industrial plants in the Northeast to shut down. As a result, more than two million employees nationwide have lost their jobs in the last five years. As market slumps and company mergers continue this year, more people will find themselves unexpectedly out of work.

Although the majority of these layoffs affect blue-collar workers, MIS professionals are not exempt. For example, one data processing manager had been at Crocker National Bank in Los Angeles for 25 years, yet he was laid off in the takeover by Wells Fargo Bank, NA in San Francisco. In another instance, nearly 20 DP professionals lost their jobs when Westinghouse Electric Corp. closed its Buffalo, N.Y., MIS shop.

Whether one is an MIS manager or a blue-collar worker, there are two important effects of a layoff. The obvious one is financial — people become concerned about making ends meet. However, the greater, less obvious impact is on a person's psyche. Newly unemployed people tend to forget that work is only one aspect of their lives, says Jackie Schwartz, a Los Angeles psychotherapist and management consultant.

Layoffs are particularly hard to deal with when poorly handled by management. Says one MIS administrator awaiting a July layoff, "I feel betrayed. The way it was done created hard feelings. The paper announced it before anyone told us."

The family's reaction also affects how a person handles a layoff. "It's a basic blow to self-esteem," Schwartz says. People need the immediate support base provided by the family. "Men, in particular, have problems with layoffs. They need support but don't know how to ask for it."

While many placement advisors believe job hunting should be conducted eight hours a day, starting with the first jobless day, this goal is unrealistic. A person needs time to adjust to a layoff.

During this adjustment time, Schwartz says, "family life, community and religious contributions give a sense of accomplishment, importance to a person." Balancing these activities while averaging 20 hours per week specifically on the job search is the most effective way to cope with a layoff, she suggests.

Preparatory steps

Although getting a new job is of prime importance, the unemployed should take a few preparatory steps before hitting the pavement.

"Start with a program to market yourself," advises Bob Palumbo of The Recruitment Group in Buffalo. "Find out who the potential hirers are, then develop an excellent resume and mail it to them. Contact the person who will make the hiring decision, not just personnel who may prematurely screen out applicants."

Some recruiting companies will help with a marketing campaign. In most large cities, Robert Half EDP Personnel Specialists, Inc., Romac & Associates Personnel Consultants and Source EDP Personnel Services, Inc. operate branch offices. These are just three examples of recruiters dedicated almost exclusively to MIS personnel. Keep in mind, however, that client companies pay these agencies. They will concentrate on placing the highest quality candidates. If your skills are more general or there is something lacking in your background, you may have to push harder to get interviews.

> "DON'T assume the interviewers are great at their jobs. Provide them with all relevant information, asked for or not. This will ensure a fair representation of skills."
>
> BOB PALUMBO
> THE RECRUITMENT GROUP

Another good way to locate potential employment is by joining professional organizations. Steve Adamson, president-elect of the Orange County, Calif., chapter of the Association for Systems Management (ASM), says, "Various chapters of ASM, the Data Processing Management Association and the Association for Computing Machinery do different things. Some publish positions, some have employment functions; but that is not as important as knowing 30 to 40 or 100 to 200 people."

Another national organization in most cities is Forty Plus. A group designed for the unemployed who are aged 40 or more, Forty Plus provides support, counseling and referral services to its members.

Instead of leaving employees on the street, a few companies help in the job search. One such firm is Westinghouse. "We set up a self-directed placement center," says John Perry of Westinghouse's Buffalo Medium AC Motor Division. "After the last layoffs, we gave a one-day seminar on resume writing and interview skills. We provide employees with phones at no cost, and we subscribe to 22 newspapers." The center also provides on-line access to the Buffalo Private Industry Council system, which matches transferable skills to a dictionary of occupational titles.

Other places to turn after a layoff include state government services. California offers the Employment Development Department, and New York operates the state Job Service, for example. However, these offices are not placement agencies and tend not to list DP jobs.

'Polish your skills'

Regardless of the avenue you use to find contacts, remember that the best written resume in the world will only land an interview, not the job. Preparing for that interview is essential. Palumbo explains, "Polish your interview skills. Have someone coach you on what to say and when. Don't assume the interviewers are great at their jobs. Provide them with all relevant information, asked for or not. This will ensure a fair representation of skills."

Not everyone will find another position in MIS. Some people look at a layoff as an opportunity to go back to school or change careers. As more jobs require some computer knowledge, many DP professionals find exciting careers in non-MIS fields. An MIS professional willing to take short-term salary cuts may find other careers more challenging and secure in the long run.

Other professionals decide to start their own companies. Local small-business associations provide advice on securing capital and preparing a business plan.

Whatever approach is taken, people are generally unemployed for three to five months. They strike out a lot. But a positive attitude and a large dose of persistence will eventually pay off.

Blumenstalk Mingus is a free-lance writer based in Buffalo, N.Y.

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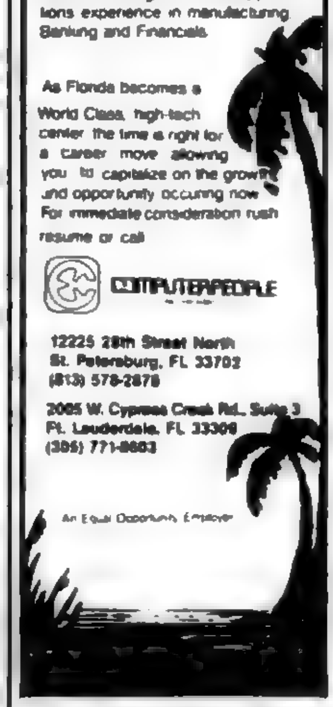

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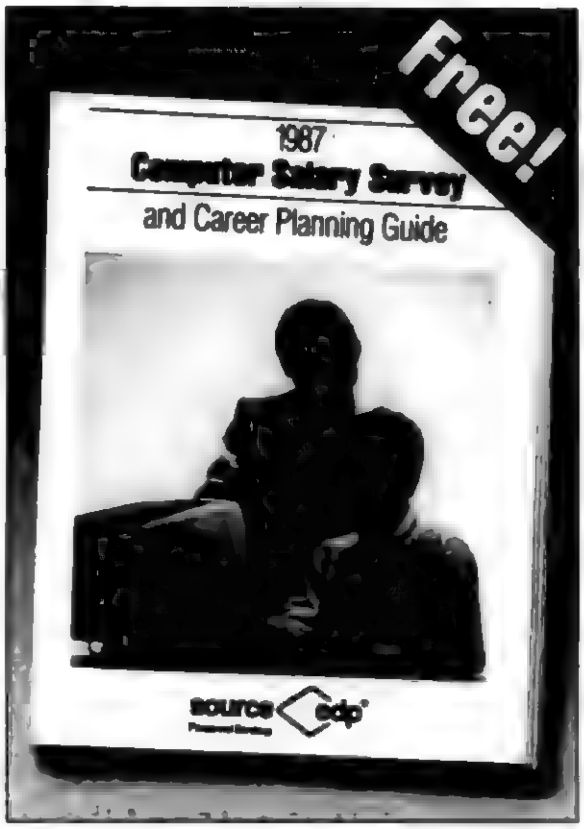

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NEW ENGLAND

BOSTON

TELECOMM. PROD. ANALYST

Prominent NE hw/sw vendor seeks well-founded telecomm. specialist w/diverse TC net design, perf. & planning skills for mkt. support & competitive analysis role. Knowl. of industry trends, various vendor offerings & prior liaison w/eng. & product devel. desired. Exceptional vis. in rapidly expanding product area of estab. technologies vendor. Salary to $70,000.

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Leading BOSTON fin'l. svcs. firm seeks sr. tech. cons. to advise firm on state-of-the-art hw/sw strategy. Must have in-depth knowl. of IBM 3090 series & opn. sys. software. Oppty. to play key tech. role in growing co. in a V.P. slot. Salary $60,000.

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DATA PROCESSING PROFESSIONALS

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APPLICATIONS— PROGRAMMERS AND PROGRAMMER ANALYSTS

Requires 3-6 years experience in analysis or programming. COBOL necessary, with experience in CICS, IMS/DB, IBM's Data Dictionary, TSO/SPF, PANVALET, VSAM, IBM-Assembler, and structured design preferred. Identify needs, recommend software/hardware solutions, design programs and systems, assist in overseeing all phases of system development and implementation.

INFORMATION CENTER ANALYST

Requires at least 4 years experience in analysis and programming. Experience preferred in MVS/XA, CICS, DB2/SQL, TSO/ISPF, PANVALET, VSAM, IBM PC's, LOTUS, SYMPHONY

We seek an experienced programmer analyst who enjoys working with end-users and Data Processing personnel to research, select and install new self-help computing tools. Future projects include selection of a mainframe spreadsheet, use of DB2 for end-users, project planning and management, and implementation of office information systems. This position will also involve the training and technical guidance of other analysts.

CICS SYSTEMS PROGRAMMER

Requires 4 years experience in CICS system programming environment, BAL and COBOL, both Macro and Command programming. CICS internals, CICS exits, Debugging and performance tuning. Knowledge in DMS, ACF/VTAM, IMS/DB or TSO/SPF desired.

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Our state-of-the-art environment features two large mainframes (3081 and 3090) with MVS/XA, JES2, CICS, ACF/VTAM, TSO/SPF, PANVALET, IMS/DB, DB2 and SAS, as well as multiple mini and micro computers.

We are located 2 hours from St. Louis and 3 hours from Chicago in Central Illinois. Recreational facilities include parks, lakes, golf courses, health clubs, as well as cultural and educational opportunities. We offer excellent salaries and comprehensive fringe benefits.

For consideration, forward resume, including education, experience, personal and salary history, in confidence, to: Ms. S. R. Chilton.

ILLINOIS POWER COMPANY
500 South 27th Street
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An Equal Opportunity Employer M/F

M-K... MANAGING PROGRESS

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Qualifications: Applicant must perform under general supervision and be competent in Systems Programming with ability to work on own. Applicant must possess:

- BS degree in Computer Science, Mathematics, or other related field.
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For immediate consideration, rush resume to:

Iris Dobler
Morrison-Knudsen
Company, Inc.
COM-069
P.O. Box 7808
Boise, ID 83729

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Fairfield, CT 06430

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PROGRAMMERS/ANALYSTS

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SENIOR DATA BASE SPECIALIST

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Would you be interested in exploring the opportunity? If so, please send resume and salary history to

Anne Stanard
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5800 Foremost Dr., S.E.
P.O. Box 2450
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Copy: We'll typeset your ad at no extra charge. Please attach clean typewritten copy. Figure about 25 words to a column inch, not including headlines. Any special artwork should be enclosed with your ad also. Logos must be submitted on white bond paper for best reproduction.

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Cornell University
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Please send your resume to: **Chris Larkin, Department 0330 7804, Digital Equipment Corporation, 333 South Street, Shrewsbury, MA 01545.**

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Financial data center located in downtown Orlando, Florida, is seeking a Sales Representative with financial data processing sales experience. Successful candidate will meet the following criteria: individual large dollar volume sales, knowledge of financial data processing products and services, i.e. deposit, loans, finance, CIF and electronic delivery systems.

We require a minimum of 4 years experience. A degree in marketing, sales or a related field a plus.

We offer a competitive salary plus commission, and excellent company paid benefits including 401(K) savings plan. For confidential consideration send resume and salary history to:

FLORIDA

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Attn: Anita Simpson
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Orlando, Florida 32802

INFORMANAGEMENT SERVICES, INC.

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SENIOR SYSTEMS ANALYST

Penn State

A Senior Systems Analyst position is currently available which provides a dynamic, creative opportunity, away from the big city, for qualified individuals to be involved in state-of-the-art software design and development. Become a member of a modest-sized research and development organization. Design and develop information systems on single and multi-processor, large scale computers and personal computers in distributed and non-distributed environments with MS-DOS, UNIX and CP6. Be involved in research, development and testing of information systems, research technical alternatives. Penn State, located in the Centre Region of Central Pennsylvania, offers the best of all worlds with a challenging work environment, cultural and sporting events, rural location, a large university setting and excellent benefits.

Requires a Bachelor's degree, or equivalent, in computer science, math or engineering, plus 4 to 6 years of effective experience, preferably in information systems and database applications. At least two years experience as a systems analyst required.

Send letter of application, resume, names of three references, and salary requirements to:

Employment Division
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CTG

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You will provide technical leadership in the evaluation and installation of software/hardware products, as well as oversee and coordinate the activities of systems programmers. Involvement in such administrative responsibilities as making technical presentations, establishing strategic direction, and coordinating hardware/software changes will prepare you for your next challenge and enhance your well-developed technical skills. Requires a minimum of 5-7 years in a large scale IBM mainframe environment with technical depth in operating and/or on-line systems.

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Salary: $64,700 to $73,400 per year

For application information, write to Jo Ann Berry, 375 ABG/DPCS, Scott AFB, Illinois 62225-5985, or call (618) 256-2550

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Business Analyst to develop business software for microcomputers. Includes creation, implementation and support of customized accounting systems integrating engineering projects management. Minimum reqs 4 years BSc BAd with 1 semester each Basic & Microcomputers, 6 mos experience in software development. $2200/month plus benefits, 8-5, 40 hrs/wk. Send resume and SS# to Indiana State Employment Service, 10 N. Senate Ave., Indianapolis, Indiana 46204, Attn: WF Shepherd, ID # 3095849.

ACP/TPF
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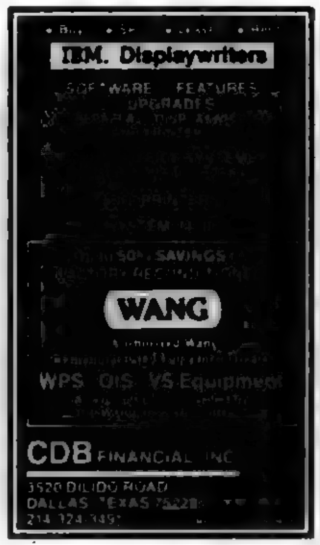

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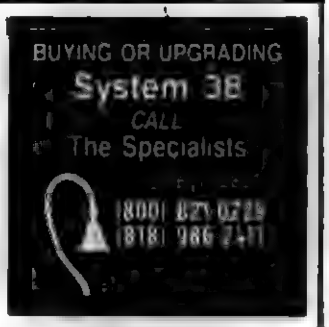

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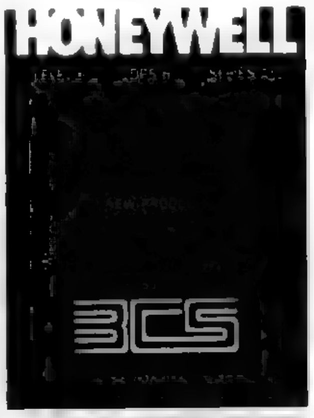

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London: Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, [illegible], United Kingdom. Phone: (011) 44 1 831 9252 Telex: (851) 262346.

United Kingdom: Euan Ross, Beere Hobson & Associates, 34 Warwick Road, Kenilworth, Warwickshire, CV8 1HE, United Kingdom. Phone: (011) 09 26 512424. Telex: (851) 311951 (BEEHOB). (Representative for all CWCI publications).

Venezuela: Kalman von Vajna Nagy, CW Comunicaciones, C.R.L. Torre Maracaibo, Piso 13, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 58 2 72 76 30.

West Germany: Eckhard Utpadel, CW Publikationen Verlagsgesellschaft mbH, Rheinstrasse 26/28, Postfach 40 0429, 8000 Munchen 40, West Germany. Phone: (011) 49 89 380880. Telex: (841) 5215350. (COMW D).

CW COMMUNICATIONS/INC.

Patrick J. McGovern
Board Chairman

Axel Leblois
Chief Executive Officer
CWCI, Inc.

Lee Vidmer
President
CWCI/Framingham

Senior VP-Communication Services, Jack Edmonston.
VP-Sales, Edward P. Marecki. VP-Finance, William P. Murphy.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: (617) 879-0700, Telex: 95-1153, FAX: (617) 875-8931

SALES Vice President/Display Sales, Edward P. Marecki. National Recruitment Sales Director, John Corrigan. Display Advertising Manager, Carolyn Novack. Classified Operations Manager, Cynthia Delany.
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ADVERTISERS INDEX

Anderson	PS 6
Applied Software	19
Artificial Intelligence	54
Astco	19
Bell Atlantic	62
BI Moyle	80
Brookvale Associates Inc.	28
Business Recovery Systems	28
CGI Systems	103
Chicago Soft	80
Cincom	26
Codex	PS Cover 2
Computer Congenerics	52
Computer Associates	39
Computer Corp of America	5
CPT	38
CTS	PS 7
Cullinet	16-17
CW Circulation	98
CW Corporate	78-79
CW Dial Inq	PS 4
CW May Focus	84
CW Spotlight	60
Data General	PS 8
Data Group	PS 3
Data 21	10
Datagram	58
Dataware	72
D&B Computing	76-77
DCA Network	48-49
Digital Equipment Corp.	22-23
Duquesne Systems	15,45,50
Execucom	71
Federal Communications	8
Fibronics	PS 5
Flaggstaff Engineering	56
Fujitsu	37
Gateway Microsystems	PS 16
General Datacomm	PS16
Hewlett-Packard	55,66-67
Infodata	40-41
Information Dimensions	32-33
Informix	30
Integral Systems	31
Interface	85
Interlink	12-13
Joseph & Cogan	[illegible]
Leasametric	46
Microcom	PS Cover 4
MicroFrame	18
MicroSoft	64-65
Mike Murach	9
Mitrol	25
MSA	104
Multi-Soft	14
Multi-Tech	47,PS 10
National Advanced Systems	61
Nixdorf	44
Northern Telecom	82-83
Nynex	43
Oracle	11
PCI Ads	36
Prime	28
Quality Micro Systems	56-57
Questronics	51
Racal Vadic	PS Cover 3
Rapid Systems Development	73
Realia	68
Retrieval Technology	52
SAS Institute	34,53
Software Technology	10
Soft Pursuits	18,19
Softool	80
Software AG	24
Software Technology & Research (STAR)	30
Syncsort	3
Systems Solutions	51
Technology Transfer	69
Televideo	42
Teltone	63
Trak Software	PS 6
Tymnet	74
Unisys	29
Universal Data Systems	PS 9
US Robotics	27
VM Software	7
Xerox	72-73

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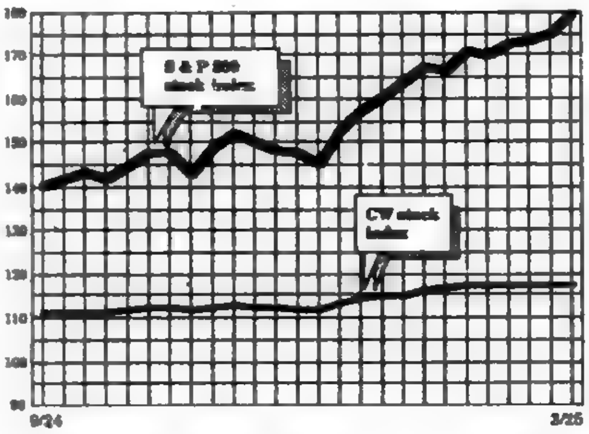
UPCOMING COMPUTERWORLD SPOTLIGHT SECTIONS

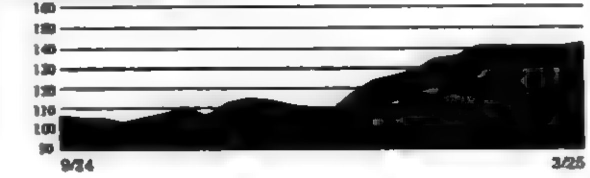
Issue Date	Topic	Ad Closing Date
April 27	T1 Equipment/Multiplexers	April 10
May 11	DEC-Compatible Software	April 24
May 25	PCs — IBM & Compatibles	May 8
June 8	LANs	May 22
June 22	Printers — Line & Character	June 5
June 29	Accounting Software	June 12
July 6	Manufacturing Technology	June 19

STOCK TRADING INDEX

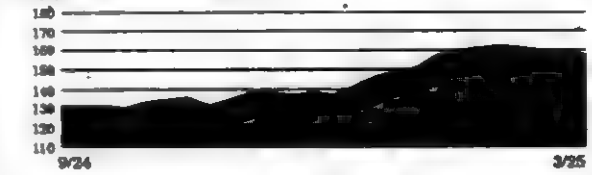


Indexes	*Last Week*	*This Week*
Computer Systems	142.5	**144.1**
Supplies & Accessories	159.0	**157.4**
Software & DP Services	133.5	**131.9**
Semiconductors	111.2	**112.7**
Peripherals & Subsystems	133.8	**135.6**
Leasing Companies	117.4	**116.8**
Composite Index	117.3	**117.3**
S&P 500 Index	175.1	**179.6**

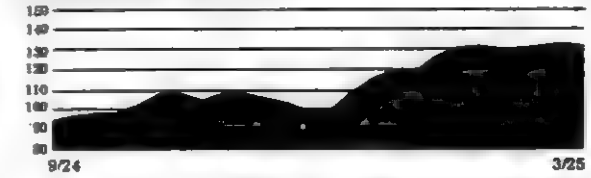
Computer Systems



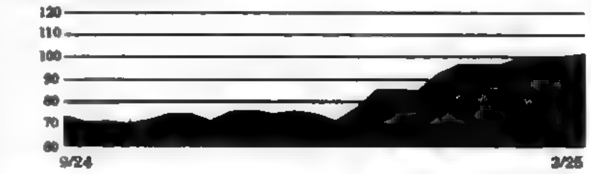
Supplies and Accessories



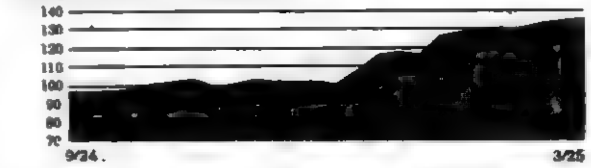
Software and DP Services



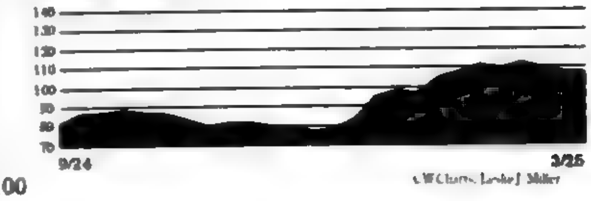
Semiconductors



Peripherals and Subsystems



Leasing Companies



CW Charts: Leslie J. Miller

Stock trading summary

CLOSING PRICES WEDNESDAY, MARCH 25, 1987

Computer Systems

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4.44	-0.2	-4.0
O	ALTOS COMPUTER SYS	19	10	14.63	-0.5	-3.3
A	AMDAHL CORP	41	14	38.25	+0.5	+1.3
O	APOLLO COMPUTER INC	23	9	19.25	+1.1	+6.2
O	APPLE COMPUTER INC	71	26	66.75	+0.8	+1.1
N	AT&T	28	22	24.88	+1.5	+6.4
O	C P T CORP	6	3	4.38	-0.1	-2.8
N	COMPAQ COMPUTER CORP	35	12	27.88	-0.4	-1.3
A	COMPUTER CONSOLES INC	12	7	8.50	-0.3	-2.9
O	CONCURRENT COMP CORP	19	11	15.75	+0.0	+0.0
N	CONTROL DATA CORP	31	20	30.75	+1.0	+3.4
O	CONVERGENT TECH	12	4	10.50	+0.5	+5.0
N	CRAY RESH INC	133	66	126.00	+3.4	+2.8
O	DAISY SYS CORP	15	8	10.00	-0.4	-3.6
N	DATA GEN CORP	45	25	31.88	-3.4	9.6
N	DATAPOINT CORP	9	4	5.50	+0.0	+0.0
N	DIGITAL EQUIP CORP	173	76	165.50	+0.3	+0.2
N	FLOATING POINT SYS INC	46	11	13.75	-0.4	2.7
N	GOULD INC	28	15	18.13	+0.5	+2.8
N	HARRIS CORP	40	27	37.88	+0.9	+2.4
N	HEWLETT PACKARD CO	63	36	58.63	+0.3	+0.4
N	HONEYWELL INC	84	58	74.00	+2.9	+4.0
N	IBM	162	116	155.63	+9.4	+6.4
O	IPL SYS INC	4	2	3.13	-0.1	-3.8
N	ITT CORP	66	43	63.38	-0.1	-0.2
N	M A COM INC	19	12	14.13	-0.1	-0.9
N	MATSUSHITA ELEC INDL LTD	138	74	109.75	-10.0	-8.4
O	MENTOR GRAPHICS CORP	29	11	27.00	+0.0	+0.0
N	NBI INC	14	8	10.38	-0.1	-1.2
N	NCR CORP	70	40	68.13	+5.3	+8.3
N	PRIME COMPUTER INC	24	16	21.63	+0.5	+2.4
O	STRATUS COMPUTER	37	18	34.00	+0.0	+0.0
O	SYMBOLICS INC	15	4	5.38	+1.1	+26.5
O	TANDEM COMPUTERS INC	75	22	72.88	+2.4	+3.4
N	TANDY CORP	56	31	50.50	-0.1	-0.2
N	TEXAS INSTRS INC	189	103	187.75	+18.0	+10.6
A	ULTIMATE CORP	35	13	23.50	-0.9	3.6
N	UNISYS CORP	113	58	103.00	-2.1	-2.0
A	WANG LABS INC B	20	11	16.13	+0.3	+1.8
A	WANG LABS INC C	20	11	15.50	-0.6	-3.9
N	XEROX CORP	77	49	76.38	+3.3	+4.4

Supplies & Accessories

EXCH		52 WEEK RANGE (1)		PRICE CLOSE MARCH 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	29.25	+0.5	+1.7
N	BARRY WRIGHT CORP	24	14	17.38	+0.1	+0.7
A	DUPLEX PRODS INC	23	18	21.25	-0.8	3.4
N	ENNIS BUSINESS FORMS INC	23	14	22.25	9.8	30.5
N	3M CO	140	97	131.75	+6.0	+4.8
N	MOORE LTD	28	20	26.13	+2.1	+8.9
O	STANDARD REGISTER CO	53	32	47.50	+0.5	+1.1
N	WALLACE COMPUTER SVCS	50	37	48.75	+3.9	+8.6

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	3.75	-0.3	-6.3
N	ADVANCED SYS INC	22	12	21.13	+0.1	+0.6
N	AGS COMPUTERS INC	40	17	37.00	-0.3	-0.7
O	AMERICAN MGMT SYS INC	33	13	31.00	+0.3	+0.8
O	AMERICAN SOFTWARE INC	30	10	29.13	+3.1	+12.0
N	ANACOMP INC	8	3	8.00	+0.6	+8.5
O	ANALYSTS INTL CORP	11	4	10.00	-0.3	-2.4
O	ASHTON TATE	30	10	23.63	-0.6	2.6
O	ASK COMPUTER SYS INC	17	9	14.75	-0.9	-5.6
O	ASTRADYNE COMP IND	3	1	1.72	+0.0	1.8
N	AUTOMATIC DATA PROC	50	29	49.00	+3.3	+7.1
O	BOOLE & BABBAGE INC	11	4	9.00	-0.5	-5.3
N	COMPUTER ASSOC INTL INC	47	17	45.13	+5.4	+13.5
O	COMPUTER HORIZONS CORP	15	10	13.50	-0.3	1.8
O	COMPUTER NETWORK TECH	10	4	4.69	-0.4	-7.4
N	COMPUTER SCIENCES CORP	61	30	59.00	+6.5	+12.4
N	COMPUTER TASK GROUP INC	19	11	14.25	-0.1	-0.9
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	18	10	16.00	1.8	-9.9
N	CULLINET SOFTWARE INC	18	6	10.00	-0.1	1.2
O	CYCARE SYS INC	17	7	9.13	+0.3	+2.8
O	DUQUESNE SYS INC	30	12	28.75	+2.5	+9.5
N	GENERAL ELEC CO	111	71	110.13	+3.1	+2.9
N	GENERAL MTRS CORP (CLASS E)	50	24	35.50	2.4	-6.3
O	HOGAN SYS INC	17	7	15.75	-0.6	3.8
O	INFORMATION SCIENCES INC	4	1	1.13	-0.4	25.0
O	INFOTRON SYS CORP	17	7	8.50	-0.8	-8.1
O	KEANE INC	16	5	8.13	+0.1	+1.6
N	LOGICON INC	38	22	29.25	+1.0	+3.5
O	LOTUS DEV CORP	25	8	21.00	-0.5	2.3
O	MANAGEMENT SCI AMER	21	11	18.25	-0.4	-2.0
O	MCI COMM CORP	12	5	6.50	-0.3	-3.7
O	MICOM SYS INC	18	10	16.13	+0.3	+1.6
O	MICRO PRO INTL CORP	6	2	5.19	-0.1	-2.4
N	MICROSOFT CORP	92	26	89.88	+0.4	+0.4
O	NATIONAL DATA CORP	27	16	25.75	+0.1	+0.5
O	ON LINE SOFTWARE INT	24	10	22.75	+0.3	+1.1
O	ORACLE SYS CORP	22	7	20.50	19.8	-49.1
N	PANSOPHIC SYS INC	42	25	37.00	+2.8	+8.0
O	POLICY MGMT SYS CORP	30	15	26.75	+0.3	+0.9
O	PROGRAMMING & SYS INC	13	8	11.00	-0.5	-4.3
O	REYNOLDS & REYNOLDS CO	42	27	39.00	+0.3	+0.6
O	SCIENTIFIC COMPUTERS INC	8	4	7.50	-0.4	4.8
O	SEI CORP	26	15	25.50	+0.3	+1.0
O	SHARED MED SYS CORP	53	30	35.50	-0.4	-1.0
O	SOFTWARE AG SYSTEMS INC	22	10	11.00	-0.9	7.4
O	SOFTWARE PUBG CORP	16	5	14.00	-0.1	-0.9
A	STERLING SOFTWARE INC	21	10	12.75	+0.3	+2.0
N	SUNGUARD DATA SYSTEMS	20	10	18.00	-0.3	1.4
N	UCCEL CORP	38	18	33.88	+1.4	+4.2
N	URS CORP	22	14	20.38	-0.1	-0.6
O	VM SOFTWARE INC	44	12	42.75	+3.8	+9.6

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	32	13	19.75	1.1	-5.4
N	ANALOG DEVICES INC	25	14	20.25	+0.6	+3.2
O	ANALOGIC CORP	14	10	11.88	+0.0	+0.0
N	APPLIED MAGNETICS CORP	31	13	30.25	+1.9	+6.6
O	AVANTEK INC	23	14	16.88	-0.3	-1.5
O	HADCO CORP	7	3	6.13	+0.6	+11.4
O	INTEL CORP	41	16	38.25	+0.0	+0.0
O	MICRO MASK INC	7	2	5.75	-0.1	-2.1
N	MOTOROLA INC	58	34	55.25	+0.9	+1.6
N	NATIONAL SEMICONDUCTOR	17	8	15.88	-0.3	-1.8
N	TERADYNE INC	30	16	24.75	+0.8	+3.1

EXCH N = NEW YORK, A = AMERICAN, P = PACIFIC, B = BOSTON;
L = NATIONAL, M = MIDWEST, O = OVER THE COUNTER, S = SPLIT

O T C PRICES ARE BID PRICES AS OF 3 P M OR LAST BID
(1) TO NEAREST DOLLAR

Peripherals & Subsystems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	8.88	+0.3	+2.9
A	ANDERSON JACOBSON INC	4	1	2.63	-0.4	-12.5
O	AST RESH INC	23	11	17.50	-2.3	-11.4
O	AUTOTROL CORP	10	5	7.75	-0.6	-7.5
O	AVANT GARDE COMPUTING	7	3	3.88	-0.3	-6.1
O	BANCTEC INC	13	6	11.75	+0.4	+3.3
N	BOLT BERANEK & NEWMAN	60	37	56.13	+1.3	+2.3
A	CETEC CORP	9	5	5.63	+0.3	+4.7
A	COGNITRONICS CORP	6	2	4.00	+0.0	+0.0
N	COMPUGRAPHIC CORP	26	16	21.63	-0.4	1.7
N	COMPUTERVISION CORP	23	10	18.38	1.8	8.7
N	CONRAC CORP	29	12	28.75	+6.8	+30.7
A	DATAPRODUCTS CORP	18	11	13.88	+0.5	+3.7
A	DATARAM CORP	18	7	8.25	-0.4	4.3
O	DATA SWITCH CORP	9	5	6.38	+0.1	+2.0
O	DATUM INC	7	4	6.13	+0.4	+6.5
N	DECISION INDS CORP	15	8	9.00	-0.9	8.9
O	ENDATA INC	9	5	8.75	+0.1	+1.4
O	EMC CORP	34	11	25.38	-0.1	-0.5
O	EVANS & SUTHERLAND	40	20	36.75	1.8	4.5
N	FLOATING POINT SYS INC	46	11	13.75	-0.4	2.7
O	GANDALF TECHNOLOGIES	11	5	10.63	+2.0	+23.2
N	GENERAL DATACOMM IND	15	8	13.50	+1.4	+11.3
N	HAZELTINE CORP	30	16	29.75	+0.0	+0.0
O	ICOT CORP	13	8	12.38	+0.1	+1.0
O	INFORMATION INTL INC	18	13	14.25	1.5	9.5
O	INTECOM INC	7	3	3.00	+0.0	+0.0
O	INTERLEAF INC	15	8	13.63	-0.5	-3.5
O	MEGADATA CORP	7	2	5.38	-0.4	-6.5
A	MSI DATA CORP	17	10	15.75	-0.4	-2.3
N	NASHUA CORP	30	20	29.75	+1.9	+6.7
O	NETWORK SYS CORP	19	11	16.75	+0.9	+5.5
N	NORTH AMERN PHILIPS CORP	48	35	40.75	+0.8	+1.9
N	NORTHERN TELECOM LTD	45	27	43.38	-0.6	-1.4
O	NOVELL INC	45	15	41.25	+1.5	+3.8
N	PARADYNE CORP	11	4	6.50	-0.5	7.1
A	PENRIL CORP	8	4	5.25	+0.1	+2.4
N	PLESSEY PLC	41	24	40.75	+2.1	+5.5
O	PRINTRONIX INC	15	10	11.50	+0.4	+3.4
N	QMS INC	18	11	16.00	-0.3	-1.5
O	RAMTEK CORP	7	3	4.75	+0.0	+0.0
N	RECOGNITION EQUIP INC	27	10	21.00	-0.8	-3.4
O	SCAN TRON CORP	19	11	13.38	+0.6	+4.9
N	SCIENTIFIC ATLANTA INC	18	9	16.75	+0.0	+0.0
O	SEAGATE TECHNOLOGY	42	9	36.13	+1.4	+4.0
N	STORAGE TECHNOLOGY	5	2	4.25	+0.0	+0.0
O	SUN MICROSYSTEM INC	33	11	32.00	+1.5	+4.9
A	T BAR INC	8	5	7.88	+0.0	+0.0
A	TAB PRODS CO	20	12	18.88	+0.8	+4.1
O	TANDON CORP	6	2	5.88	+1.9	+46.9
A	TEC INC	7	3	2.88	-0.4	11.5
N	TEKTRONIX INC	43	27	39.75	+1.5	+3.9
O	TELEVIDEO SYS INC	4	2	3.00	+0.3	+9.1
N	TELEX CORP	102	52	92.75	+5.9	+6.8
N	TIMEPLEX INC	41	14	37.25	-2.5	-6.3
N	TITAN CORP	12	6	7.38	+0.0	+0.0
O	VISUAL TECHNOLOGY INC	1	0	0.44	+0.0	+0.0
O	WYSE TECH	30	13	23.88	-1.3	-5.0

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE MARCH 25 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	29	15	27.88	+1.3	+4.7
N	CONTINENTAL INFO SYS	14	7	13.63	+0.4	+2.8
O	FINALCO GROUP INC	5	2	2.88	+0.0	+0.0
O	PHOENIX AMERN INC	8	3	5.63	-0.1	-2.2
O	SELECTERM INC	12	5	4.75	-0.5	-9.5
N	U.S. LEASING	52	38	51.00	+0.5	+1.0

Boom pervades

Overall high buoys industry; IBM takes lead; TI bounces back

Stocks in virtually all computer industry sectors are sharing in the current market boom, which saw the Dow Jones industrial average rise to record highs in three of the first four trading sessions last week.

IBM, to no one's surprise, is leading the charge. Although Big Blue tailed off a bit on Thursday, the stock still racked up a 5⅜-point gain in four days to close at 154. The stock is reportedly back in fashion among large institutional investors, who hold approximately half of IBM's shares.

Texas Instruments, Inc., bouncing back nicely from its steep losses, is also riding the market crest. TI reached a 52-week high of 187¾ in Wednesday's session before falling 1⅞ points Thursday. Other New York Stock Exchange technology issues reaching new highs during the week were Comdisco, Inc., NCR Corp., Control Data Corp., Perkin-Elmer Corp., Xerox Corp., Anacomp, Inc., Automatic Data Processing, Inc. and Computer Sciences Corp.

Two computer stocks may have reached their peak, however. Unisys Corp. fell five points last week to 102½, and Digital Equipment Corp. dropped four points to 162½.

CLINTON WILDER

IBM readies

FROM PAGE 1

take best advantage of the new computer family's capabilities, according to several developers that have received invitations.

IBM will unwrap at least four aggressively priced systems, which some sources refer to as the Personal System 2 series. Specifics of the new machines were circulated last week by Winston & Winston, Inc., a Fort Worth, Texas-based public relations firm, and confirmed by other sources.

The series includes three 10 MHz Intel Corp. 80286-based machines, which have proprietary buses to increase speed and performance, and a 7.54 MHz 8086-based system designed to slow the momentum of low-end clone makers.

IBM has an 80386-based machine ready to debut, but the system may not be part of this week's announcements. The company may delay the system's introduction if it cannot effectively price and position it in relation to the 80286-based systems, one source said. Other sources remain split on whether the much-rumored 80386 system will appear.

Token-Ring enhancements

The company will also significantly enhance its Token-Ring network and PC Network systems to run up to four times faster than they do today. The products will include high-speed adapters, a Starlan version of the PC Network and an enhanced version of IBM's network operating system, according to published reports.

A 16M bit/sec. Token-Ring could be used as a backbone to connect multiple 4M bit/sec. rings with minimal problem to the customer, a source said.

The 80286-based systems, called the Models 50 and 60, respectively, will have 3½-in. floppy disk drives supporting 1.4M bytes.

All three systems will have serial and parallel ports and graphics adapters built onto the motherboard, sources said.

The Model 50 has 20M-byte hard disks and supports 640- by 480-pixel color graphics. The system's footprint is smaller than an existing PC AT, sources said.

The Model 60 is a floor-mount version of the 80286 systems that will be used as a file server. It will have choices of a 40M-byte or 77M-byte hard disk.

The Model 30 is the company's 8086-based system that is clearly aimed at clone makers. Despite its 8-bit processor, sources say the Model 30 is as fast as a PC AT in terms of throughput, thanks to accelerated graphics and disk controller.

The Model 30 is expected to be the only one of the new machines to incorporate an industry standard bus, allowing it to accept existing expansion cards.

Like the 80286-based systems, the Model 30 has serial and parallel ports on the motherboard and supports 640 by 320 pixels in color and 640 by 480 pixels in monochrome in a very small package.

Protected mode possible?

Several sources said they expect IBM to announce a protected-mode operating system this week but do not expect it to be delivered until much later this year.

Most expect the system to contain some proprietary extensions such as the user interface, which some expect to be an incompatible variation of Microsoft Corp.'s Windows.

Sources said they also expect IBM to unveil a relational data base management system featuring the Structured Query Language, a series of high-resolution monitors, a laser printer, various desktop publishing products, a compact disk/read-only memory drive, an expanded-memory adapter card and an endorsement of Aldus, Inc.'s Pagemaker.

Diskless 3Com unit unveiled

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. is expected to introduce 3Station today, the first in a line of diskless workstations featuring built-in network adapters and advanced graphics.

3Station is an IBM-compatible Ethernet "netstation." It is based on Intel Corp.'s 80286 processor and uses five custom ASIC chips and a read-only memory-resident menu-driven setup. A token-ring version is slated for delivery sometime during first-quarter 1988.

3Com is adapting more than 20,000 personal computers a month for use in networked work groups, said Chairman Robert Metcalfe, who also headed the 3Station product development team. "It's clear the time has come for us to provide our customers with workstations designed especially for networks," he said.

Priced at $1,895, the 3Station integrates the 80286 chip, Phoenix Technologies Ltd.'s BIOS version and four graphics adapters — a monochrome adapter, a Hercules Computer Technology, Inc. compatible and IBM Color Graphics Adapter and Enhanced Graphics Adapter compatibles. The workstation also includes 1M byte of main memory upgradable to 4M bytes, Lotus/Intel/Microsoft Expanded Memory Specification support and Ethernet. There are no expansion slots, no fan, no jumpers and no switches.

Memory rises

3Com stressed that the unit offers 25% to 30% more memory — 570K bytes of working memory is available for DOS and applications — than adapted personal computers, resulting in higher performance.

3Station's CPU has direct access to on-board graphics and network hardware. Memory mapping takes advantage of the available memory area normally dedicated to slots in traditional DOS machines, using this area as random-access memory to hold the company's 3+ networking software.

Analysts, vendors and dealers who have seen the product praised 3Station's sophistication and compact design.

"In terms of compactness, ease of installation, technology sophistication and price, 3Com has a winner," said Ralph Gilman, a senior vice-president with Infocorp, a Cupertino, Calif.-based research firm.

IBM aims to lock up PC market

BY DOUGLAS BARNEY
CW STAFF

ANALYSIS

NEW YORK — IBM intends to regain control of the fragmented personal computer market with a rash of major PC, connectivity and software announcements this week that are intended to make life difficult for IBM's competitors.

High on the list of new products is a line of PCs with a proprietary bus, a new operating system based on Microsoft Corp.'s unreleased, protected-mode DOS with extensions developed by IBM and a higher performance implementation of the Token-Ring network. Layers of proprietary code are expected to make the machines very difficult to copy.

Taken together, the announcements indicate that IBM is attempting to convince MIS and data processing organizations to lock into IBM's personal computing and networking offerings.

MIS/DP and microcomputer managers will first have to decide whether to commit to a new 3½-in. floppy disk drive format, even though it may be better. Further, they need to determine whether a better bus is worth sacrificing compatibility with existing boards.

Strong signals

The announcements, which are largely strategic, will send out other strong signals to IBM's user base and competitors. According to the IBM strategy, the Intel Corp. 80286 chip is still a viable and growing architecture and will not be fully eclipsed by the 80386 chip in the near or immediate future.

But perhaps most important, the industry had better brace for a split in the market between the IBM camp and the myriad IBM Personal Computer compatible makers, which are sure to have difficulty cloning the next generation of IBM personal computers.

By splitting the market with semiproprietary PCs, IBM is forcing users to make some very tough choices. Users must decide whether to move away from the current industry standard and go to a new, enhanced IBM standard. Observers are divided on whether the computer giant can successfully change a standard that it no longer controls.

Good news, bad news

IBM reportedly is making changes to the standard for the sake of making cloning difficult and to add functionality in the form of higher capacity and more durable 3½-in. floppy disk drives, a higher performance bus and enhanced graphics.

IBM's expected networking announcements this week will be good news and bad news for Big Blue customers. On the positive side, the vendor's networking products should be getting long-overdue boosts in transmission rates. On the other hand, users may end up even more confused about which of IBM's networking products represent the main current of the company's marketing strategy.

According to one source, an announcement of the long-awaited 16M bit/sec. version of the Token-Ring next week is virtually certain. This raises the question of how easy — and desirable — it will be for 4M bit/sec. Token-Ring customers to upgrade.

Token-Ring as backbone

The source was told that upward migration requires a trade-in of interface boards and that IBM will provide a bridge between the two types of networks. This would mean that a 16M bit/sec. Token-Ring could be used as a backbone to connect multiple 4M bit/sec. rings, with minimal problems to the customer, he said.

However, there really is no need to connect personal computers over such a high-speed network. Observers speculate that the 16M bit/sec. Token-Ring will be oriented more toward the high end, with the first interface boards plugging into IBM's 9370 and 80386-based workstation.

Industry watchers are also puzzled by reports that IBM will introduce a version of Ethernet/Starlan, a 1M bit/sec., twisted-pair network that is a major element of AT&T's networking strategy. If IBM does make that announcement, it will probably target a particular niche rather than IBM customers at large, analysts speculate.

CW Senior Editors Ed Scannell and Elisabeth Horwitt and staff writer David Bright contributed to this report.

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MIPS offers second RISC line

BY JAMES CONNOLLY
CW STAFF

SUNNYVALE, Calif. — MIPS Computer Systems, Inc. introduced the second generation of its reduced instruction set computing (RISC) line last week with the announcement of a Unix-based system designed to be configured as a computer server, disk server, file server or multiuser system.

MIPS claimed the M/800 processes 8 million instructions per second.

"MIPS is a technology company supplying RISC building blocks at three key levels of integration: component kits, boards and full systems. With the M/800, we have demonstrated that the company can deliver higher performance in an aggressive time frame," said Al Sisto, MIPS vice-president of sales and marketing.

The M/500 can be converted to the M/800 with an $11,500 CPU board.

The standard configuration for the M/800 includes 8M bytes of memory with error-correcting code, a 12-slot VMEbus card cage, a 337M-byte disk drive and a 60M-byte tape drive. The M/800 is priced at $51,330 in quantities of 10. It will be available in July, according to MIPS.

Chip tariffs proposed in retaliation

Cabinet seeks revenge against Japan's alleged unfair trade practices

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — President Ronald Reagan's Cabinet advisers, seeking to retaliate against Japanese semiconductor makers for allegedly unfair trade practices, last week urged the president to impose high tariffs on a variety of Japanese products using chips, perhaps including personal computers, disk drives and laser printers.

The president was expected to make his decision late Friday or early this week on the recommendation by the Cabinet-level Economic Policy Council.

Industry sources said the tariffs — which raise the price of Japanese imports — would be placed on products produced by the same Japanese firms accused of predatory pricing of their semiconductors. Those firms include NEC Corp., Hitachi Ltd., Fujitsu Ltd., Oki Electric Industry Co. and Toshiba Corp.

"It's likely to involve end-product items that are carefully defined so that they target particular companies," said Jon Kent, an American Electronics Association spokesman.

Placing tariffs on the finished products, rather than on Japanese chips themselves, protects U.S. manufacturers that use Japanese chips from the higher prices.

But U.S. officials said they believe the action will send a strong signal that the U.S. has lost patience with Japan's alleged violations of the July 1986 U.S.-Japan semiconductor trade agreement.

Honeywell

FROM PAGE 1

are glad it finally happened. We weren't looking forward to having to change vendors and are happy that we don't have to," said Mike Finley, director of MIS for Grand Prairie, Texas-based amusement park operator Six Flags Corp. Finley said Honeywell and Bull officials have kept him posted about restructuring developments.

Of the $527 million in cash, only $177 million reflects the value of the assets being sold to Honeywell Bull by Honeywell. The remaining $350 million is composed of Honeywell Bull's return to Honeywell of paid-in capital, or Honeywell's original investment in Honeywell's Information Systems division, and the repayment of the Information Systems division's debt carried on Honeywell's balance sheet. Honeywell said it will use most of the cash to reduce long-term debt incurred through the $1.4 billion purchase of Sperry Corp.'s Aerospace Group in December 1986.

Stern described the venture as a unique combination in the industry that reinforces long-term relationships among the companies. "Three independent companies, each strong national competitors in their home markets, are pooling their resources to develop a powerful worldwide force rooted in the U.S., Europe and Japan," he said.

Meyer, who joined Honeywell after completing two years as president of Varian Associates, Inc. in 1986 and who previously managed Sperry Univac's commercial minicomputer operations, said total research and development expenditures by both Honeywell Bull and the French Bull will total $500 million this year. He added that the combined R&D of the three owners totaled more than $3 billion in 1986.

Noting that the three owner companies have worked together in various ventures since 1972, Meyer said that with the new relationship, "We will be able to move more quickly and effectively to help meet the needs of customers."

Honeywell began working with NEC in 1962, when it signed an agreement to provide the Japanese firm with technology and products and, in effect, spawned what has become one of the largest computer businesses not only in Japan but in the world, which in recent years has provided mainframes at the top end of the Honeywell line.

Honeywell became allied with Bull, which has specialized in minicomputer development for sale by Bull and Honeywell, when it acquired a 66% interest in the French firm through its acquisition of General Electric Co.'s computer business in 1970. Honeywell reduced ownership in Bull to 47% in 1976, when the French company merged with Compagnie Internationale pour l'Informatique (CII). In 1982, Honeywell sold half its interest in CII-Honeywell Bull to the French government, and the firm was nationalized.

Honeywell said it expects to be the largest customer for Honeywell Bull products, purchasing systems for use internally, for integration within its building and industrial automation systems and for resale through its Federal Systems Division, which was not included in the sale to Bull and NEC. The retention of the Federal Systems Division has been seen as a move to prevent any opposition to U.S. government purchases from a company controlled by foreign ownership. The U.S. government represents the largest sales base for Honeywell products.

Responding to the current U.S. climate for foreign ownership in light of the opposition to Fujitsu Ltd.'s forsaken acquisition of Fairchild Semiconductor Corp., Meyer said the companies have kept the government apprised and consider the venture "a done deal." Although NEC is not allowed to purchase further shares in the venture under the current agreement, Meyer noted that "anything is negotiable."

Reported by staff members Alan Alper, James Connolly and Clinton Wilder.

INSIDE LINES

We don't DB2 the PC. Norris van den Berg, IBM's advanced data base project manager in Santa Teresa, Calif., said last week in Washington, D.C., that IBM plans to put a relational data base product on each of its processors. Asked if that included the IBM Personal Computer, he said yes but that it would not be a version of DB2. "I suspect you don't have enough memory on a PC for DB2," he said, noting that much of DB2's underlying system was designed to make the data base management system work with IBM's MVS/XA operating system. With six million lines of code, MVS/XA will never be confused with a PC operating system.

Dusty museum setting. Most MIS managers think of disaster as fire or flood, but last week, Boston's surprised Museum of Fine Arts staff had to move its computer operations to a Wang hot site when dust from computer-room expansions brought the systems down.

Apple set to phone in. Northern Telecom and Apple are expected this week to jointly announce products that will provide communications among multiple Appletalk local-area networks (LAN) via Northern Telecom's Meridian SL1 private branch exchange system. Macintosh users on any of the connected LANs will be able to exchange files as well as share storage space on Memorybank 485, a 485M-byte storage subsystem designed for Macintoshes and Appleshare, a Northern Telecom spokesman said.

Sounds heady! DEC Senior Vice-President Win Hindle has had a major shift in responsibilities during recent weeks. Hindle, a 25-year DEC veteran, will now split his time between "executive committee issues" and "high-level customer business," according to a DEC spokesman. Hindle's responsibilities for corporate quality, purchasing, information systems, corporate planning and the internal corporate consultant group have been distributed among Jack Smith, senior vice-president; John Sims, vice-president of personnel and administration; and James Osterhoff, vice-president, finance. Hindle currently retains the corporate marketing and public relations functions, but, according to the spokesman, that area is in the process of being restructured while the search for a replacement for departed public relations chief David Price continues.

Pass the token. Sources say Novell has developed a version of its Netware to run over IBM's newly enhanced Token-Ring network. It's worth noting that IBM, which has turned to Novell once before for technical aid, is expected this week to release a new version of its PC Program network software. If IBM has decided to resell Netware with the Token-Ring, 3Com Chairman Robert Metcalfe concedes, "it will hurt us badly reputation-wise."

But will anyone be listening? Issues of American competitiveness, in general, and the new generation of microprocessors, in particular, will be aired at the National Computer Conference in Chicago in June during the keynote address by Robert W. Galvin, chairman of Motorola. Galvin's address is expected to cover his ongoing concern with America's challenge from Japan as well as Motorola's 68000 microprocessor and expected advances in personal computers and their integration with mainframes.

We vote for Rio. Two years ago, the fashionable way to announce computer products was on boats, such as luxury yachts cruising the Hudson River. More recently, introductions were being held in art galleries and museums. Now the popular setting is music. Control Data's introduction of its Cyber 930 departmental system was set in a Greenwich Village jazz club with the theme "930 In Concert." Next week, DG will host "Data General In Concert," a Chicago media event that includes seminars and receptions. However, rather than focus on a product announcement, DG will be proving how it works "in concert" with its customers.

Salty chips. After a two-month delay, Intel's Personal Computer Enhancement Operation has begun shipping its Inboard 386/AT add-in board for the IBM PC AT. A spokeswoman for the company said the hold up was caused by "compatibility issues."

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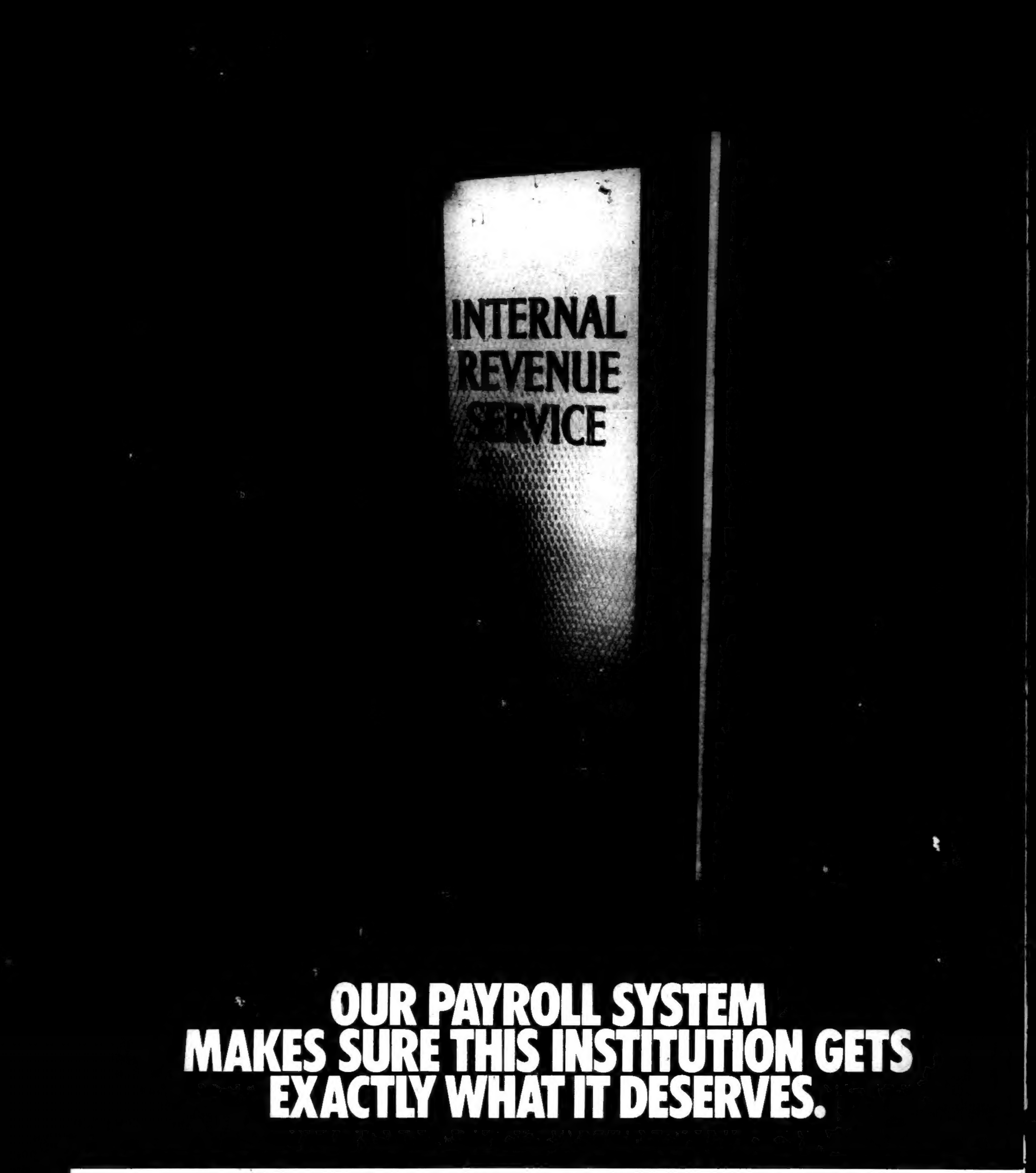

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